SP Electricity North West

Low Voltage (LV) Flexibility Strategy

Unlocking flexibility on the LV network using transparent criteria, robust systems, and inclusive processes.

1/16/26

Distribution System Operator

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1. About Us

SP Electricity North West is one of 14 Distribution Network Operators (DNOs) in the UK, regulated by Ofgem. We operate the local electricity network and distribute electricity to 2.4 million homes and businesses in the North West.

We are responsible for maintaining and upgrading 13,000 km of overhead power lines, more than 44,000 km of underground electricity cables and nearly 500 major substations across the region. We supply electricity to the diverse communities in the North West of England all the way from Macclesfield to Carlisle.

Figure 1 - SP Electricity North West service area

Our network in the North West is one of the most reliable in the country and we are investing £1.9 billion between 2023-28 to ensure we continue to deliver an excellent, safe and affordable service to all our customers.

From 1 April 2023, we entered a regulatory price control period referred to as RIIO-ED2, which runs until March 2028. During this period, we will see significant change in the way and amount of electricity that is generated, consumed and stored, driving innovation across the whole energy system both now and into the future.

2. Purpose of this Document

This document sets out SP Electricity North West's approach for assessing the flexibility requirements on our Low Voltage (LV) network, explaining how we determine *how*, *when* and *where* we procure flexibility services to manage constraints on our LV network.

It outlines the process, criteria and systems we use to estimate, tender and procure our LV flexibility requirements and products.

3. Document Audience

This document is intended for **all users of our network**, providing a clear explanation of how we assess the requirements for flexibility services across our LV network, while minimising both cost and carbon impact, and ensuring transparency.

It also serves **stakeholders and relevant authorities** by offering transparency into our process for assessing our LV flexibility requirements, enabling them to assess our efficiency and provide constructive feedback for continuous improvement.

Additionally, this document is designed to support existing and potential **LV Flexibility Service Providers** (FSPs) – i.e. customers connected to our LV network, such as homeowners, tenants, schools, small business, and local services – considering participation in flexibility services. It aims to help these customers better understand the nature of these services, the associated benefits and risks, and the guidance and support available from SP Electricity North West.

4. What are Flexibility Services

Flexibility services are arrangements where electricity customers connected to our distribution network agree to actively make temporary changes in the way they consume, generate, or store electricity to help DSOs manage network constraints during peak times or restore an outage/fault, in return for payment. These services are used to defer or avoid network reinforcement and enable faster and cheaper customer connections.

Customers that provide us with flexibility services are called Flexibility Service Providers (FSPs).

4.1. Managing Growing Demand in Low Voltage Networks

Flexibility services on low voltage (LV) networks are becoming increasingly important. As domestic and commercial electricity demand continues to grow - especially with the rise of electric vehicles (EVs) and heat pumps - local networks can become congested. LV flexibility helps avoid overloads on the LV network without upgrading infrastructure.

4.2. Expanding Flexibility Market Opportunities to Smaller Players

As a social DSO, we're committed to making flexibility markets more inclusive, fair, and accessible, especially for smaller participants. While customers connected to LV network have always been able to participate in our EHV and HV flexibility markets, by including focused LV flexibility requirements in our tenders (first launched in autumn 2024), we provide additional, targeted opportunities aligned with the scale and delivery capabilities of LV participants.

By reducing entry thresholds and focusing on LV-specific requirements, we're enabling a broader range of participants, such as tenants, homeowners, schools, small businesses, and community energy groups, to engage more and more easily. Whether participating directly or via an aggregator, these customers can now unlock new revenue streams, support decarbonisation, and play a more active role in the energy transition.

4.3. Our LV Flexibility Services Products

LV Flexibility requirements are tendered via two service types (products): **Peak Reduction** and **Scheduled Utilisation**. These services are delivered based on **fixed, pre-defined dispatch profiles**, which specify the service windows (months, days, and time of the day) and **required capacities** (kW).

The use of scheduled dispatch profiles reflects stakeholder feedback: participants prefer **advance visibility** of dispatch requirements, which improves recruitment and delivery reliability at the LV level.

Currently, our LV Flexibility Services are procured through one-year contracts.

For full details on the flexibility products and their parameters, please refer to our Product Parameters Guidance Document, available in our Flexibility Services Document Library.

5. How we evaluate our LV flexibility service requirements

5.1. LV Network monitoring

Our enhanced Network Management System (NMS) models the whole network down to Low Voltage (LV) and provides the ability to operate tele-controllable equipment (where installed) down to and including on the Low Voltage (LV) network.

During ED1 and ED2, we have significantly increased monitoring of the LV network, now covering over 70%[1] of domestic customers. As part of this effort, we are actively working to

[1] *As of November 2025.*

integrate smart meter data into our network planning processes to enhance visibility, forecasting, and decision-making.

5.1.1. PreSense

SP ENW is currently using PreSense units to monitor the electricity demand at secondary substations, particularly those serving a large number of customers. The data is processed in real-time and aggregated into half-hourly intervals. As of March 2025, 70% of LV customers are covered by PreSense. In the future, LV customer monitoring will be achieved using smart metering data and existing DNO network monitoring.

Substations selected for flexibility service deployment were chosen based on having over 20 days' worth of data in the current financial year. This ensured a sufficient number of data points across the monitoring period, particularly during winter, when demand is typically highest. **This monitoring data is used to identify the maximum demand at secondary substations.** An ongoing programme is in place to identify new LV sites for monitoring, aiming to expand coverage and improve network visibility.

5.1.2. Continuous Improvement in LV Monitoring and Control

Whilst real-time monitoring and control at the LV level is still evolving, significant progress has been made through the deployment of PreSense units, which provide valuable data for planning and forecasting. This data is not yet fully integrated into our real-time SCADA system, however it still lays a strong foundation for future enhancements. Our Active Network Management System (ANM) has the ability to monitor the flows of demand and generation on the HV and EHV networks (6.6kV-132kV) and can assert control right down to low voltage assets (230V). We continue to expand our monitoring capabilities and explore integration opportunities, we are steadily moving toward enabling wide-scale, real-time active network management for the entire network (230V-132kV).

This limitation is taken into account in our LV flexibility service products, introduced in our Autumn 2024 flexibility services tender, which utilise **fixed, pre-defined dispatch profiles**.

This approach provides clarity and predictability on service windows and volumes, helping to address the challenges of:

- **Limited demand diversity** within secondary (LV) substation feed areas.
- **Lower customer density**, which makes securing sufficient flexible capacity more critical.
- The need for **clear and predictable revenue signals** to incentivise participation.

5.2. Our approach to determine LV flexibility service requirements

Based on the above approach and limitations, our LV flexibility requirements are defined using the following approach:

- Non-real-time LV monitoring data: To determine our LV flexibility service requirements, we use on our PreSense monitoring data (half-hourly demand measurements at secondary substations). The PreSense devices are not part of our real time SCADA, but we use it as planning data in our long-term LV demand forecasts.

- Risk Management & Utilisation[2] Thresholds: To manage the risk associated with the absence of real-time data, we apply more tailored risk assumptions for the flexibility requirements on the LV network compared to those use at HV and EHV. More specifically:

    - Secondary (LV) substations: flexibility service requirements are proactively triggered before demand exceeds substation capacity, i.e. when the capacity utilisation is below 100%. In the absence of real-time monitoring, we typically apply an 80% flexibility need threshold, as outlined in the LV monitoring Engineering Justification Paper (EJP) for ED2. This proactive approach supports early intervention and enhances network resilience.

    - EHV and HV substations: Flexibility service requirements are typically triggered when forcasted or measured demand exceeds substation capacity, i.e. when the capacity utilisation is above 100%.

- Consistent/flat flexible capacity requirements (kW) for the secondary substations across the entire the service window: For each secondary substation identified as requiring flexibility services, we estimate the maximum *(peak)* flexible capacity (in kW) required during the service window. To manage the risks associated with limited demand diversity and lack of real-time data, we adopt a simplified approach: rather than using *variable* flexible capacity requirements (kW), each secondary substation is assumed to have constistent/flat **peak flexible capacity requirements (kW) across the entire service window**.
  → More details about the process we use for calculating the LV flexibility service requirements are provided in Section 6.

- Consistent service window across all secondary substations. All secondary substations within the same tender will require flexibility services within the same service window(s) and therefore have the same estimated utilisation hours.
  → More details about the process we use for calculating the LV flexibility service windows are provided in Section 6.

- Consistent ceiling price (£) across all secondary substations: For all secondary substations within the same tender, we offer the same total ceiling price in £. This single ceiling price is calculated using the average total expenditure (£) required to install a new secondary (LV) substation and the average annual flexible volume requirements (kWh) across all participating secondary (LV) substations. While the

[2] [2] ***Substation utilisation*** *is defined as the ratio of the actual load (power) handled by the substation to its maximum rated capacity.*
Utilisation (%) = (Actual Load/Rated Capacity) × 100.
For a substation having two transformers, utilisation is defined as the as the peak demand over the sum of the two transformers' rated capacity.
It describes how effectively an electrical substation is being used relative to its capacity. It helps utilities manage load, plan upgrades, and ensure reliability. High utilisation (e.g., >80%) may indicate the need for expansion or risk of overload.

ceiling price in £ remains consistent, the utilisation price in £/MWh might vary per substation depending on its kW requirements, and LV customers are paid based on the actual kWh of flexibility they deliver, ensuring fairness and accuracy in compensation.
→ More details about the process we use for calculating the ceiling price for LV flexibility services are provided in Section 7.

- This simplified method ensures more predictable service delivery and simplifies planning for both the DSO and flexibility providers. It is particularly useful in areas where network conditions are less dynamic, harder to schedule, or have limited monitoring capabilities.

6. How we calculate the LV flexibility service requirements and service windows

We use a combination of data analytics tools to identify when and where flexibility services are needed across our LV network. The process involves:

- **Data Preparation**: We cleanse and process electricity demand data from PreSense-monitored secondary (LV) substations to ensure accuracy.
- **Substation Selection**: Only secondary (LV) substations expected to experience high utilisation in the coming year are included within the analysis.
- **Identifying Service Windows**: Using this data, we identify the seasonal needs (dates of year) and daily needs (times of day) when demand is expected to exceed a capacity threshold, indicating a need for flexibility to secure network supply.
- **Capacity Requirements**: For each substation, we estimate how much flexibility (in terms of capacity in kW) is needed. This information is used to inform our procurement process and is shared with market participants through our tender documents.
- **Annual Volume Estimation**: We estimate the total flexibility volume (kWh) needed over the year to support pricing and procurement decisions.
- **Handling Data Gaps**: Where monitoring data is incomplete, we use typical demand values to fill gaps, ensuring selected secondary (LV) substations are included in the analysis.
- **Load Transfers**: Substations affected by load transfers are retained in the analysis to reflect potential similar future network behaviour. This is a risk averse approach that takes into account that the LV network is not dynamically (in real time) reconfigured.

7. Understanding how we pay for LV Flexibility Services

7.1. What is the ceiling price and why we use it?

The ceiling price is the maximum amount we are prepared to pay for each unit (kWh) of flexibility provided by FSPs. It reflects the cost of traditional network reinforcement (e.g., installing new substations) that would be needed if flexibility were not available. This ensures payments are fair, cost-effective, and transparent.

The ceiling prices for LV flexibility services are published on the ElectronConnect platform, in the tender appendices on the Flexibility Hub page on our website (including our latest and previous tenders), our Flexibility Map, and our Open Data Portal.

Our cost calculator is available to flexibility service providers (FSPs) to download and use as a tool to identify if their bid prices exceed the ceiling (maximum) price which SP ENW is offering as part of the current tender and calculate their optimal bid price.

7.2. How we set the Ceiling Price

When flexibility services are deployed to release network capacity at congested parts of our network (i.e. to defer or avoid traditional network reinforcement and/or accelerate a connection), the ceiling prices are calculated based on the costs that would be required to deliver the counterfactual network reinforcement. This pricing approach applies to all network levels, i.e., EHV, HV, and LV.

When flexibility services are used to release network capacity on the EHV and HV parts of our network, we calculate site-specific ceiling prices for each site (substation) that requires flexibility, based on bespoke reinforcement costs and flexibility requirements.

For LV flexibility services, we follow a similar but simplified process; we apply a *single* ceiling price (in £) across all LV sites (secondary substations) that have been identified to require flexibility services. The LV ceiling price calculation is based on the following inputs:

- **Counterfactual reinforcement cost (£).** This is the average total expenditure to install a new secondary (LV) substation. A single cost value for the whole programme of reinforcing secondary substations is considered.
- **Annual flexible volume requirements (kWh).** This is the average annual flexible volume requirement (kWh) across all secondary (LV) substations in the tender (calculated as described in section 6).

The above inputs are used in the CEM Tool to define the total ceiling price (£) that applies to all participating secondary substations. To get a ceiling price per kWh (£/kWh) for each substation, we simply divide the ceiling price (£) by the annual flexibility needed (kWh) of that substation.

Given FSPs for LV flexibility are predominantly domestic and small commercial customers, using a single ceiling price for all secondary substations within our LV flexibility services tender offers a number of benefits:

✅ Simple and predictable: FSPs do not need to worry about different prices for different locations.

✅ Fair: Everyone gets paid the same for the same service, no matter where they are connected.

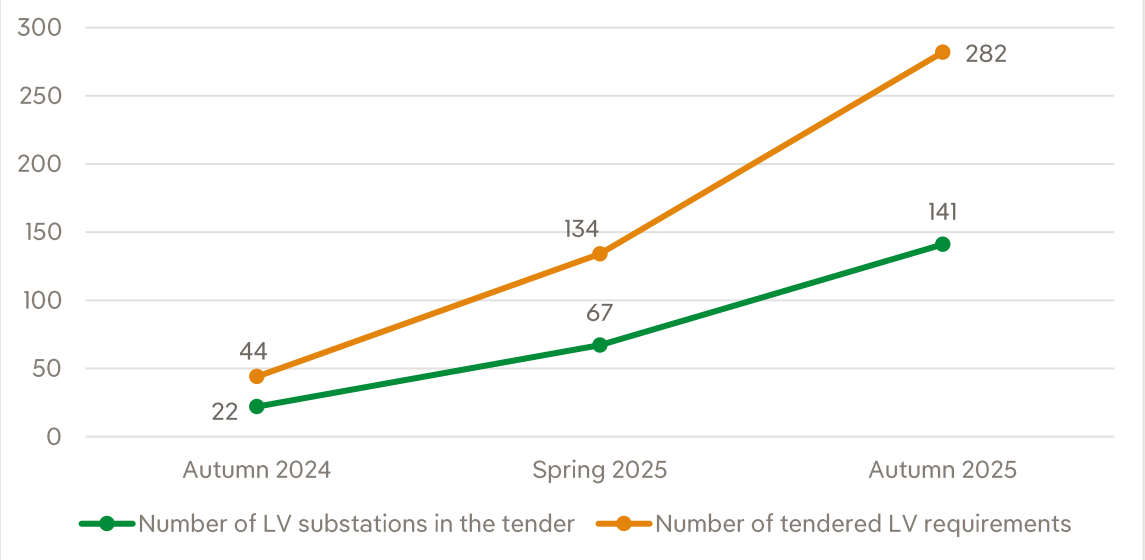
✅ Transparent: The price is based on real network costs and energy needs.

8. Historical Tender/Procurement of LV Flexibility Services

Our Autumn 2024 tender sought to procure 22 LV requirements across 11 LV substations, covering over 5,000 customers, offered via two types of Flexibility Services products: Peak Reduction and Scheduled Utilisation.

For the Spring 2025 tender round, we expanded opportunities for FSPs with more LV flexibility requirements, procuring 134 LV requirements across 67 locations in the North West.

For the Autumn 2025 tender, we are procuring 282 LV requirements across 141 different locations in the North West, covering nearly 110,000 LV customers.



9. Benefits of LV Flexibility Services

Low voltage flexibility is useful for several important reasons, especially as electricity distribution networks evolve to accommodate more distributed energy resources (DERs), more housing infrastructure, and changing demand patterns:

1) Enhances Grid Efficiency and Reliability

- Local balancing: Flexibility at the low voltage level (e.g. residential or small commercial) helps balance supply and demand locally, reducing constraints on the wider network.
- Congestion management: It can alleviate bottlenecks in the distribution system, especially during peak times.
- Increase network utilisation: We can get more out of the same/existing assets.

2) Supports Decarbonisation Goals

- Integration of renewables and Distributed Energy Resources (DERs): Low voltage flexibility enables better integration of rooftop solar panels, electric vehicles (EVs), and battery storage, which are often connected at the LV network. These resources can cause voltage fluctuations and reverse power flows, which traditional networks were not designed to handle. Flexibility services help manage these challenges by adjusting demand and/or generation.
- Reduced need for fossil-fuel-based peaking plants: By shifting or reducing demand, it lowers reliance on carbon-intensive backup generation that could be required to manage a network constraint of restore the network following a fault.

3) Avoids/Defers Costly Infrastructure Upgrades

- Instead of reinforcing the network with expensive, disrupting and time-consuming physical upgrades, flexibility allows SP Electricity North West to manage demand dynamically, saving money and time. This helps to keep bills low for customers.

4) Empowers Consumers

- Participation in flexibility markets: Households and businesses can earn revenue by offering flexibility services (e.g., shifting EV charging, using more efficient appliances or using battery storage).
- Improved energy management: Encourages customers to optimise their energy use using smart appliances or manual control.
- Demand reduction, especially though energy efficiency measures, can reduce energy bills.
- Smaller businesses reduce their carbon footprint.

5) Increases Resilience

- Flexibility can help maintain supply during faults or outages by rerouting power or reducing demand in affected areas.

6) Provides Easy Entry into Flexibility Services via Passive Flexibility

- With a lower participation threshold of 5kW, LV flexibility services open the door for more households and small businesses new to energy flexibility to participate in our flexibility market —regardless of technical expertise or lifestyle.
- LV flexibility offers a simple, accessible pathway by combining passive flexibility with energy efficiency measures. Participants can support the energy system and reduce their energy use without needing to actively manage devices or change routines.
    - By pre-scheduling energy use (either manually or automatically via smart devices or appliances with scheduling features) according to grid needs, participants help create a more stable and sustainable energy network while generating additional revenue.
    - LV flexibility providers can also participate in LV flexibility services by implementing energy efficiency upgrades, such as LED lighting, more efficient appliances, or insulation. These measures reduce their overall consumption and enhance their flexibility potential, offering a low-effort, dual-benefit approach: lower bills and flexibility payments.

10. Moving Forward

Looking ahead, we anticipate a scaling up of LV flexibility requirements, supporting the growth of residential flexibility and energy efficiency markets, while continuing to meet our responsibilities as a neutral market facilitator.

To ensure our approach remains responsive and effective:

- We will refresh our LV flexibility guidance annually, incorporating any updates to our assessment methodology.
- This process will be informed by ongoing stakeholder engagement, enabling us to evaluate and continuously improve how we define and procure LV flexibility services.

This iterative approach ensures our services remain aligned with market needs, technical capabilities, and regulatory expectations.

11. Engage with us

If you want to speak to the team about our Flexibility Services, please get in touch at flexible.contracts@enwl.co.uk. We encourage feedback and collaboration to continuously improve our processes and services.