SP Energy Networks | DSO

Network Development Plan

Summary Report

May 2026

Contents

1 Welcome to our Network Development Plan

Welcome to SP Energy Networks' (SPEN's) Network Development Plan (NDP). This suite of documents sets out how we will respond to the future electricity demand and generation growth identified through NESO's transitional Regional Energy System Plan (tRESP) and our Distribution Future Energy Scenarios (DFES) – it sets out how we plan to deliver the network capacity required to support a secure, timely, and cost-effective transition to Net Zero.

Electricity networks are central to decarbonising our society and facilitating regional economic growth. The scale of decarbonisation means that by 2050 the peak demand on our distribution network is forecast to double (primarily due to the electrification of transport and heat), and we will likely see a four-fold increase in generation and storage. These changes are forecast both in NESO's tRESP and our own DFES.

The purpose of the NDP is to respond to these forecasts. We know from detailed modelling that this new demand, generation, and storage will increasingly push the distribution network beyond what it is designed for. The NDP identifies where and when network constraints are likely to emerge, and sets out how we will address them. This includes determining the most appropriate mix of network reinforcement, flexibility services, and innovative solutions to meet customer needs while delivering value for money.

However capacity provision is only part of the answer – as the energy system becomes more distributed and dynamic, the way we plan, develop, and operate the network must also continue to evolve. The NDP reflects this shift, and how we have moved beyond reinforcement only approaches to consider a much broader range of planning and operational interventions. Flexibility services, innovative operational tools, and enhanced network visibility are now integral components of our planning approach, and are all assessed to determine the most efficient response to network constraints.

The scale and pace of change identified in tRESP and DFES means that the NDP includes a level of network intervention significantly greater than has been required historically. These interventions are targeted, evidence-based and proportionate, focusing on locations where DFES shows credible and sustained growth in demand or generation. In doing so, the NDP supports the enablement of customers' decarbonisation ambitions and regional growth targets while maintaining network security, reliability, and affordability.

The NDP also plays a critical role in linking long-term system planning with delivery. It provides the foundation for our RIIO-ED3 business planning, informs engagement with stakeholders and Local Authorities, and supports coordination with NESO and wider system partners. By clearly setting out how tRESP and DFES outcomes translate into network actions, the NDP enables greater transparency and confidence for customers, developers and stakeholders.

We welcome continued engagement on the NDP and DFES. Sharing data, maintaining open dialogue, and working collaboratively with our stakeholders are essential to delivering a successful and fair transition to Net Zero, and to ensuring that network investment is delivered where and when it is needed most.

2 Introduction

2.1 Who we are

We are SP Energy Networks. We own and operate the electricity distribution network in Central and Southern Scotland (our SP Distribution network), and in North Wales, Merseyside, Cheshire, and North Shropshire (our SP Manweb network). It is through these two networks of underground cables, overhead lines, and substations that we provide our 3.5 million customers with a safe, reliable, and efficient supply of electricity.

2.2 Document context and purpose

Sharing data is key to the efficiency of the energy system as we decarbonise to Net Zero. It enables customers and stakeholders to assess market opportunities and participate in flexibility markets, in turn promoting the efficiency and competitiveness of these markets. It enables network companies and key stakeholders to work together to promote efficient whole system planning and operation and spur innovation and new solutions benefitting all customers.

In this context, Ofgem introduced Standard Licence Condition 25B to require each DNO to publish a Network Development Plan (NDP), setting out a high-level scope of what was to be included and a Form of Statement was published in December 2021 for DNOs to follow.

The primary objective of the NDP is to provide information on available network capacity to accommodate demand and generation growth, and interventions the DNO plans, which will increase network capacity (such as reinforcement and flexibility use). The NDP is a medium-term outlook, and is designed to sit between Long Term Development Statements (LTDS) looking five-years ahead and long-term Distribution Future Energy Scenarios (DFES) forecasts looking out to 2050.

Each DNO's NDP must cover three main components:

1. **Part 1: Development report** – detailed information on the interventions we plan that will increase capacity. This includes non-load interventions which are not done to provide capacity but will increase capacity nonetheless (e.g. asset management interventions such as replacing an end-of-life transformer with a larger equivalent)[1].
2. **Part 2: Network scenario headroom report** – the indicative demand and generation capacity available at each primary substation (down to and including the HV busbar). Forecasts are produced for every year for the first 10 years, and then for every five years after that out to 2050. These capacity forecasts must take account of financially approved interventions which will increase capacity.
3. **Part 3: Methodology statement** – a document explaining how we have produced Parts 1 and 2.

Parts 1 and 2 need to be produced for each DNO licence area, down to primary substation group (i.e. the NDP does not include network interventions and capacity headroom for the LV and HV networks).

[1] Non-load interventions that increase network capacity (included in the document) are assumed to be due to switchgear and transformer asset-risk driven replacements. Where this is done on a like-for-like basis, there will be no network capacity increase.

Therefore, to meet our NDP licence obligation we publish four NDP documents[2]:

1. A **summary** document to introduce our NDP, set out strategic context and summarise the contents. **This document.**
2. A pdf report and supporting excel datasheet for **SP Distribution**, covering Parts 1 and 2.
3. A pdf report and supporting excel datasheet for **SP Manweb**, covering Parts 1 and 2.
4. A single document for Part 3, covering SP Manweb and SP Distribution together as the **methodology** is the same for each. This includes how we have incorporated **stakeholder feedback** we have received.

Figure 1 shows the document map for these four documents.

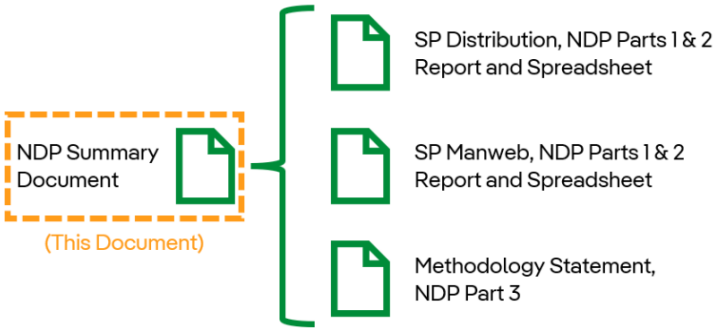


Figure 1: SP Energy Networks' NDP document map

2.3 How this NDP links to our RIIO-ED3 Business Plan

The NDP contains our analysis of where and when network constraints are likely to emerge. This means it's a key input to our planning on what interventions we need to deliver over the RIIO-ED3 period (April 2028 – March 2033). Given that our RIIO-ED3 Business Plan is due for submission to Ofgem in December this year, we're at an advanced stage but development and optioneering of proposed interventions is still on-going. If you would like to get involved, we would welcome your feedback and input, please contact us on: **systemdesignteam@spenergynetworks.co.uk**

In the NDP Part 1 reports, in addition to financially approved interventions in RIIO-ED2 (April 2023 – March 2028), we have signposted locations that our modelling has indicated will exceed capacity in the RIIO-ED3 period due to the growth in our tRESP informed DFES. Interventions in the RIIO-ED3 period will be subject to regulatory approval[3] and optioneering will continue to progress through 2026 as we work with stakeholders to identify the optimal network interventions.

In the NDP Part 2 (Network Scenario Headroom Report) headroom calculations consider financially approved network developments. This means the capacity headroom values do not yet reflect the capacity release associated with any RIIO-ED3 interventions.

[2] www.spenergynetworks.co.uk/NDP
[3] Ofgem's Final Determination is expected in December 2027

3 Our Network Development Plan

3.1 Overarching process

The process below summarises how we produced NDP Parts 1 and 2 for SP Distribution and SP Manweb. For further details please refer to NDP Part 3 Methodology Statement.

- **Step 1, forecasting:** we develop our network to accommodate our customers' demand and generation requirements. Therefore, the first step of network planning is to understand what these are. We do this using the outcomes of our Distribution Future Energy Scenarios (DFES), which directly apply NESO's tRESP pathways and Consistent Planning Assumptions (CPAs), as well as reflecting stakeholder input, ensuring national, regional and local alignment.
- **Step 2, network impact assessments:** we undertake industry-leading assessments to understand where, when, and how much additional network capacity is needed to accommodate these forecast customer requirements.
- **Step 3, options assessment for load-driven investment:** to provide the capacity in the optimal way, we fairly and impartially assess different types and combinations of interventions (flexibility, energy efficiency, smart, innovation, and reinforcement), different delivery models (reactive, proactive), and how they could be coordinated with other interventions to reduce customer cost and disruption.
- **Step 4, flexibility tenders:** where our assessments show we need additional capacity, we tender for flexibility services to understand the availability and cost of using flexibility to provide it.

These four steps identify the load interventions we will make that add network capacity – these are a key input to NDP Parts 1 and 2. Whilst these create the majority of the additional capacity we will deliver, the NDP requires that we include all interventions that increase capacity.

For this year's publication, we have also signposted locations of indicative interventions that are in the process of being planned for the next price control period. These signposted interventions remain subject to regulatory approval and are therefore provided for information only.

- **Step 5, NDP Part 1 – reporting of network interventions which add capacity:** we combine the load driven interventions identified in steps 1-4 with connections-driven, losses-driven, and non-load driven interventions which add capacity, to produce NDP Part 1.

After these five steps we know all the interventions we plan to make that will add capacity – this means Part 1 of the NDP is complete. To complete Part 2:

- **Step 6, NDP Part 2 – reporting network scenario headroom:** combining our existing network model, our scenario forecasts, and our known intervention plans to calculate the "post-intervention" headroom. Our NDP Part 2 Capacity Headroom spreadsheet data files provide an indication of headroom for each primary substation/substation group for each year through to 2050.

3.2 NDP Scope

The scope of the Network Development report (Part 1) and Network Scenario Headroom report (Part 2) and are summarised below.

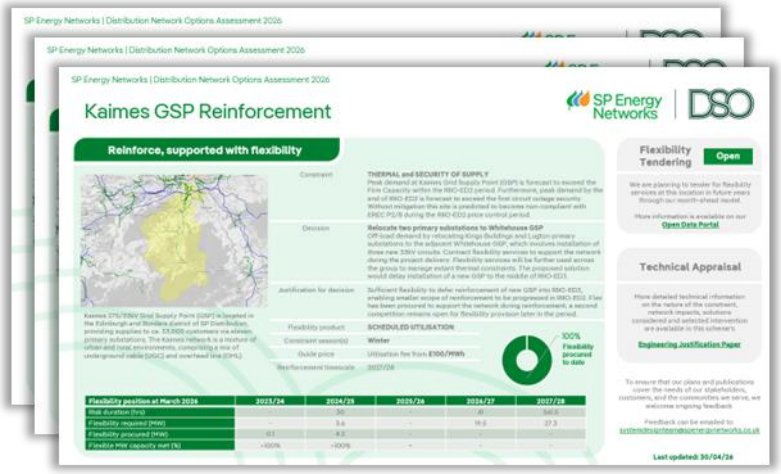
<table>
<tr><th>Documents</th><th>Network Development</th><th colspan="2">Network Scenario Headroom</th></tr>
<tr><td>Date range</td><td>Planned interventions for the next 10 years.</td><td colspan="2">Up to 2050.
Consideration to 2050 matches the DFES date range and so can reflect the uncertainty on long term network impacts.</td></tr>
<tr><td>Reporting granularity</td><td>Location, magnitude (MW) and timescales of interventions.</td><td colspan="2">Every year for the first ten years.
Every five years beyond that to the end of 2050.</td></tr>
<tr><td>Network coverage</td><td>All Primary substations (33/11 kV).</td><td colspan="2">All Primary substations (33/11 kV).
NOTE: In Scotland the 132/33 kV substations are considered as Grid Supply Points (GSPs), and are excluded from this document.</td></tr>
<tr><td>Forecast scenarios</td><td rowspan="4"></td><td colspan="2">Load scenarios based on DFES for all years up to 2050.</td></tr>
<tr><td>Reported headroom</td><td>Demand</td><td>Generation</td></tr>
<tr><td>Network parameters underlying headroom calculations</td><td>Thermal loading</td><td>Thermal loading (including reverse power flows)
Fault level</td></tr>
<tr><td>Evaluation methodology</td><td colspan="2">Detailed analysis for the short-term where practical.
Simple tabular comparisons for the longer-term to 2050 (loading versus firm capacity).</td></tr>
</table>

3.3 Distribution Network Options Assessment (DNOA)

For every location where our network assessments have identified that there will be insufficient network capacity to meet customer needs, we have a decision to make – how should we best intervene to provide the capacity? Our **DSO Decision Making Framework**[4] provides detail and transparency on the processes we follow to impartially select optimal solutions, and how we decide when and where to rely on flexibility services instead of other network interventions.

The outcome of these decisions is published in our NDP Part 1, where we list the interventions we have planned, grouped by GSP. Where these are driven by a requirement for capacity, we provide a link to our detailed Engineering Justification Paper (EJP) to give transparency in the decision making process at a scheme-by-scheme level.

We have continued the publication of Distribution Network Options Assessments (DNOA) to provide stakeholders with more information on individual scheme decisions. This provides an overview of the individual constraint, how we are managing it, and where flexibility forms part of our solution, we provide details of the flexibility requirements at this location. Following the move to monthly tendering for flexibility, the annual DNOA publication will signpost upcoming longer-term requirements. We intend to publish our DNOA annually, but we may refresh information more frequently if there are any changes in our decision making at individual sites.



We published our DNOA scheme pages for the first time in the 2024 NDP documents, which received positive stakeholder feedback with suggestions for improvement. We have addressed feedback since then, and in published details of additional sites this year. There are links to DNOA scheme pages in the reporting of network interventions throughout the NDP Part 1.

3.4 Stakeholder engagement

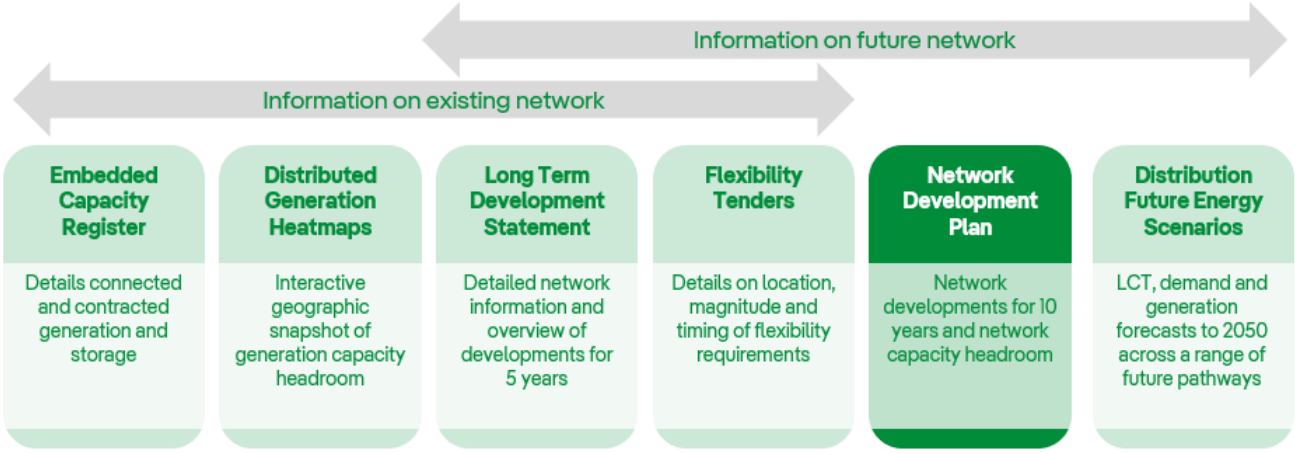
Since our first NDP publication, we have worked closely with stakeholders to ensure our publication meets the local and regional needs. Communications have been sent to a wide range of stakeholders, and we have received detailed feedback directly from stakeholders and through our NDP surveys. We would like to thank stakeholders for sharing their views with us. A summary of this feedback and the actions we have taken is available in our NDP Methodology Statement.

We are committed to ensuring our publications and processes deliver the most value to our stakeholders and continue to develop to their needs. For this reason, we are keeping our NDP survey live; this can be found on our website[5]. Alternately, you can continue to provide your feedback by email to systemdesignteam@spenergynetworks.co.uk. These will be monitored and fed into our next publication.

[4] Our Decision Making Framework is available here: DSO Decision Making Framework - SP Energy Networks
[5] Our NDP is available here: https://www.spenergynetworks.co.uk/pages/network_development_plan.aspx

3.5 How the NDP and DNOA fits with other data provision

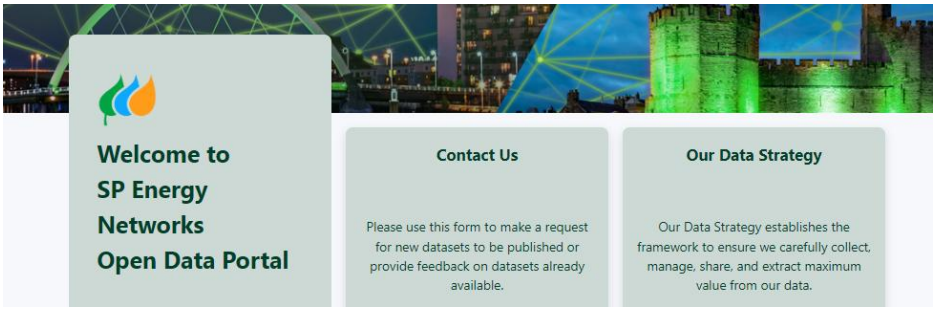
Publishing our NDP is just one measure we are taking to increase the transparency of how we plan and operate our distribution network, and is aligned with our approach of sharing an increasing range of network data with stakeholders. Other current data provision includes:



- **Embedded Capacity Register**[6] – previously known as the System Wide Resource Register, this currently provides information on generation and storage resources (≥50kW) that are connected, or accepted to connect, to our distribution network. It is updated on the 10th working day of each month.
- **Heatmaps**[7] – these provide a geographic view of where there is available network capacity to accommodate new generation and demand.
- **LTDS**[8] – these statements contain a range of information on our 33kV and 11kV network. This includes network asset technical data, network configuration, geographic plans, fault level information, demand and generation levels, and planned works. This information helps customers identify opportunities and carry out high level assessments on the capability of the network to accommodate new demand and generation. The main update is published every November with a minor update every May.
- **Flexibility tenders**[9] – we tender for flexibility for all viable network constraints. When we run tenders we publish information on the location, magnitude, and duration of the constraint. In some cases we will also send ceiling price information. In 2025, we moved to a monthly flexibility tender model, which is further supported by our Market Prospectus[10] that aims to provide improved clarity on the future market opportunities.
- **DFES forecasts**[11] – these provide long-term forecasts for key customer demand, generation and storage metrics out to 2050 and form the forecasting evidence base for the NDP. DFES forecasts are derived directly from NESO's tRESP pathways and Consistent Planning Assumptions, ensuring alignment with national strategy and Clean Power 2030 by construction. DFES applies these pathways at greater spatial resolution, informed by stakeholder engagement and local planning evidence, and is updated annually

[6] Our Embedded Capacity Register is available here: Embedded Capacity Register - SP Energy Networks
[7] Our heatmaps are available here: Distributed Generation Heat Maps - SP Energy Networks
[8] Our LTDS is available here: Long Term Development Statement - SP Energy Networks
[9] Our flexibility services and tenders are available here: Flexibility Services - SP Energy Networks
[10] Our Market Prospectus is available here: Distribution Flexibility Service Market Prospectus
[11] Our DFES is available here: Distribution Future Energy Scenarios - SP Energy Networks

3.6 Our commitment to open data



Our Open Data portal provides a single, easy-to-access interface for our users, enabling them to easily explore, filter, view, download and consume our available data. Via our portal, stakeholders can:

- Download data in multiple formats
- Consume data via an API
- Feedback on datasets
- Subscribe for datasets specific updates

We are committed to becoming a data-centric organisation, harnessing the power of data to drive strategic decision-making, foster innovation, and embrace sustainability. We recognise that access to data, and information, will be a key enabler in our ability to achieve net zero, and that we have an important role in facilitating efficient whole system planning and operation, and supporting the development of new markets and opportunities. We are committed to sharing data with our customers and stakeholders on a "presumed open" basis. Through our ongoing engagement, we are aware that stakeholders require access to data and information about our network to develop accurate plans, enhance project proposals, and to understand their impact on our network. It is also important for transparency that our decision making and our future plans are shared with our stakeholders, allow them to feedback their views and to use this data and information to inform their decision making.

To enable us to efficiently and effectively share our data, we have developed and launched an online "Open Data Portal". This portal was launched in 2023 and can be freely accessed by our customers and stakeholders via the SPEN website. The site enables users to search, view, and export datasets in simple, standardised format. Users can easily search our data catalogue and detailed metadata, as well as independently download, export and consume data via an API. We are also working to develop the visualisation capabilities of the portal, enhancing the provision of information for users. Our datasets are easy to find in our Open Data Portal. Users have the ability to search on keywords and themes of the datasets. We also have detailed descriptions and definitions in place to support our stakeholders to understand the content. Work has been carried out this year to implement standardised terms in our Open Data Portal , and we are now looking forward to working with the wider industry to ensure that these terms align.

We make it easy for stakeholders to access our data, with all our openly published, and shared, datasets hosted on our Open Data Portal. The portal is accessible via our SP Energy Networks website, and we have recently undertaken changes to our website to promote visibility, providing our stakeholders with a clear and simple path to access our data. All datasets have been transitioned to our Open Data Portal, meaning that our Stakeholders do not need to visit more than one location when looking for access to our data. We have also uploaded the datasets that underpin our strategic documentation into the Open Data Portal, facilitating our Stakeholders to download the datasets and perform their own analysis. We recognise that not all stakeholders have the same requirements when it comes to accessing data and that is why we make our datasets available in a number of formats including CSV, Excel and JSON, and with the ability for them to be downloaded via an API. We also work alongside our stakeholders, where possible, to provide data in their preferred format. As an example, we have converted our GIS Shapefiles into Excel format following a stakeholder request in January 2024.

We embrace continuous review and improvement of the data that we publish to better meet our stakeholder needs. Shortly after implementation of our Open Data Portal, we uploaded our GIS Shapefiles onto our Portal, under a shared data licence, in direct response to high stakeholder demand. Access to these files has been well received by our stakeholders and we continue to work alongside them to identify opportunities for refinement, whilst always ensuring a robust data triage assessment is applied prior to publication. In October 2023, we extended our GIS Shapefiles to include additional information on poles and stays, and non-powered cables and lines in direct response to working with our stakeholders.

4 Strategic Context

Electricity networks are at the heart of the transition to a Net Zero energy system. The scale, pace and geographic concentration of change now facing distribution networks is unprecedented, driven by the electrification of transport, heat and industry alongside rapid growth in renewable generation and electricity storage. This Network Development Plan (NDP) responds to the outcomes identified through our Distribution Future Energy Scenarios (DFES), within an increasingly coordinated whole-system planning framework

4.1 Whole system planning and national context

The energy system is undergoing a fundamental shift towards more coordinated, whole-system planning. NESO now plays a central role in setting strategic direction across electricity supply, demand and infrastructure through the tRESP, which reflects national and devolved government policy, including the ambitions set out in Clean Power 2030.

The tRESP provides a consistent set of pathways and Consistent Planning Assumptions that define the scale and timing of future change across regions. These pathways form the basis of our DFES and, in turn, provide the demand- and generation-led evidence base for this NDP. This alignment ensures that distribution network planning is coordinated with national strategy and wider system development, and that investment decisions across RIIO-ED3 are informed by a common evidence base.

4.2 Key drivers of change for distribution networks

Across SPEN's distribution licence areas, several strategic drivers are reshaping how electricity networks must be planned and developed:

- **Electrification of transport, heat and industry**, increasing both total electricity demand and peak demand.
- **Rapid growth in distributed generation and electricity storage**, changing the direction, timing and variability of power flows.
- **Rising and increasingly localised peak demand**, particularly where electrification and industrial growth coincide.
- **Spatial clustering of growth**, driven by transport corridors, industrial zones, urban development and renewable resource availability.

These drivers mean that future network requirements are not evenly distributed and cannot be addressed solely through traditional reinforcement approaches. These factors are captured in our DFES publication and drive our NDP process.

4.3 Transmission network capacity and co-ordination

Distribution network development is increasingly shaped by the capacity and capability of the transmission system. High levels of renewable generation, particularly in Scotland, are driving sustained north–south power flows, while new sources of large demand and generation in England and Wales are increasing pressure on transmission interfaces. In parallel, some regions with historically low levels of infrastructure are now expected to accommodate materially different demand and generation patterns as decarbonisation accelerates.

As a result, distribution networks must be planned in close co-ordination with transmission investment and operational arrangements. This includes accommodating non-firm access, managing constrained operation where appropriate, and aligning the timing of distribution interventions with transmission reinforcements to avoid inefficient or premature investment.

For stakeholders across the SPM area, the Mersey Ring is a strategically important element of the transmission system. Planned upgrades associated with the Mersey Ring are expected to play a key role in enabling long-term economic growth, industrial decarbonisation and increased electricity demand across parts of the North West of

England and North Wales. From a distribution perspective, anticipated changes to transmission capability will influence where and when distribution capacity is required, and how best to sequence network interventions.

In Wales, and particularly in Mid Wales, long-term electricity capacity requirements present a distinct strategic challenge. Existing infrastructure in these areas was originally designed to serve low levels of rural demand, with limited provision for large-scale generation or electrified industrial growth. However, Mid Wales has significant potential to support renewable generation and wider decarbonisation ambitions, meaning that future network requirements are expected to differ materially from historical patterns. While near-term needs can be managed through efficient use of existing assets and targeted distribution-level measures, meeting long-term demand and generation requirements will require coordinated transmission and distribution solutions, developed in alignment with national and regional system planning.

In parallel with longer-term transmission investment, SPEN is enabling earlier connection of strategic demand through the use of Load Management Schemes (LMS). These arrangements allow certain large demand customers, such as hydrogen production facilities and data centres, to connect on a managed or curtailable basis, enabling access to network capacity ahead of full transmission reinforcement. LMS provides a pragmatic, whole-system solution that supports timely industrial decarbonisation and economic growth while maintaining system security. By coordinating distribution and transmission planning in this way, LMS helps avoid unnecessary delays to connection, reduces the risk of over-building network capacity, and ensures that infrastructure delivery under RIIO-T3 and RIIO-ED3 is better aligned with the pace of customer demand.

Transmission investment decisions under RIIO-T3 will therefore play a critical role in unlocking distribution capacity across SP Energy Networks' licence areas. The NDP reflects this growing interdependence, ensuring that distribution network planning is aligned with expected transmission developments and wider whole-system delivery.

4.4 Industrial decarbonisation and Net Zero Industrial Pathways (NZIP)

Industrial decarbonisation is emerging as a major driver of future electricity demand, with large industrial sites and clusters exploring electrification, hydrogen and hybrid pathways as part of their transition to Net Zero. These changes can result in substantial, time-critical demand growth that is highly location-specific and closely linked to wider infrastructure availability.

Building on the lessons learned from regional initiatives such as NEWID, SPEN is developing the **Net Zero Industrial Pathways (NZIP)** innovation project. NZIP expands this approach across both SP Distribution and SP Manweb licence areas, providing a structured framework to engage with industrial stakeholders, understand decarbonisation pathways, and translate these into credible signals for network planning.

Insights from NZIP inform DFES forecasts and help ensure that the NDP reflects realistic industrial growth trajectories, supporting proactive and coordinated network investment while managing uncertainty around technology choice and delivery timescales.

4.5 Increase in other large demand connections

Beyond domestic electrification and industrial clusters, there is growing demand from large commercial customers, including data centres and major developments. These connections can be material in scale, highly location-specific and sensitive to delivery timescales.

The pace and concentration of large demand connections introduce additional complexity into network planning, particularly where multiple developments coincide or interact with other strategic drivers. The NDP considers these emerging requirements as a key driver of future capacity needs, informed by DFES outcomes and ongoing engagement with customers and stakeholders.

4.6 Electrification of Transport – major ultrafast charging network

Electrification of transport remains a major driver of network change, extending beyond private vehicle uptake to include high-capacity charging infrastructure, freight and fleet electrification. Motorway service areas and strategic

transport routes are expected to see particularly concentrated demand growth, often requiring substantial capacity within constrained timeframes.

These forms of demand are distinct from domestic EV charging and have different implications for network planning. The NDP reflects the strategic nature of transport electrification, recognising the importance of coordination with transport authorities, Local Authorities and national infrastructure programmes.

4.7 Supporting our Local Authorities and strategic projects

A Local Authorities play a central role in shaping future electricity demand and generation through spatial planning, heat decarbonisation strategies and transport initiatives. SP Energy Networks works closely with Local Authorities across its licence areas to support Local Heat and Energy Efficiency Strategies (LHEES), Local Area Energy Plans (LAEPs) and Local Development Plans.

A key mechanism for ensuring that local ambition is reflected within DFES and, in turn, the NDP is our **Register of Strategic Projects**. This register provides early visibility of developments that may act as catalysts for decarbonisation or economic growth, including cross-vector projects, industrial clusters and regionally significant developments. By capturing location, indicative capacity requirements and expected phasing at an early stage, the register ensures that credible local plans are incorporated into DFES forecasts and therefore flow directly into network development planning.

4.8 What this means for the Network Development Plan

Taken together, these strategic drivers reinforce the need for a proactive, evidence led approach to network development. The NDP responds to DFES and tRESP identified outcomes by assessing where capacity constraints are likely to emerge and identifying the most appropriate mix of interventions, including reinforcement, flexibility and innovative solutions.

Coordination with transmission planning, Local Authorities, NESO and wider system partners is essential to ensure that network investment is delivered efficiently and supports the transition to Net Zero. The remainder of this NDP sets out how these strategic considerations translate into specific network assessments and planned interventions.

5 Developing a network for Net Zero

5.1 Our role as a Distribution System Operator

Our role as a DSO is increasingly focused on anticipatory, evidence-led system planning, informed by whole-system coordination. NESO's transitional Regional Energy Strategic Plan (tRESP) now provides the strategic pathways and Consistent Planning Assumptions that define future electricity demand and generation across Great Britain. These are applied directly through our Distribution Future Energy Scenarios (DFES), ensuring alignment with national policy, Clean Power 2030 and regional planning priorities by construction.

DFES translates these strategic pathways into a granular, distribution-level view of future customer requirements. This provides the foundation for our network development planning and underpins the Network Development Plan (NDP). Understanding how our customers and stakeholders intend to use and access the network is therefore critical. Our ability to plan efficiently and cost-effectively relies on close collaboration with customers, Local Authorities, developers and system partners, ensuring that emerging ambitions and behaviours are reflected within DFES and, in turn, the NDP.

To support this role, we continue to develop industry-leading analytical and optimisation tools that enable us to identify where, when and how network capacity is required. These tools support impartial assessment of investment options across reinforcement, flexibility and innovative solutions. Building on this capability, we are also developing tools and data products for our stakeholders, helping them to better understand network constraints, optimise their plans and engage earlier and more effectively with the network.

5.2 Our DSO Strategy

As part of our transition to a smarter, more flexible energy system, we are evolving to enhance network efficiency, enable greater customer participation, and support the UK's Net Zero targets. By improving network visibility, optimising the use of distributed energy resources (DER), and fostering market-based flexibility, we are driving a more resilient, reliable, and decarbonised electricity system.

We have updated our approach to DSO, building it around four key customer outcomes. These outcomes have been tested with, and are supported by, our stakeholders. These outcomes ensure our network evolves to meet future energy demands while delivering value, enhancing reliability, and enabling the transition to Net Zero for our customers. They provide a clear framework for how we will operate, engage, and make decisions in a way that supports customers, stakeholders, and the wider energy system.

5.3 Delivering DSO Infrastructure

We are delivering DSO network infrastructure, tools and capabilities. These are outside the scope of the NDP, but are relevant as they help make better use of existing capacity, better target load-driven interventions, and increase the range of tools we have available to create capacity – these all help provide the capacity our customers need.

The following are key examples of the DNO network infrastructure and tools we are in the process of delivering:

1. Scalable network management and flexibility dispatch infrastructure

Constraint Management Zones (CMZs) enable greater use of customer flexibility, automation, and provide operational tools to provide capacity instead of reinforcement. CMZs include advanced control systems that actively coordinate and dispatch operational solutions. These help to save money by avoiding significant reinforcements and help make best use of existing capacity. As an example, one functionality of CMZs is to automatically manage the output from large generators, such as wind farms, to ensure that network electricity flows don't exceed what the network is capable of. We are also developing our CMZs with additional functionality such as flexibility service coordination to enable real time dispatch, active fault level management to maximise capacity for generation, and coordination of System Restoration in the unlikely event of a national power issue. Currently, we have deployed 19 CMZs, as shown in Figure 2.

In RIIO-ED2, we will deliver 12 more CMZs, taking the total number to 31. We will also extend their functionality to help our control team manage the increasingly complex and interactive network. This next generation of CMZs will coordinate and dispatch operational solutions – using network models, live data from network monitors, and automated analysis, they can make better decisions in shorter timescales than humans can to keep network power flows within limits and defer the need for reinforcement.

CMZs, along with the active network management (ANM) platform, are a key component to enable a smarter and more flexible network that safely makes best use of existing network capacity.

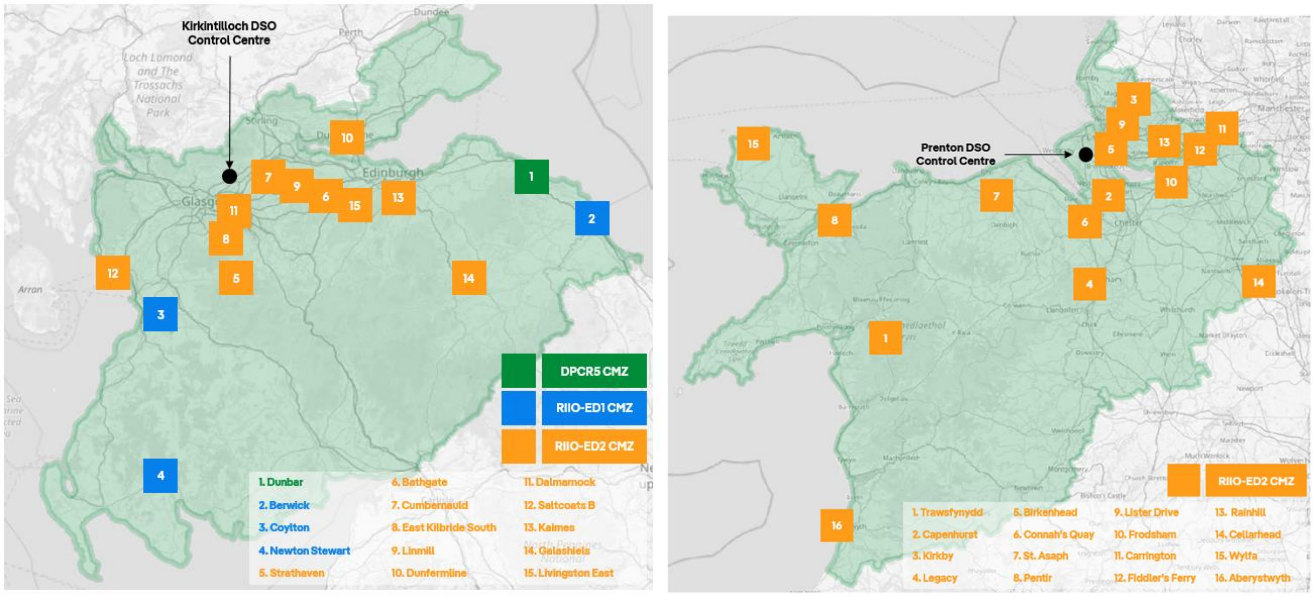


Figure 2: Existing and planned CMZs

2. Operational IT and telecoms

Operational IT and telecoms is the network's nervous system, our flexibility, innovative, and smart interventions to provide capacity all depend on this operating efficiently. We will be investing to deliver the reliable, cyber-secure, low latency communication network that DSO outputs and other DSO infrastructure depend on.

3. Network visibility

Visibility of network demand, generation, and power flows is important to help us efficiently and safely plan and operate the network to meet our customers' needs – it helps us get more out of existing network capacity and make more targeted, timely, and efficient interventions to provide capacity. We are rolling out real time fault level monitoring and LV monitoring across our network and making greater use of smart meter data. We had originally targeted deploying over 14,000 LV monitors in RIIO-ED2, but we have since increased this to 15,000 given the value they are delivering . This will extend monitoring coverage to 80 % of customers.

4. Enhanced forecasting

By better forecasting customer requirements we can better respond to them with more efficient and timely interventions to provide capacity. Following our industry-leading EV-Up and Heat-Up forecasting tools, FutureUp is SPEN's next-generation spatial forecasting development programme, designed to provide our partners in Local Authorities and our planning and strategic investment teams with the tools to make the best decisions on improving access to EV and low-carbon heat related planning and bring them into one intelligent, real-time view. It connects seamlessly with SPEN's existing systems and gives planners high-resolution, location-specific insight they can use to shape both today's operational decisions and tomorrow's network strategy. As charge-point plans evolve, retrofit activity grows and commercial load scenarios shift, FutureUp refreshes the forecasts instantly, highlighting where pressure will land so SPEN can stay ahead of demand.

5. Simulation and modelling

Combining simulation and modelling with measures to increase network visibility, we can make high quality planning and operational decisions to help ensure there is sufficient network capacity. This helps keep our network safe, efficient, and reliable for our customers as we transition to Net Zero. Central to this is our new central network planning and operational tool – our ENZ Platform. This combines network data sources (enhanced and near-time forecasts, network monitoring, smart meters, weather correction, LCT notifications, asset condition data) with a whole network model to create a real-time data-driven, whole network analytical model. This tells us what is happening on the network now, and in planning and operational timescales.

6. Digitalisation and IT platforms

Digitalisation and IT platforms are needed for our forecasting, modelling, flexibility platforms, and data sharing capabilities. Like with operational IT and telecoms, these are enabling investments which allow us to use a wider range of interventions to provide capacity.

6 NDP Part 1 - Network Developments

6.1 Load-driven interventions – delivering the capacity our customers need

These are the interventions we make whose purpose is to increase capacity. These are governed by our vision to: *maintain a safe, secure and reliable network by efficiently delivering the capacity our customers need to decarbonise, in the timescales they need it – so that they can use LCTs immediately and at full capacity.*

Our network modelling showed that three network areas in particular require a significant increase in intervention in the coming decade:

1. **LV service cables and cut out units**. LV service cables and cut out units are the network assets which connect individual households to the LV network. 560,000 of our customers are supplied by looped services; this is where multiple properties share a single service cable. The forecast electrification of domestic heat and transport means household demand could triple, dangerously overloading these assets. We need to start intervening on these assets to remove this barrier to customer LCT uptake. Our Baseline scenario demonstrates the need to intervene on over 43,000 LV looped service cables and cut out units within RIIO-ED2. This is over 50 times the load-driven RIIO-ED1 intervention rate.
2. **The LV network.** This is the section of network that runs from local substations to just outside customers' properties. As households are supplied from the LV network, the tripling of household demand that affects LV services and cut out units also impacts the LV network.
3. **Switchgear.** These are the network assets which safely isolate the network in the event of a fault. They are rated to cope with a certain level of fault current that flows in the event of an asset failure ('fault level'). As generators are a source of fault current, increasing volumes of generation will lead to an increase in fault level. Our modelling demonstrates the need to intervene on 28 of our 33kV substations, 4 HV substations and 4 HV interconnected groups within RIIO-ED2. In RIIO-ED1, we used innovation to successfully develop fault level monitoring technology. We are embedding this innovation into business-as usual with deployment in RIIO-ED2 at 41 sites (fault level monitoring at 38 sites and active fault level management at three sites).

If we don't respond in these areas in RIIO-ED2 there will be a safety risk to customers, 2050 Net Zero will be unachievable, and the network will be overloaded, exposing customers to supply interruptions and higher overall costs. It is absolutely in our customers' interests for us to deliver additional capacity.

To deliver this additional capacity we impartially assessed a range of flexible, energy efficiency, smart, innovative, and reinforcement solutions and different delivery options. Based on this, our interventions include:

- We plan to use flexibility at over 1,300 sites at all voltage levels. This includes over 450MW across 77 locations at primary substations and above – these are listed in detail in Part 1 of our NDP.
- Our RIIO-ED2 baseline load plan will deliver over 1.2GW of additional network capacity across all voltage levels through a range of smart, innovative and reinforcement solutions. 755MW of this is at primary substations and above and is listed in detail in Part 1 of our NDP.
- Over 43,000 looped service interventions so customers can safely connect EVs and HPs. As these are interventions at LV, they are not detailed within our NDP.

Please see our NDP Methodology Statement for more information on how we identified the load interventions needed to provide the capacity our customers need. Please see our NDP Part 1 reports for SP Distribution and SP Manweb for more information on the interventions themselves.

6.2 Non-load – other interventions which create capacity

In addition to load-driven interventions (Section 6.1), we will also make a range of asset management interventions to manage losses and safeguard network risk, resilience, and reliability. Some of these will increase capacity, even though this isn't the primary reason for making them – these are included in the NDP. Others will safeguard existing capacity be ensuring a reliable, healthy[12], and resilient network – these are beyond the scope of the NDP, but we have summarised them here as they contribute to capacity availability.

Network reliability – keeping the capacity available for our customers

- We have a strong track record on reliability. On average over RIIO-ED1 our customers have experienced some of the lowest levels of interruption across industry.
- In RIIO-ED2, we will reduce the likelihood of unplanned customer interruptions occurring by 19% by optimising network risk (see below), integrating asset risk data into our network planning and operational tools, greater use of technology and data (e.g. network automation, predictive fault analytics, and satellite analysis), and by increasing our network's resilience to a range of external factors (see below).
- In RIIO-ED2, we will reduce the duration of unplanned interruptions by 19% by finding faults more quickly with digital tools and data, using post-fault flexibility, automatically reconfiguring networks, and adopting a DSO organisational structure that enables DSO and DNO staff to closely coordinate (e.g. during storms when staff from across the organisation help with the response).

Network risk – safeguarding reliability by keeping our assets healthy

- We have delivered our RIIO-ED1 asset risk reduction in full. We have managed emerging risks and embedded efficiencies for RIIO-ED2. In 2019, Ofgem recognised the quality of our asset risk systems.
- We are carrying greater risk on like-for-like assets entering RIIO-ED2 compared to RIIO-ED1. Delivering our RIIO-ED1 funded targets means our underlying asset base will deteriorate by 21.8%. We are managing a far greater challenge in RIIO-ED2, so we have increased our investment for RIIO-ED2.
- For RIIO-ED2, we have embedded leading optimisation techniques within our asset risk planning. This has enabled a reduction in asset deterioration from 2.7% p.a. in RIIO-ED1, to 1.1% p.a. in RIIO-ED2. We will invest £355.7m to deliver a 'monetised risk' reduction of £813.5m (using industry common risk values). This keeps our asset base healthy in the most efficient targeted way. Please see our RIIO-ED2 Business Plan for more information on how we will manage network risk.[13]

Network resilience – safeguarding reliability by ensuring resilience to a range of external factors

- In RIIO-ED2, we are improving our network resilience to Climate Change and reducing external threats by: expanding flood resilience and vegetation management (to Storm Resilient standards, ETR 132), employing digital security measures at all our sites, and investing in increased cyber and fire resilience.

Network losses – freeing up existing network capacity

- In RIIO-ED2, we will undertake a range of measures to manage technical and non-technical losses. These include combining smart meter and network monitoring data to identify non-technical losses, replacing high-loss equipment, and increasing standard conductor sizes. The great majority of these will increase capacity, but only on the HV and LV network and so aren't included within the NDP. Please see our Losses Strategy for more information on how we will manage losses.[14]

[12] Asset health (aka condition) is one of two components of network risk.
[13] Our RIIO-ED2 Business Plan is available at: https://www.spenergynetworks.co.uk/pages/our_riio_ed2_business_plan.aspx
[14] Our Losses Strategy is available at:
https://www.spenergynetworks.co.uk/userfiles/file/SPEN_Revised_Losses_Strategy_Final_Issue_1.pdf

6.3 NDP Part 1 – Summary of capacity from our planned interventions

Our NDP Part 1 combines the load and non-load interventions which increase capacity that we plan to make on our 33kV and 132kV network. Figure 3 summarises the firm capacity release in MVA arising from the interventions by driver (i.e. why we need to make them) for SP Distribution and SP Manweb respectively.

As a reminder, Figure 3 only shows interventions on primary substations upwards given the scope of the NDP. This means they exclude interventions on the LV and HV networks, which account for the vast majority of the interventions we need to make to provide capacity. The figure also only shows the financially approved in-delivery interventions; hence only the approved plans in the remainder of RIIO-ED2 are included (RIIO-ED3 are signposted in NDP Part 1 for information only).

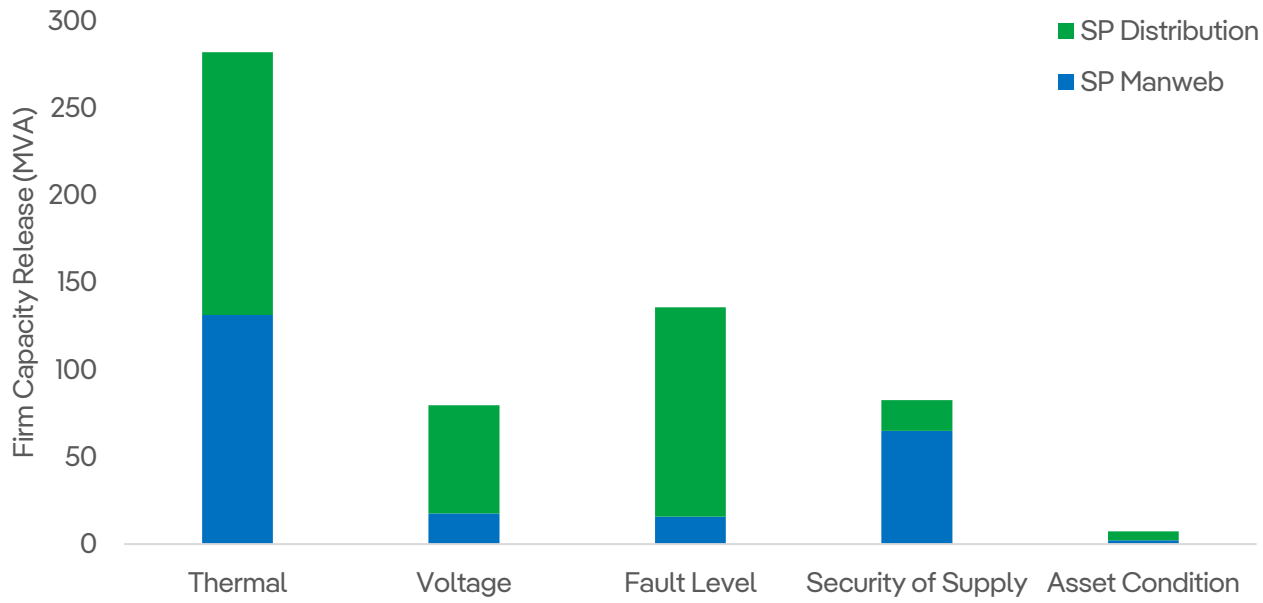


Figure 3: Summary of financially approved in-delivery interventions by driver in RIIO-ED2

Figure 3 shows that the need to provide thermal capacity is the main driver of interventions (an explanation of the different types of capacity/constraints is available in our NDP Methodology Statement).

Our load and non-load intervention plans are both designed to be adaptable so they can respond to emerging customer needs. This means the interventions we actually deliver may differ slightly from those we currently plan to deliver. We will only make changes to the delivery plan where it is in customers' interests.

7 NDP Part 2 – Network Headroom

We have calculated network scenario headroom by combining existing network capacity, planned interventions, and forecast demand and generation growth.

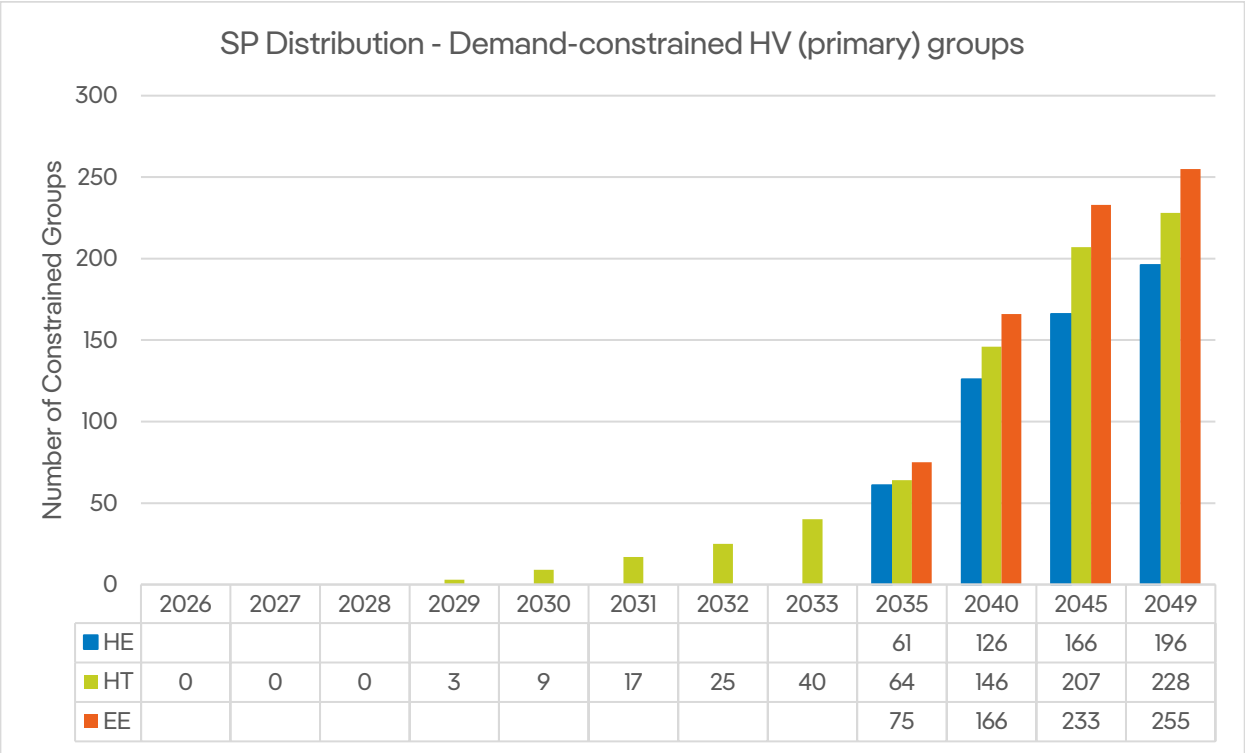
The results paint a clear picture – without additional network capacity, customer demand and generation growth will overwhelm network capacity. This highlights the need for investment in networks, so we can provide our customers with the capacity they need for the energy transition.

7.1 Demand capacity headroom

Figure 4 and Figure 5 show the number of primary substation groups in SP Distribution and SP Manweb with demand constraints out to 2050. To give context to the results, in total there are 391 primary substation groups in SP Distribution and 339 in SP Manweb.

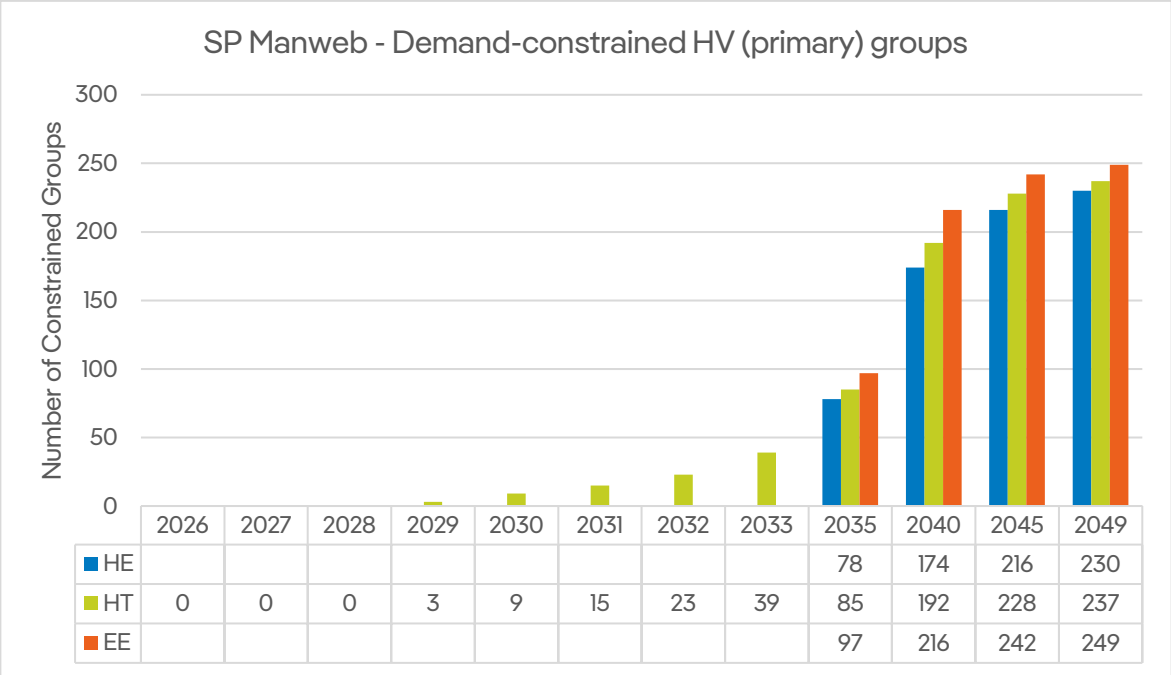
Demand growth is increasing from now out to 2050, driven mainly by the decarbonisation of heat, transport, and industry. This isn't fully reflected in Figure 4 and Figure 5, which show the number of constrained primary groups accelerating after 2028, as this constraint data incorporates our planned RIIO-ED2 investments (i.e. there are few constraints up to 2028 as we have already planned interventions to resolve these rather than because there is no demand increase). Constraints increase after this point as we haven't yet confirmed interventions for that period (we have started planning these interventions in preparation for RIIO-ED3, these are signposted in Part 1 of our reports).

The difference in constraint growth pre-2028 and post-2028 illustrates an important point: we can provide the interventions and capacity our customers need to decarbonise, providing Ofgem authorise the investment. However, if the interventions aren't made then the network will suffer from widespread constraints. These would make 2050 Net Zero unachievable, and the network would be overloaded, exposing customers to safety risks, supply interruptions, and higher overall costs.



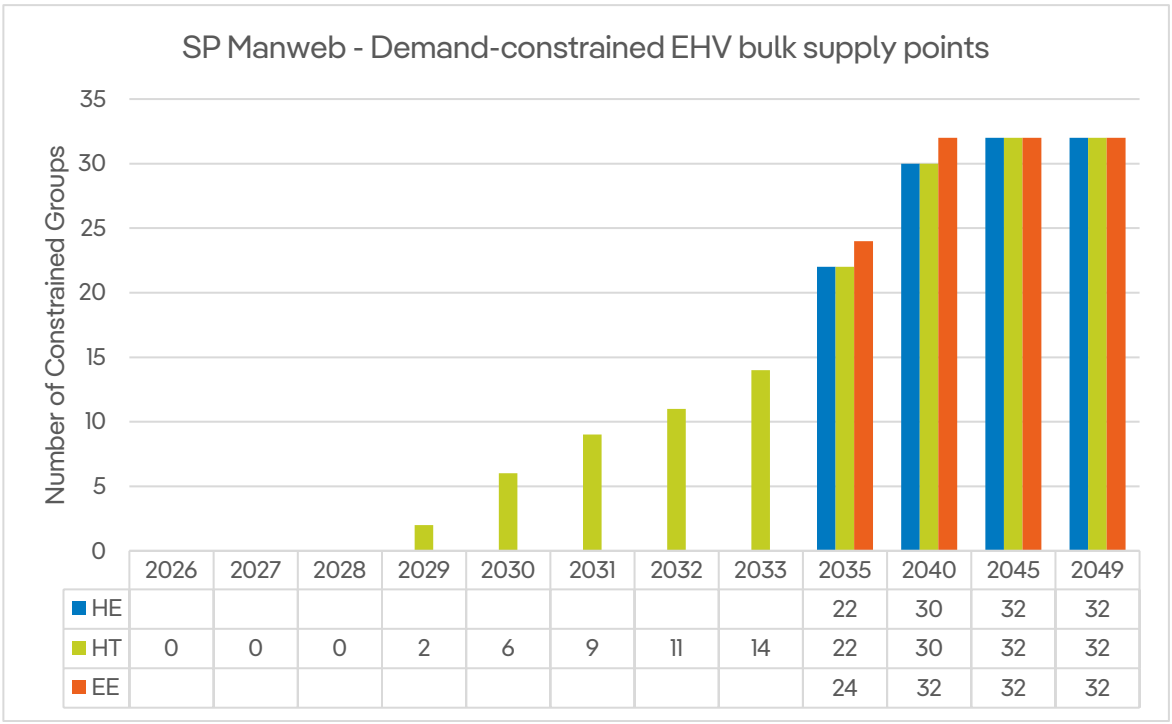
	2026	2027	2028	2029	2030	2031	2032	2033	2035	2040	2045	2049
HE									61	126	166	196
HT	0	0	0	3	9	17	25	40	64	146	207	228
EE									75	166	233	255

Figure 4: SP Distribution number of demand constrained primary substation groups



	2026	2027	2028	2029	2030	2031	2032	2033	2035	2040	2045	2049
HE									78	174	216	230
HT	0	0	0	3	9	15	23	39	85	192	228	237
EE									97	216	242	249

Figure 5: SP Manweb number of demand constrained primary substation groups



	2026	2027	2028	2029	2030	2031	2032	2033	2035	2040	2045	2049
HE									22	30	32	32
HT	0	0	0	2	6	9	11	14	22	30	32	32
EE									24	32	32	32

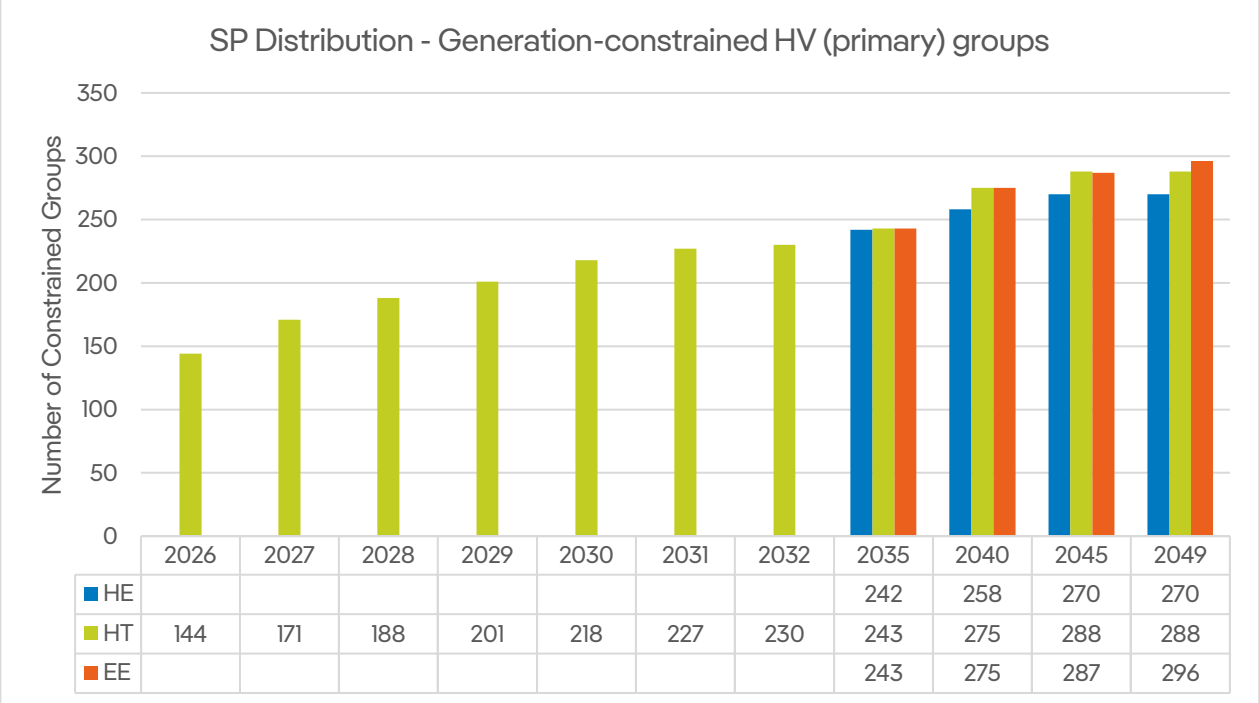
Figure 6: SP Manweb number of demand constrained EHV (33kV) grid groups

7.2 Generation capacity headroom

Generation growth is increasing from now out to 2050. These figures show that we are not reducing all known generation constraints within RIIO-ED2. Some key points:

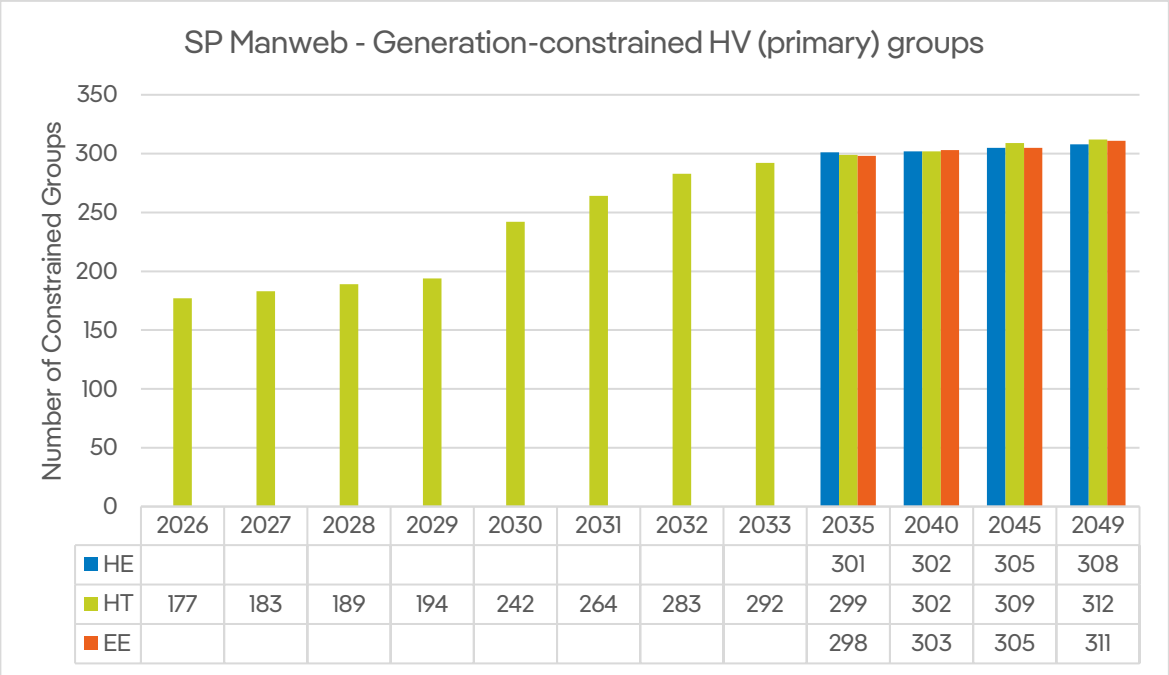
1. Figure 7 and Figure 8 show the number of primary substation groups with no spare firm capacity. However, we are enabling generation to connect to some of these primary substation groups through flexible connection arrangements such as ANM and AFLM.
2. As these show constrained primary substations, these constraints will not necessarily impede larger-scale generation where this connects to 33kV or 132kV network assets.
3. These constraints will likely not impede domestic-scale (<50kW) generation given its minimal contribution to network constraints and is below the Transmission Impact Assessment limit.
4. Figure 7 and Figure 8 incorporate upstream constraints but do not reflect constraints beyond the boundaries of our network.

Renewable generation connecting to our networks will be a key part of the energy supply that GB needs to decarbonise. We can accommodate it through a range of firm and flexible arrangements.



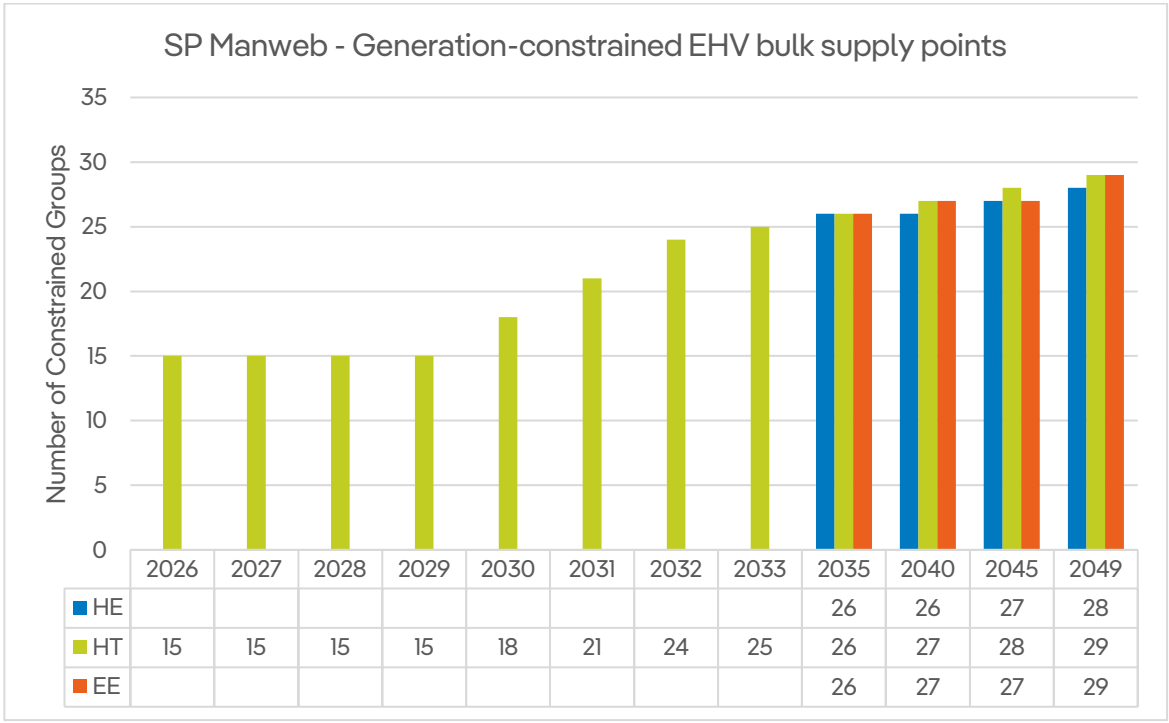
	2026	2027	2028	2029	2030	2031	2032	2035	2040	2045	2049
HE								242	258	270	270
HT	144	171	188	201	218	227	230	243	275	288	288
EE								243	275	287	296

Figure 7: SP Distribution number of generation constrained primary substation groups



	2026	2027	2028	2029	2030	2031	2032	2033	2035	2040	2045	2049
HE									301	302	305	308
HT	177	183	189	194	242	264	283	292	299	302	309	312
EE									298	303	305	311

Figure 8: SP Manweb number of generation constrained primary substation groups



	2026	2027	2028	2029	2030	2031	2032	2033	2035	2040	2045	2049
HE									26	26	27	28
HT	15	15	15	15	18	21	24	25	26	27	28	29
EE									26	27	27	29

Figure 9: SP Manweb number of generation constrained EHV (33kV) grid groups

8 Stakeholder feedback

We recognise that stakeholder views, plans and requirements evolve over time. It is therefore important that we continue to work closely with our stakeholders to ensure that our network planning reflects the most up-to-date information and emerging priorities. As the purpose of the Network Development Plan (NDP) is to provide transparency and support informed decision-making, we are committed to ensuring that these documents remain relevant and responsive to stakeholder needs.

As a result of feedback from our stakeholders, we have extend our consultation period and our stakeholder survey will remain live throughout the year. This will provide stakeholders with the opportunity to provide feedback on our Network Development Plan on a continuous basis until our next publication. A summary of the feedback received and the actions taken in response is provided in our NDP Methodology Statement, and we will continue to review and act on stakeholder feedback as part of future NDP publications.

Stakeholders are invited to respond to the consultation questions set out in this document and to submit any additional feedback on the NDP by emailing **systemdesignteam@spenergynetworks.co.uk.** All feedback received will be considered as part of the development of our next publication.

Network Development report (document)

1. How could/will our Network Scenario Headroom and Development report be used by your community/business?
2. Are there any ways we could improve the information contained within our Network Scenario Headroom and Development report?
3. Do you find the links to the DNOA scheme pages useful? Do you find the layout of information within these scheme pages useful? Are there any ways we could improve the information contained within these pages?

Network Scenario Headroom part (documents and spreadsheets)

4. How could/will our Network Scenario Headroom data tables be used by your community/business?
5. Do you find the information contained within our Network Scenario Headroom data tables useful? If not, how could it be improved?
6. Do you find the presentation of headroom for the scenarios helpful? If not, how could they be improved?

Methodology report (document)

7. Do you support the steps/process we have followed to produce our Network Development Plan (NDP)?

Other

8. Do you make use of any other data sources we publish? LTDS, heatmaps, ECR, DFES, etc. (tick all that apply)
9. Are there any other parameters you would like to see included within our NDP?
10. Are there any other comments or feedback you would like to make?