Distribution Network Options Assessment

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1 Foreword

It is with great pleasure that I present our Distribution Network Options Assessments (DNOA) publication, which encapsulates the vision, principles and strategies that underpin our approach to the operation and growth of the electricity distribution network.

Distribution System Operation (DSO) serves as the cornerstone of our endeavour to develop a smart and flexible distribution network capable of accommodating the ever-changing behaviours and demands of our customers. It is the embodiment of our commitment to delivering efficient network capacity to our customers, ensuring that the infrastructure is optimised for their benefit.

As we look ahead, our expectations for network investment and flexibility grow more pronounced. We are firm in prioritising flexibility services as a cost-effective approach to managing network congestion, while concurrently advocating for energy efficiency measures.

This document serves as a comprehensive guide, describing the methodologies and approaches that inform our evaluation of network upgrade options. It underlines our commitment to transparency, ensuring that our investments are both economical and efficient, thereby yielding tangible benefits for our customers.

Crucially, at Electricity North West, we remain steadfast in our commitment to delivering for our customers and contributing to the realisation of net zero targets in our region. Our decision-making framework firmly upholds the principles of our Integrated Capability Model (ICM), affirming the separation of responsibilities as a cornerstone of our operational ethos.

In our pursuit of continuous improvement and transparency, we extend an open invitation for feedback on the presentation of our framework and the data therein. Your engagement is invaluable, and we encourage you to connect with us at development.plans@enwl.co.uk.

Ultimately, this publication is a testament to our unwavering dedication to enhancing engagement, fostering transparency and driving sustainable development within the electricity distribution landscape. We trust that you will find this document a valuable resource, and we eagerly anticipate the insights and collaborative efforts that will unfold as a result of its dissemination.

Kind regards

Ben Grunfeld
Strategy and Growth Director
Electricity North West

2 Executive summary

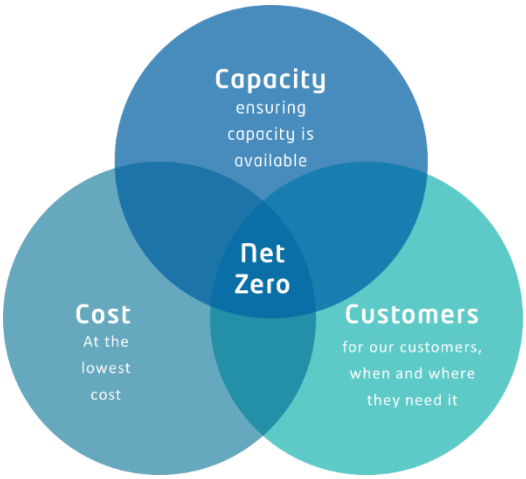
Our goal is to provide our customers with reliable and affordable access to network capacity whenever and wherever they need it. We achieve this through a strategic approach that focuses on:

Enabling net zero: We are committed to ensuring that our network does not hinder the transition to net zero. We will invest in network upgrades and flexibility solutions that support the growth of renewable energy sources and distributed energy resources.

Efficient network development: We will make informed investment decisions that optimise network capacity and minimise costs to customers for the provision of this capacity. We will utilise data analytics and forecasting tools to accurately assess network needs and develop cost-effective solutions.

Transparent uncertainty management: We recognise the inherent uncertainties in network planning. We will engage with stakeholders to gather insights and develop plans that can adapt to changing conditions.

We believe that collaboration, whole-system thinking, and stakeholder engagement are essential for achieving our goals. By working together with our partners and communities, we can develop innovative solutions that address complex challenges. We take a whole-system approach to our work, considering the interconnectedness of different systems and the impact of our decisions. We also value the input of our stakeholders, including our customers, employees and the communities we serve. By working together, we can create a more sustainable and equitable future for all.



To achieve our objectives, we have developed a comprehensive action plan that focuses on DSO activities, flexibility services and energy efficiency markets. Our action plan consists of four key steps:

- **Enhanced network understanding**: We utilise big-data analytics to gain a deeper understanding of our network's capabilities and limitations.
- **Accurate network capacity forecasting**: We continuously refine our forecasting models to accurately predict future network capacity needs under various forecasting scenarios, taking into account net zero targets and what they mean for the UK and our region.
- **Flexibility first approach**: We prioritise flexibility services as a cost-effective means of managing network congestion. We also promote energy efficiency measures to reduce overall demand.
- **Strategic network interventions**: We invest in network upgrades strategically to avoid stranded or unutilised network assets and facilitate net zero.

Our commitment to ensuring sufficient network capacity for our customers is unwavering. We will continue to invest in innovative solutions and collaborate with stakeholders to deliver reliable, affordable and sustainable network infrastructure.

At the heart of the DNOA process is our commitment to transparency and accountability. This methodology document serves as a guide, detailing the journey from the generation of forecasts

through the Distribution Future Electricity Scenarios (DFES) process to the assessment of options aimed at alleviating current and future network constraints. We provide a comprehensive overview of our evaluation methodologies and the governance process, that underpins the confirmation and communication of the final recommendations. For confirmed schemes, detailed documentation is provided within the Long Term Development Statement (LTDS).

Feedback is a crucial component of our commitment to transparency and engagement, and we welcome your valuable input as we continue to enhance our decision-making processes. Together, we strive to create a network infrastructure that meets the evolving needs of our communities and ensures the efficient and reliable delivery of electricity. If you have any feedback, please get in touch with us at development.plans@enwl.co.uk as we look to continuously improve this document.

3 Introduction

Electricity North West Limited serves as the power network for the North West region and operates as one of Great Britain's 14 electricity Distribution Network Operators (DNOs). Responsible for the upkeep and enhancement of over 57,000km of electricity network and numerous substations spanning from Macclesfield to Carlisle, we cater to the diverse communities in our area. Our extensive network of overhead lines, underground cables and substations supplies power to 5 million individuals in 2.4 million households and businesses.

Focusing on key aspects such as safety, reliability, customer service and facilitating the transition to net zero, we invest significantly in the region. Our commitment to the region includes embarking on a significant investment of over £2 billion in the North West's power network over a five-year period. Specifically, our RIIO-ED2 business plan outlines a £162 million load-related investment from 2023 to 2028.

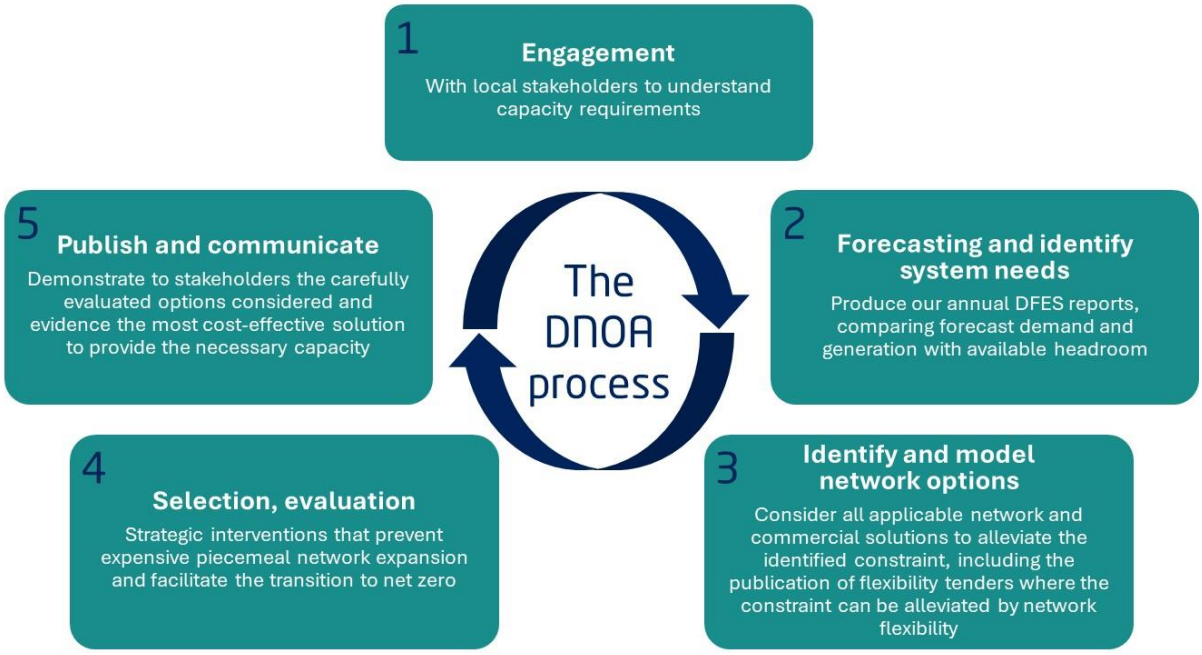
As part of our plan, we have pledged to disclose our forecasting methodologies, maintain a 'flexibility first' approach, and subject all decisions to scrutiny by our independent DSO stakeholder panel. This document marks the second version of our DNOA methodology. Updates will reflect adjustments to our approach, responses to stakeholder input, and updates on newly evaluated schemes.

Figure 3.1: Our operational area

4 The DNOA process

The DNOA process is a cycle of engagement, analysis, optioneering and evaluation, and communication. Section 7 describes the detailed timeline of our reporting and load-related investment process activities including DNOA and the associated interactions with other processes. The DNOA process starts and ends with engagement with our key stakeholders to ensure that their needs are reflected and that our investments remain fit for the customers they serve and demonstrate efficient and economic decisions.

Figure 4.1: The DNOA process



In our DNOA report we present the DSO recommendations for the use of flexibility services and we will also be presenting cases where we have been successful in securing flexibility services. Beyond the DNOA report we are committed to continue publishing the outputs of the Common Evaluation Model (CEM) tool with any additional insights from other tools (e.g. our advanced Real Options CBA tool) to continue providing the maximum possible transparency in our decision-making process. Importantly, the publication of the full CEM tool used for evaluation of flexibility service options can reassure our stakeholders that the flexibility prices are transparent in their rationale and values.

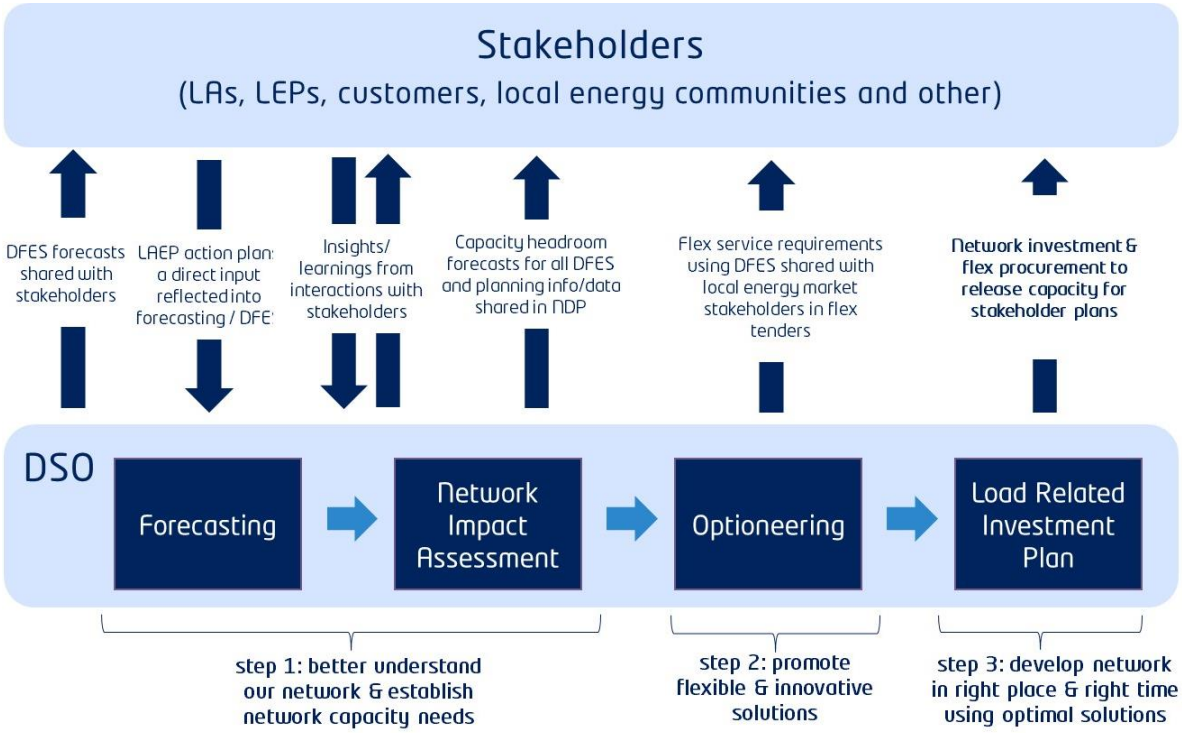
4.1 Stakeholder engagement as part of our annual DSO load-related investment cycle

Decarbonisation and the road to net zero is a whole system challenge. Working with other energy vectors, academic and research institutions, technology providers and local authorities will be a key part of understanding the pathways to net zero and formalising the whole system changes to planning processes.

We will continue to use our position to develop strategic partnerships to provide a common language for regional and national stakeholders to speak about their energy and decarbonisation needs, particularly those associated with the regional planning process. We have already begun working with other energy vectors, such as the local gas distribution network operators and local development agencies in the heat and transport areas. Through this combined work we help all actors in our region to develop plans for low-carbon

transportation and housing development as part of supporting local authorities to develop Local Area Energy Plans (LAEPs).

Figure 4.2: Stakeholder engagement as part of our DSO annual load-related investment cycle



5 Governance

5.1 DSO structure

As part of the requirement for submitting a compliant business plan, Ofgem sought justification for any proposed measures for managing conflicts of interest, including legal separation of DSO activities. In the submission of our RIIO-ED2 Final Business Plan, we advocated against an immediate full legal separation of DSO functions from the distribution network licensee. The details on DSO-DNO interfaces, interactions and processes to manage conflicts of interest is outside the scope of this document. The latest DSO-DNO interaction aspects will be presented in a separate publication in early 2025, as well as our annual DSO report.

Measures for governance and transparency

To ensure robust governance and transparency, we have implemented a comprehensive set of measures:

- **Publication of data and methodologies:** Full transparency in decision-making processes. Publicising data, methodologies, and rules guiding the DSO team's decisions will enhance trust and understanding among stakeholders.
- **DSO Compliance Officer:** Appointment of a Compliance Officer dedicated to monitoring and reporting on compliance matters. This role ensures adherence to regulatory standards and internal policies.
- **Independent DSO stakeholder panel:** Introduction of an independent panel responsible for overseeing decisions and methodologies. This panel will guide, support and evaluate the progress of the DSO transition. Its independence assures stakeholders of impartial oversight.

Assurance of neutrality and efficiency

These collective measures form a robust governance and reporting framework. They assure customers and stakeholders that Electricity North West functions as a neutral market facilitator. The emphasis on embracing energy efficiency and flexibility prioritisation ensures the efficient delivery of network capacity at an optimal price point.

In addition to the comprehensive governance framework outlined earlier, Electricity North West Limited emphasises cost evaluation to complement its governance strategy. Utilising Ofgem's Cost Benefit Analysis (CBA) tool, the Load Related Expenditure (LRE) manager will evaluate costs to ensure that proposed initiatives deliver optimal value for stakeholders.

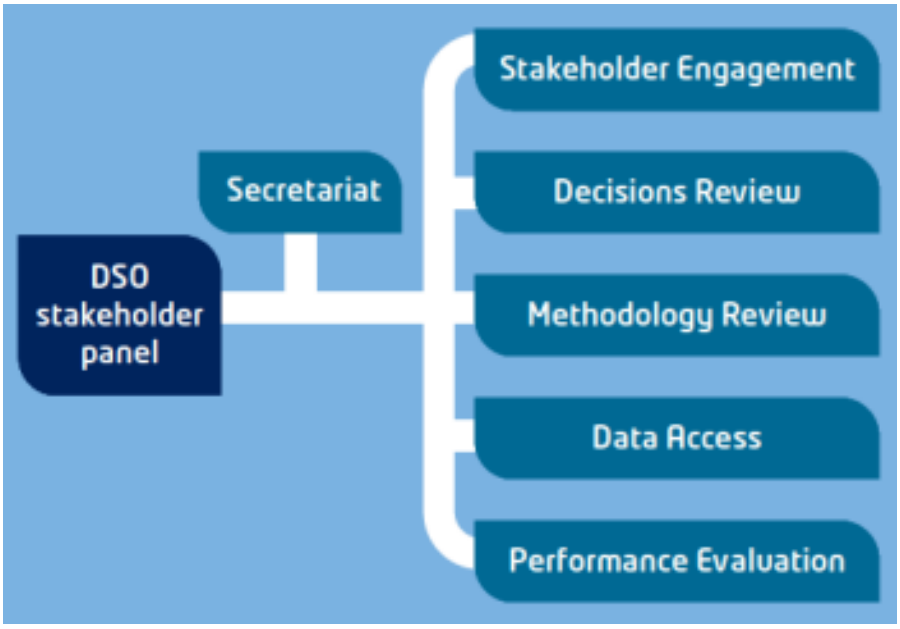
Alongside this, the DSO flexibility team is responsible for implementing the Common Evaluation Methodology (CEM). This methodology serves as a robust assessment framework, enabling the team to evaluate diverse flexibility solutions. By utilising this methodology, we aim to identify and implement the most efficient and cost-effective flexibility services, aligned with our 'flexibility first' approach.

These initiatives reflect our commitment not only to governance and transparency but also to prudent cost management. By integrating these evaluations into their broader governance strategy, we strive to ensure that all DSO initiatives are not just effective and transparent but also cost-efficient, maximising value for customers and stakeholders alike.

5.2 DSO stakeholder panel

A key aspect of our DSO engagement and governance framework for RIIO-ED2 is the creation of our new DSO stakeholder panel. The panel will oversee our engagement with network users and the wider stakeholder community, ensuring that they have a say in the speed and scope of our DSO transition plan. This independent panel also acts as the body that evaluates and reports on our performance. With their clear focus on listening to our stakeholder community, they are empowered with the ability to review challenged decisions and methodologies and make recommendations to overturn a decision or a change in methodology.

Figure 5.1: Responsibilities of our DSO stakeholder panel



Objectives of the DSO stakeholder panel

- To guide our engagement with the DSO community, ensuring all customer and stakeholder groupings are appropriately engaged, including specialist stakeholders like flexibility providers
- To shape our approach to data sharing, ensuring we are delivering against any industry recommendations, and providing the scope and granularity of information required by stakeholders in ways that meet their required levels of accessibility
- To provide confidence to stakeholders and customers that we have published robust decision-making processes and that we are following them
- To review any decisions that are challenged by an affected party and make a recommendation on whether the proposed decision should be overturned if the process has not been followed correctly, or relevant facts not considered, and if a decision-making process is found to be flawed, the panel is empowered to review the methodology and make recommendations to modify it. A ten-day standstill period after publication of decisions and prior to entering into a contract with successful flexibility providers has also been implemented, to allow a period for scrutiny and challenge of our proposed decision
- As the panel will be intrinsically involved in the delivery of DSO activities, we believe that they are best placed to monitor and evaluate the ongoing performance of the DSO transition using evidence gathered from the DSO community in accordance with Ofgem's performance frameworks and guidance.

Summary

These transparent processes coupled with oversight by the DSO stakeholder panel provide the opportunity for any party to scrutinise our decisions. This is particularly important for licensees involved with DSO functionality where they are evaluating and choosing between a range of potential solutions from multiple parties.

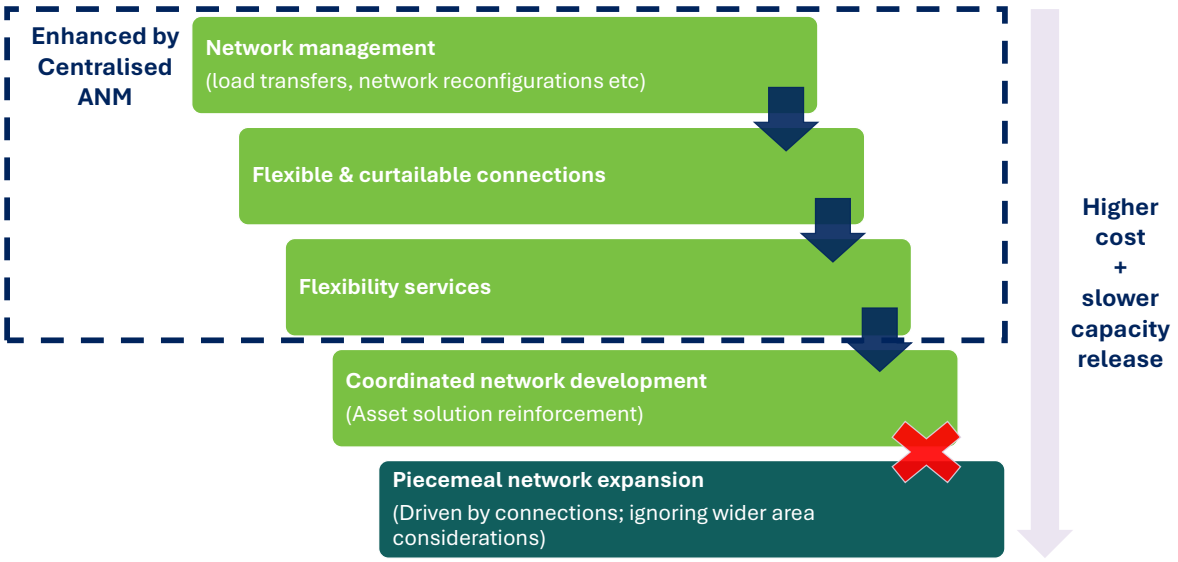
6 Optimisation of capacity release

Our capacity strategy aims to optimise capacity release to facilitate local decarbonisation, economic growth and our stakeholders' plans. The optimisation process aims to:

- Release capacity at minimum cost and consequently lowest impact on customers' energy bills
- Accelerate the capacity release to improve customer satisfaction and facilitate the timely transition to net zero.

Our capacity strategy prioritises zero cost capital expenditure options to release capacity in very short lead times. The first option is to release capacity via network management, which includes options such as network reconfigurations (ie moving normally open points, load transfers etc). The second option utilises flexible connections (ie connect and manage, non-firm connections etc) where we can release more capacity from existing assets. For example, we can facilitate non-firm battery connections at higher capacities than the firm capacity available for other types of demand customers.

Figure 6.1: Optimisation process: starting from lower cost and faster capacity release



Curtailable connections are a similar example where we can accelerate capacity release and connect customers faster, but this is an option that is also generally combined with coordinated network development. In parallel to offering curtailable connections, we engage with customers to reduce their contracted Maximum Import and Export Capacities (MIC/MEC) when it is being underutilised.

Following on from the zero cost options, our flexibility first approach prioritises flexibility services in all cases where they are more economic (ie more cost efficient) to defer, in time, the network reinforcement counterfactual. We follow a fully transparent process, where the ceiling prices are defined by the reinforcement solution costs and we publish the CEM CBA tool results in our decision-making for flexibility services.

It must be highlighted that for all these non-asset solutions to release capacity we are in the process of further increasing the benefits in terms of cost efficiencies and speed of capacity release by energising our centralised active network management (ANM) system. Unlike all other GB DNO network management systems, our ANM is centralised and embeds real time power flow processes, rather than tactical control (non-power flow based) solutions per GSP feeding area. In practice this allows us to:

- Scale the dispatch of flexibility services in a very short time (ie commissioning of new ANM zones can be achieved using existing hardware in days) and the dispatch of flexibility services is coordinated with flexible connections and assets
- Have a robust process as all actions are automated using a centralised system that sits within our control room.

Our ANM moved earlier this financial year (FY25) from the test environment to production. By the end of the financial year ANM will go live on at least one network zone to fully utilise the cost and the connections and flexibility service facilitation benefits.

When capacity requirements cannot be met by any of the above mentioned non-asset solutions, our next step is to proceed with coordinated network development through network reinforcement. To do that we focus on wider network areas aiming to release capacity through minimum cost combinations of interventions considering that we need to:

- Facilitate both the connections activity and the demand/generation growth from our DFES forecasts that include low carbon technology (LCT) forecasts and importantly high certainty

plans of economic growth and decarbonisation as defined by local authorities and their developers
- Fully co-utilise non-asset solutions, e.g. load transfers and existing/forthcoming flexible assets (connections and services)
- Reinforce in stages to avoid over-investing ahead of need, but at the same time avoiding foreclosing the transition to net zero
- Reinforcement across wider areas can be deployed at different voltage levels, i.e. a holistic and whole system approach considering bulk supply points, primary substations and downstream options
- Deploy infrastructure to facilitate the uptake of LCTs and support the transition to net zero.

Following this top-down prioritisation process utilises both non-asset and asset solutions and means we can avoid piecemeal and higher cost network expansion. But this coordinated and cost-efficient use of non-asset and asset solutions can only be achieved through holistic understanding of the wider network needs. Our world class forecasting approach uses true bottom up and half-hourly through year time-series analysis with stakeholder engagement inputs. Our approach also embeds insights and data across the connections activity and stakeholder plans (LAEPs, economic growth plans etc) that allow us capture short-term certainties and long-term uncertainties of granular network needs to then define flexibility services and reinforcement optioneering.

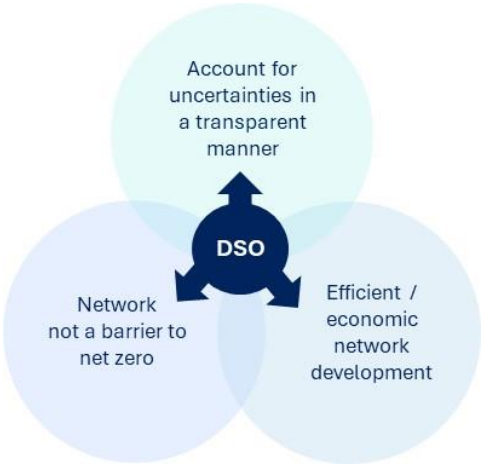
7 Overview of our investment planning process

Our strategic vision underpins our RIIO-ED2 load-related investment plan and is defined by three objectives, which are:

- To make sure that our network will not be a barrier to net zero
- To implement efficient and economic network development
- To manage uncertainties in a transparent manner.

In order to meet these objectives, our action plan for load-related network investment in RIIO-ED2 is centred on DSO benefits with a focus on efficient and cost-effective network development. Our aim is to find the most cost-efficient network solution for every network need identified.

Figure 7.1: Our RIIO-ED2 strategic vision



Our DSO based action plan for load-related investment comprises four steps as shown in Figure 7.2 below. This action plan ensures that our strategic vision follows through in our end-to-end investment decision making.

Figure 7.2: Action plan to meet the objectives of our strategic vision for load-related investment

Steps	Initiatives	Enabling data

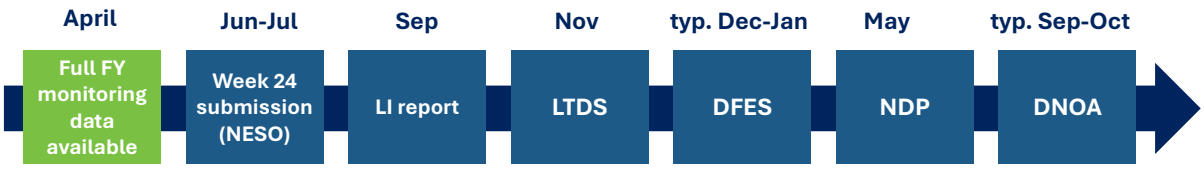
Step 1: Better under-stand our network
Monitoring
	• Deliver greater network visibility through:
	  ○ Expansion of network monitoring including neutral currents and power quality
	  ○ Integration of smart meter and other third-party data sources
	• Analysis of measurements to understand impacts of new customer behaviours including changes in the time of day and year that energy is consumed and produced
		• Prioritise vulnerable customers and worst served customer needs
		• Raw measurements, time sequence loading data and consumption profiles

Step 2: Establish network capacity needs
Forecasting
Network impact assessment
	• Deliver granular forecasts and undertake network impact assessments
	  ○ Develop DFES forecasts to quantify uncertainty
	  ○ Net zero future pathways
	  ○ Develop LTDS/ NDP cognisant of all net zero compliant scenarios to not foreclose credible alternative pathways
		• Distribution Future Electricity Scenarios (DFES)
		• Long Term Development Statement (LTDS)
		• Network Development Plan (NDP)

Step 3: Promote flexible and innovative solutions Optioneering	• Deliver connect and manage approach at low voltage (LV) • Deliver flexibility first to reduce costs, defer costs and mitigate risks • Deliver flexible solution options including flexible connections / ANM • Deliver heatmaps enabling customers to connect in locations with favourable network conditions • Signpost network needs to promote opportunities bolstering flexibility services / energy efficiency market and facilitating third party solutions provision and innovations • Promote and deliver energy efficiency to reduce network loading	• Heatmaps • Flexibility services / energy efficiency tenders • Market operation data
Step 4: Develop our network in the right place at the right time using the optimal solution Load-related investment plan	• Use flexibility services to manage uncertainty, and only install new assets when there is high certainty of the needs and little risk of stranding • Apply fully integrated strategic planning for efficient network development, avoiding piecemeal network expansion • Evaluate intervention options always factoring in asset condition and connection requirements	• Market operation data, evaluation tools and outcomes

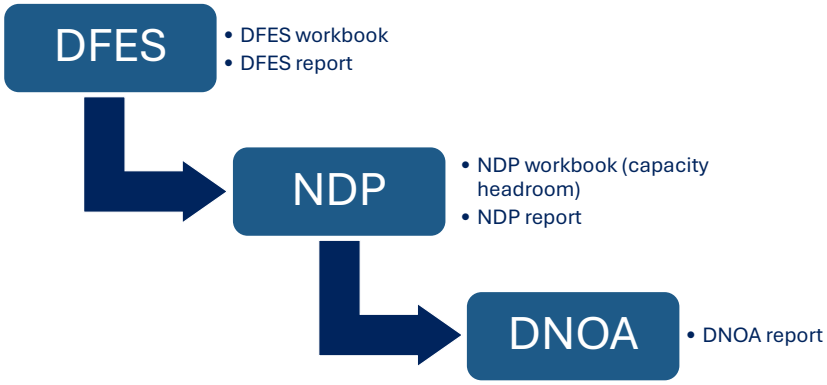
Each year we undertake the individual processes of forecasting, network impact and options assessment following a timeline that starts when a full year of the latest historical monitoring data (measurements) is made available.

Figure 7.3: Timeline of annual reporting and publications associated with forecasting and planning



The outputs from each step act as the inputs into the next step. For the NDP it should be noted that even though the publication of the report follows a bi-annual cycle, the NDP workbook (ENA's Scenarios Headroom Report) follows an annual cycle in line with the DFES and DNOA. The reports and workbooks associated with DFES, NDP and DNOA are published annually on our Open Data Portal (together with load indices, LTDS and other network, load and capacity data, information and reports).

Figure 7.4: Publications of forecasting and network information



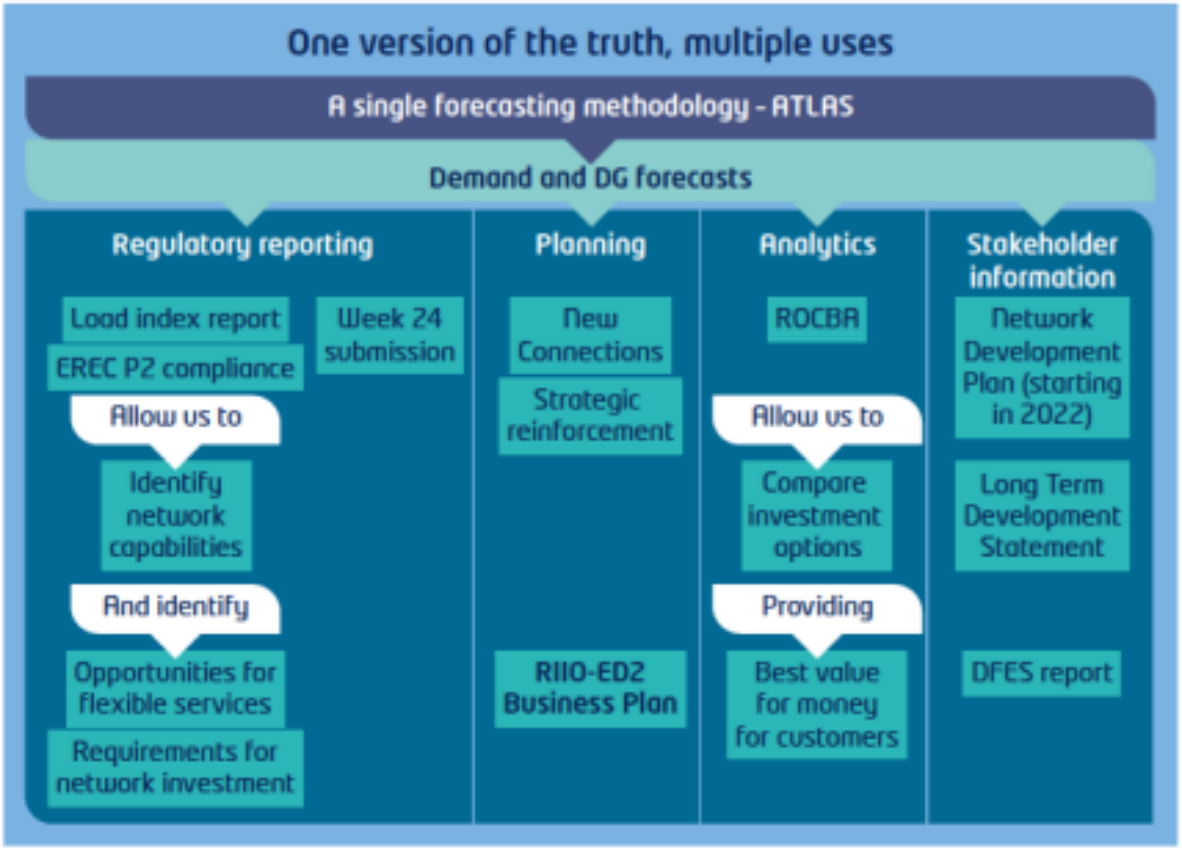
8 Distribution Future Electricity Scenarios

The DFES are long-term forecasting scenarios of electricity demand supplied by our distribution networks, as well as forecasts for distributed generation and battery storage connected to our networks. Our DFES uses models that show the impact of customer choice and societal change. We also consider granular data on local characteristics and the plans of our local stakeholders and customers.

Our DFES is produced using our ATLAS forecasting methodology, which is a single version of the truth with multiple uses. ATLAS was an innovation project, funded under Ofgem's Network Innovation Allowance (NIA) in 2015-2017, that used insights and information from previous projects (including our Demand Scenarios NIA project). Since then ATLAS has been continuously developing as a business-as-usual methodology and has been used to produce all our annual DFES publications and datasets since 2018.

ATLAS is a true bottom up methodology that utilises granular modelling down to individual buildings, assets, LCTs and time-series (half-hourly through year) modelling. Importantly it combines a) best DSO positioned data and insights including DNO connections and planning interactions with local stakeholders with b) third party data including consumer choice models for LCTs and a wide range of granular datasets.

Figure 8.1: Utilising our forecasting methodology



Our DFES consists of a range of scenarios that aim to capture:

- Short- and mid-term certainties
- Short- and importantly long-term uncertainties.

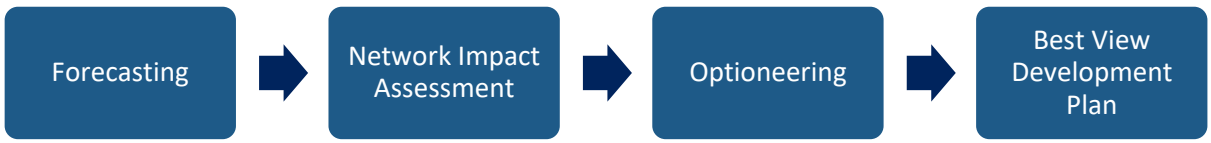
Best View is the region's highest certainty scenario that focuses on high certainty in the next one to ten years. The high-level assumptions in our Best View scenario have not changed. For example, we still expect that the electrification of transport will accelerate in our area as we approach 2030, whereas a slow electrification of heating is not expected to change until after 2026 and the UK government's decision on the future of hydrogen for domestic heating.

More information on our DFES report as well as the detailed workbook data (over 30 datasets of granular forecasts) can be found on our DFES website.

8.1 Network Development Plan

Our approach to capacity-related network planning follows a systematic end-to-end development process to produce our Network Development Plan (NDP).

Figure 8.2: High-level capacity related network planning methodology



Forecasts of credible futures (from DFES) are an essential starting point as customers' and wider stakeholder requirements are expected to continue to change in an evolving energy

system influenced by net zero targets. These alternative views of the future allow us to prepare for a range of eventualities including different levels of LCT uptake. Analysis of demand and generation forecasts informs our understanding of where our network will have sufficient capacity and how this varies for each scenario. Our forecasts of capacity headroom for demand and generation are published in our NDP workbook (Network Scenario Headroom Report) which is updated on an annual basis using the latest DFES forecasts. Our NDP workbook also presents transmission constraints including inputs from our latest engagement with the NESO.

Where we identify potential network constraints, we consider mitigation options based on their location, magnitude nature and timing dependencies. This optioneering process provides a view of future development requirements and is supported in the near term by a comprehensive cost-benefit analysis to support our decision-making. All decisions are reviewed and may be revised throughout the progression of each development project. Our network development options for conventional reinforcement and associated flexibility service requirements are published in our NDP report.

We are continuing to engage with customers, stakeholders and the industry as a whole, and we also have long-term investment plans in place to continue to meet the growing demand for connections to our network. For more information see www.enwl.co.uk/capacity.

8.2 Flexibility first

The use of flexibility services is a key DSO function and a vehicle for change, as it facilitates the North West's transition to net zero carbon. The rise in LCTs will ultimately result in a lot more demand being placed on our network, and the cost of upgrading the network to meet this increased demand would mean higher bills for customers. We are therefore trialling smarter, more affordable techniques to use the existing network more efficiently, which will reduce costs for all our electricity customers in the future. Some of the ways in which we can facilitate the extra demand associated with the transition to net zero while utilising our existing network is through the procurement of flexibility services and the promotion of energy efficiency measures.

In our RIIO-ED2 business plan, we used CBA to present how the use of flexibility services can be cost-efficient for our customers. Using flexibility, we envisioned to deliver over £3.5 million of cost savings per year from 2023 to 2028 by avoiding or deferring conventional reinforcement and passed through to customers via reductions in network charges. At times of high electricity demand and when the network is operating abnormally, we are looking to enter into contracts with flexibility service providers (FSPs) to adjust how much electricity they consume or generate either through flexibility or energy efficiency measures, in return for financial payment, as an alternative to traditional approaches. The aim is to reduce the cost for electricity distribution networks in customer energy bills while ensuring that our network remains reliable, resilient and meets our customers' needs.

Electricity North West has a 'flexibility first' approach, in that it promotes flexible opportunities to the market first as an alternative to traditional network capacity provision, at all opportunities where it is robust and economic to do so. The below table details where flexibility can be used to mitigate the need for asset intervention in these different constraint categories. Where flexibility cannot be used, there may still be a need to use traditional asset-based solutions, but even in these instances, we will still seek to innovate to develop the most efficient solution.

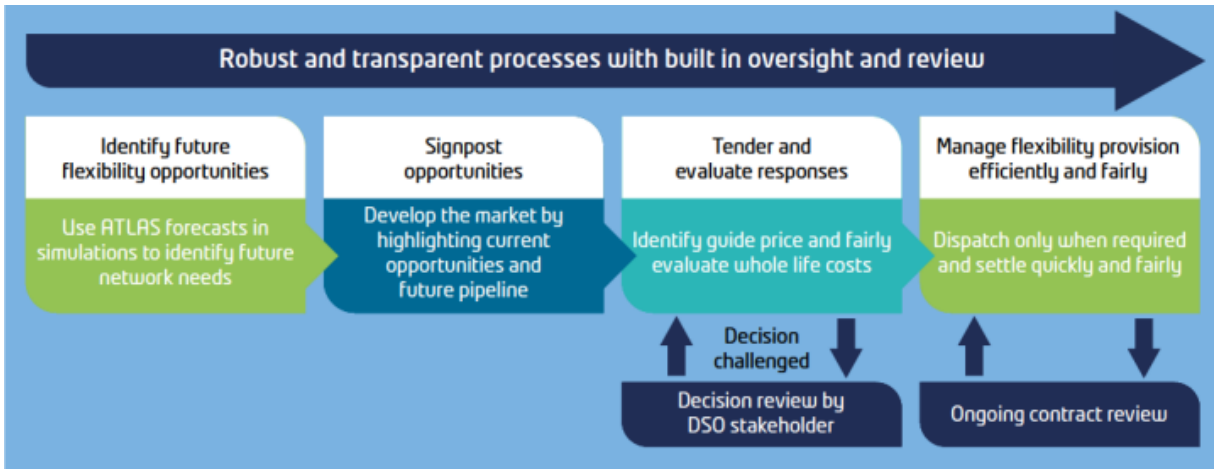
Figure 8.3: Network constraints and potential to use flexibility

Network constraint category	Potential to use flexibility
Fault level constraint	No
Power quality (voltage, harmonics) issue	No
Protection	No
Non-compliance with EREC P2/8	Yes
Thermal capacity or voltage exceedance	Yes
Thermal limitation in neutral conductor	Yes
Voltage step change	No

Our 'flexibility first' approach is systematically applied across all extra high voltage (EHV) substations considering our DFES forecasts of peak demand. This approach helps us check the market for service provision across all reinforcement needs driven by our forecast that can be tackled using flexibility services across all of our bulk supply points and primary substations. We are currently expanding our processes to apply the 'flexibility first' approach to accelerate connections (linked with connections driven reinforcement) and defer high voltage (HV) network reinforcement driven by our demand forecasts.

Our approach to the use of flexibility services to support a capacity requirement can be two-fold. Flexibility services can be a key interim solution while we assess load growth and a wider strategic conventional reinforcement therefore avoiding inefficient piecemeal network expansion and stranded assets. Alternatively, flexibility services allow us to mitigate the risk if demand growth is accelerated and there is a long lead time associated with asset-based interventions. In some instances, depending on the level of flexibility market in the location of the capacity requirement and the scale of the capacity requirement, flexibility services could be considered as an enduring network solution. We remain committed to ensuring we champion a level playing field for all network users with connected resources and adopt a neutral market position in everything we do. Each year we aim to increase the accessibility and transparency of flexibility service opportunities.

Figure 8.4: Robust and transparent processes for delivering flexibility first



Our procurement processes are common across the DNOs and continue to be refined and standardised through dedicated workstreams under the Open Networks Project and through collaborative work with other DNOs and our procurement platform provider. This involves continuous development and standardisation of the processes used for identification, signposting, tendering (including pre-qualification and contracting), evaluating and purchasing

flexibility. This includes its dispatch, baselining and settlement, as well as its coordination rules. We also ensure consistency throughout our publications, those sites put forward to 'signposting' being reflective of those studied under the Network Development Plan, and available to view on our flexibility map, showing potential opportunities in the three to five-year and five to ten-year planning horizons.

Each invitation to tender that we publish on our website details the type of response (product) that is required within its specified location. Our four types of responses are: **Peak Reduction, Operational Utilisation, Scheduled Utilisation, and Operational Utilisation and Variable Availability**. These are industry standardised products developed through the ENA Open Networks Project in collaboration with all UK DNOs and the National Energy System Operator (NESO).

Below is an overview of each product we are currently procuring. Further detail is provided at our webinar events and a simple explanation can be found in the helpful guides section of our Document Library.

Figure 8.5: Product overview

Product	Response details	Use case
Peak Reduction	This product seeks a reduction in peak power utilised over time. This response can manage peaks in demand and could be provided by long-term energy efficiency activities.	This product could be used where energy efficiency measures are planned that would reduce a site's overall electricity consumption across the year but specifically during high peak periods.
Scheduled Utilisation	In this product, the time that flexibility is delivered has been pre-agreed in advance with the provider. This product will primarily benefit FSPs that cannot respond in real-time or near to real-time.	This service can be used by the DNOs to manage seasonal peak demands and defer network reinforcement, for example.
Operational Utilisation	This product allows for the use case where the amount of flexibility delivered is agreed nearer to real time. This can be utilised to facilitate a change in demand profile from FSPs based on network conditions close to real-time. The assets will be dispatched for the required level of service based on actual network measurement data thus managing cost	A DNO may utilise this product to restore network supplies following an unplanned outage/fault where the regulatory funding does not allow for availability payments e.g. customer interruptions.
Operational Utilisation and Variable Availability	This product allows DNOs and NESO to procure a level of contracted capacity, but then refine the requirements in terms of availability closer to the event. The assets will be dispatched for the required level of service based on actual network measurement data, meaning that the DNO/NESO is only paying utilisation payments based on the actual needs of the network.	A DNO is planning for sufficiency of flexible service contracts based on long range forecasting of network constraints.

9 Flexibility service requirements and the role of our enhanced ANM

Our flexibility service requirements and the associated ceiling prices are assessed based on:

- The primary objective of the flexibility services, which can include but are not limited to deferring reinforcement, accelerating a connection and/or supporting outage planning
- Our ability to dispatch flexibility services using our enhanced ANM system based on the voltage level of the capacity need.

The provision of flexibility services allows us to release capacity. The ceiling prices for the released capacity are assessed using the CEM tool and are based on the counterfactual network reinforcement costs with a consideration of environmental benefits (based on carbon costs embedded in the CEM tool).

9.1 The role of our enhanced ANM

Unlike a widely followed practice, our ANM system does not deploy tactical solutions that involve rule based controls. This approach is applicable to bespoke network zones, i.e. the rules are tailored to network zones and real time field measurements are utilised in implementation.

Our enhanced ANM goes beyond this current GB practice and utilises centralised and real time power flows. This is not a rule-based approach, but a fully automated cross-network model down to low voltage that uses real time measurements from our network management system (NMS). The real time power flows inform our DSO control and curtailment actions, while the ANM is linked with our Merit Order Management (MOM) system that embeds in the real time operational actions:

- Use of flexible assets, i.e. switching operations, load transfers etc
- Use of DSO flexible curtailable connections
- Use of DSO flexibility services.

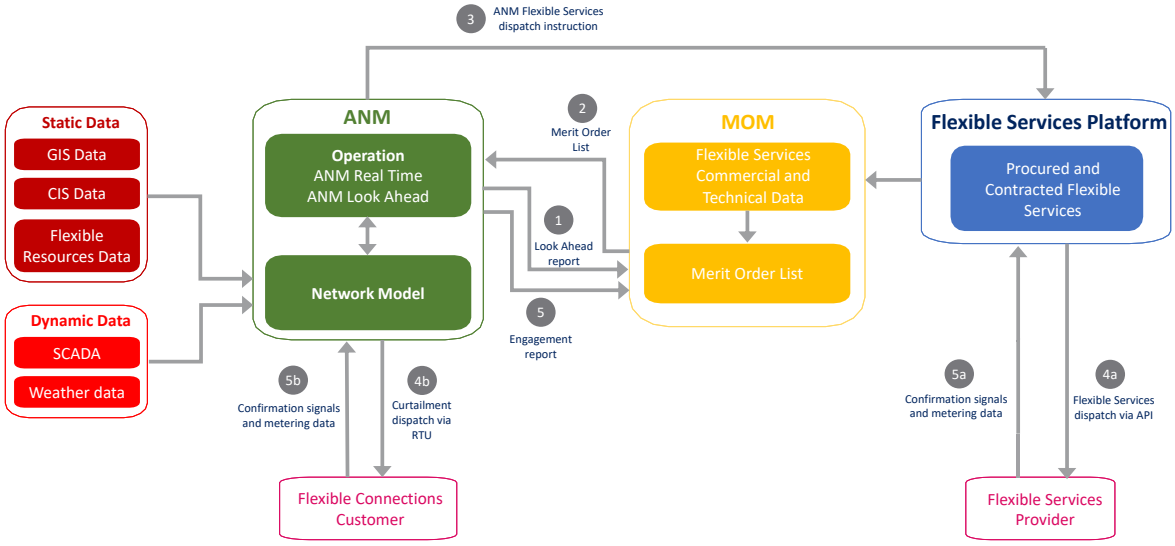
Our enhanced ANM system increases efficiencies as:

- It is a centralised system that sits within our control room
- It considers a single real-time topology map for all constraints
- It maximises the utilisation of flexible assets (i.e. zero cost switching operations)

Using our enhanced ANM we can optimise the capacity release in terms of cost efficiencies and timely facilitation of net zero by:

- Minimising over dispatching, by employing real time power flow evaluation
- Maximising asset capacity with application of enhanced ratings
- Facilitating a scalable utilisation of all types of network flexibility, unlike tactical solutions. This is delivered by:
    - the commissioning of new ANM zones which can be done using existing hardware in days
    - our enhanced functionalities which allow coordination of dispatch of flexibility services, flexible connections and assets

Figure 9.1: Overview of the interfaces of our enhanced active network management system



In FY2024/25 our ANM moved into the production environment. In the same year our ANM has gone live in the first zones of our network to fully utilise the capacity benefits and facilitate enhanced flexible services that accelerate the energisation of new connections currently held in transmission queues. More details on our ANM and the interfaces/interactions with other systems can be found in our published Operational Decision Making Framework (ODMF). Details of active and planned constraint management zones within ANM can be also found on our flexible connections webpage.

9.2 LV flexibility services

Our flexibility services that tackle capacity issues at EHV and HV voltage networks are predominantly linked to real time dispatch by our NMS using our enhanced ANM. Flexibility services at these voltage levels can be also dispatched by Electron, our third party partner that uses application programming interfaces (APIs) to dispatch flexibility services direct. This approach, where flexibility services are dispatched by a third party, is safe as our enhanced ANM can use real time power flows to resolve any potential issues driven by third party actions.

Our enhanced NMS models the whole network down to low voltage (LV) and operates down to the HV side of the secondary (HV/LV) substations. Within ED1 and the start of ED2 we have been increasing the level of LV network monitoring connected, via our PRESense sensors, smart meter data integration and Smart Street programmes. However there is still insufficient real time monitoring and control on the LV network for wide scale real time active network management at this level. This is taken into account in our LV flexibility service products introduced in our autumn 2024 flexibility tender. These requirements have been tendered for utilising our Scheduled Utilisation and Peak Reduction products, based on fixed pre-defined dispatch profiles. The use of scheduled dispatch profiles is also reflective of stakeholder feedback that they generally find it easier to recruit at this level when the dispatch requirements are known well in advance. It is harder to achieve sufficient diversity within an LV substation feed area, due to the lower customer numbers at this level; as such it is more important to ensure sufficient capacity can be secured and appropriately incentivised by clear revenues. These requirements have been defined utilising:

- **Non-real time LV monitoring data:** our LV flexibility services use our PRESense monitoring data (half-hourly demand measurements at secondary substations) to define the requirements. 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 considerations due to lack of real time measurements:** the lack of real time measurements is dealt with by considering different risk assumptions for LV networks compared to EHV and HV, specifically:
  - for EHV and HV the high-level consideration is that flexibility requirements are triggered when capacity utilisation is above 100%, i.e. when demand exceeds network capacity
  - for LV networks flexibility requirements are triggered when the capacity utilisation is close to 100%, i.e. in our autumn 2024 tender a 95% utilisation threshold has been considered. This allows us to mitigate any risks of exceeding capacity when this cannot be linked to access to real time measurements.

9.3 Assessment of ceiling prices

EHV and HV capacity release

The ceiling prices for flexibility services are published in our flexibility tenders. When flexibility services are used to release network capacity at EHV and HV parts of our network, the ceiling prices are calculated based on the costs to deliver the counterfactual network reinforcement. This applies to all cases where flexibility services are used to defer reinforcement and/or accelerate a connection.

For all evaluations of EHV and HV flexibility services with counterfactual reinforcement we publish the corresponding CEM tool results that contain the ceiling prices, as well as all numerical assumptions on costs and the detailed timeline of the compared interventions. Beyond the counterfactual reinforcement costs, the assessment of ceiling prices in the CEM tool also considers the carbon costs.

Moving forward we will engage and work more closely with the NESO to reflect their inputs and insights as whole system planning co-ordinators, and incorporate the whole system benefits from the released capacity in the assessment of our ceiling prices in a standardised way.

LV capacity release

For LV flexibility services we follow a simplified process, where the ceiling prices are not a bespoke assessment of costs for the reinforcement of specific LV sites. Our approach considers the assessment of a single ceiling price per kWh based on:

- The cost of counterfactual reinforcement for the whole population of secondary substations
- A requirement of kWh that beyond the required capacity (in kW) considers the time profile requirements.

The counterfactual reinforcement costs considers the total expenditure to install a new secondary substation for the identified sites where capacity needs to be released. A single cost value for the whole programme of reinforcing secondary substations is considered. Together with the reinforcement costs the carbon costs are considered in the CEM tool to define the ceiling prices.

To quantify the volumes of all kWh of flexibility services we analyse the profiles of all secondary substations to define the season (dates) and the time of day when the flexibility services would be required across all substations.

By using a single ceiling price for our LV flexibility services we simplify the process for FSPs. This is important as our FSPs for LV flexibility are predominantly domestic and small commercial customers. At the same time customers who provide the same kWh of flexibility services and are supplied by different secondary substations are paid the same prices.

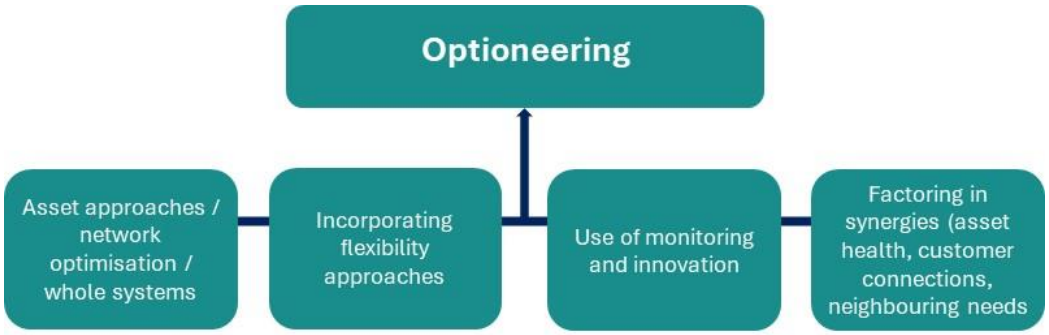
10 Optioneering

When we have a view of requirements in a constrained area, we then begin to consider the range of network options to create future capacity based on location, magnitude, nature and timing dependencies. Interventions could range from purchasing flexible demand and generation services to investing in new assets or deploying innovative technology to ensure that the necessary capacity is available up to 2030 and beyond.

This optioneering process provides a view of future development requirements and is supported in the near term by a comprehensive CBA to support our decision-making.

Alternative approaches are thoroughly assessed to ensure that the optimal development plan is identified, considering the timing of interventions and not foreclosing future pathways. For development of the EHV network, this is supported by the use of rigorous CBA which ensures that flexible solutions are considered equitably alongside traditional asset solutions.

Figure 10.1: Optioneering to ensure optimal network development planning



The options considered for intervention are:

- Procurement of flexibility services
- Network reconfiguration and/or voltage control
- Delivering an energy efficiency programme
- Innovative solutions
- Network reinforcement

By determining the cost of the most efficient traditional reinforcement option we provide the counterfactual for any assessment of the alternatives. The network planning processes to identify the asset intervention solution are done in parallel with the development of the alternative solutions. To ensure that our approach is transparent and open to review, we have described this process in detail in our Network Development Plan. We also look for proactive network interventions that consider cost efficiencies and risk mitigation across larger areas and allow us to avoid piecemeal expansion of the network.

Positively engaging with as many solution providers as possible in all our decisions is key to our strategy of delivering efficiencies for our customers, and ensuring that we have the widest range of options possible for evaluation to adopt the most suitable economic approaches. We publish information on network constraints to encourage potential solutions from all parties e.g. flexibility providers, customers, the NESO, transmission operators, other DNOs and independent distribution network operators (IDNOs), and groups such as local community groups. This holistic approach would, for example, allow a community energy group to bring forward a proposal for an energy efficiency programme in its locality to solve a network capacity need. Working with other energy vectors and local authorities will be a key part of developing

whole system outcomes through the planning process. For more information please see our NDP methodology.

These are described in a 'needs' paper that covers:

- Load-related criteria
- Non-load-related criteria
- Stakeholder engagement
- Whole system impact and analysis, including LAEP inputs
- Options considered
- Budgets and financial evaluations
- Timescales
- Internal control and governance.

11 Evaluation

The needs paper will detail the options that are to be assessed for each scheme.

Two different CBA models are predominantly used, the Ofgem CBA tool, as used throughout our RIIO-ED2 submission, and the Common Evaluation Methodology (CEM) and Tool developed through the Open Networks Project, led by Electricity North West and supported by Baringa (business management consultants).

To enhance transparency and confidence in our network investment decisions for our stakeholders we publish all CEM tool files on our website with detailed assumptions showing how we price flexibility services and compare them with conventional network reinforcement interventions.

The CEM tool was informed by our more sophisticated Real Options CBA (ROCBA) tool developed as part of our Demand Scenarios project by the University of Manchester. The ROCBA tool was originally developed in MS Excel to quantify benefits in terms of cost and risk assessments accounting for uncertainties in future peak demand growth as well as other uncertainties (e.g. energy prices, weather conditions etc). Moving forward we intend to fully utilise the benefits of our ROCBA tool to provide additional insights on decision making. Thus, we have recently re-platformed both the CEM and the ROCBA tools to facilitate automation of evaluation across larger volumes of interventions.

11.1 Ofgem Cost Benefit Analysis (CBA) tool

The Ofgem CBA tool is used for comparing all potential options to the identified constraint, except flexibility where the CEM tool is used. The most cost-effective solution identified through CBA evaluation will then be used as the counterfactual for evaluation of a flexible solution.

11.2 Common Evaluation Methodology (CEM) tool

In RIIO-ED1, Electricity North West led the development of the CEM tool within Workstream 1A of the Open Networks Project in collaboration with other DNOs and supported by Baringa. The

CEM tool builds on much of the learning from our ROCBA model and is similarly based on the Ofgem CBA model.

The CEM tool is used to identify the ceiling price available for flexibility on an individual site basis. This price is derived from the most cost effective solution identified as the counterfactual from the Ofgem CBA. It is then published on the ElectronConnect platform, in the tender appendices on our flexibility hub, our flexibility map and our Open Data Portal.

Cost calculators are for flexibility providers to use as a tool for calculating their optimal bid price, in accordance with the ceiling price for each window.

We carry out this evaluation in accordance with the 'good practice guide', also developed through the Open Networks Project. Completed CEM assessments are available to view for each tender round. See details of our previous tenders.

The ongoing governance of the tool is managed through the Open Networks Project, and all future modifications will be consulted upon with stakeholders.

Useful links

- Common evaluation methodology cost benefit analysis user guide
- Common evaluation methodology tool
- Good practice guide

11.3 Re-platform of CEM and ROCBA tools

In autumn 2024 we re-platformed our ROCBA tool as well as the CEM tool using Python. The re-platformed versions allow automated assessments with reduced manual processing by our DSO experts.

This is a step forward as it:

- Informs our decision-making with insights provided by two different CBA tools (CEM and ROCBA)
- Facilitates the evaluation of large volumes of interventions, e.g. the use of flexibility services to accelerate connections and LV flexibility services.

12 Recommendation

The DSO recommendations for flexibility services follow our 'flexibility first' approach and are linked with the capacity release objective that is met as follows:

- **EHV reinforcement deferral:** in our DNOA report there is a DSO recommendation for the use of flexibility services as the preferred option when it is economic to do so, i.e. when flexibility providers bid not more than the ceiling prices based on counterfactual reinforcement costs. This is linked with the EHV reinforcement that is driven by our annual DFES forecasts and associated NDP report and workbook (Network Scenario Headroom Report) capacity headroom forecasts workings. The deferred reinforcement is linked with the DFES driven reinforcement including the impact of connections activity that affects the conventional sub-transmission reinforcement solutions.
- **Accelerate capacity release and/or defer reinforcement for accepted connections:** this is a process initiated in 2024 where we consider reinforcement driven by accepted connections. We consider the reinforcement costs and capacity requirements to offer through our flexibility service tender products that can allow us to accelerate the connection through faster capacity release via flexibility, defer reinforcement or do both. In our autumn 2024 tender we tested all connections driven reinforcement schemes that were part of our January 2025 load-related expenditure re-opener.
- **LV reinforcement deferral:** as described in the LV flexibility subsection in this document, we use LV flexibility services in combination with annual refreshes of LV measurements (continuous visibility approach) to defer LV reinforcement.

In summary our 'flexibility first' approach not only includes DFES driven reinforcement on the EHV network, but now considers connections driven reinforcement and LV reinforcement deferrals.

Following the engagement, analysis and optioneering undertaken in previous steps, our process concludes with our recommendation for each constraint.

Decisions are disseminated both internally and externally through several channels:

- Our DSO stakeholder panel serves as a platform for transparent communication, offering a ten-day standstill period for stakeholders to scrutinise and potentially challenge our recommendations.
- Information is shared through this report, ensuring comprehensive visibility and understanding of our decisions.
- Details regarding flexibility tender specifications are promptly published on our 'previous requirements' webpage within 30 days of contract award. Additionally, this platform hosts the published CEM tool results used for evaluation.
- Annually, a comprehensive Distributed Flexibility Procurement Report is released, encapsulating our decisions and actions in the realm of distributed flexibility procurement, providing a comprehensive overview of our strategies and outcomes.
- Our Open Data Portal is updated following the award of contracts post tender to provide data on flexibility service procurement in a multitude of formats including CSV and API.

13 Feedback

This document is intended to serve as a comprehensive guide to the methodologies and processes that inform our network investment activities. We remain committed to transparency, ensuring that our investments are both economical and efficient, thereby yielding tangible benefits for our customers. However, we want to ensure that this provides a useful resource for our stakeholders, and we welcome feedback on these documents and how we communicate these processes and decisions.

We will refresh this document annually to reflect changes in our DFES, looking to our stakeholders to help us inform future iterations. Data flows and engagement between all actors remains crucial in the journey to net zero, ensuring our customers' needs are reflected in the development and operation of our network.

Have your say on our future network development

- Is this useful?
- Is there anything else you would like to see?
- Would you like the reports available in any other data format?
- Is the decision-making process clear? Is there anything that requires more transparency?
- Score out of 10.

If you have any feedback or you would like to speak to the team about development plans, please email us.