



# Network Development Plan 2022

Introductory Document  
Strategic Planning, DSO Directorate  
April 2022

# Contents

1	Welcome .....	2
2	Planning our future network.....	3
2.1	Network Planning Approach .....	3
2.2	Importance of sharing information.....	4
2.3	Our suite of network information.....	4
3	Introducing our Network Development Plan.....	6
3.1	The scope of the NDP and document structure .....	6
3.2	Network Headroom Report .....	7
3.3	Network Development Report.....	8
3.4	NDP Methodology.....	8

# 1 Welcome

**Welcome to our first publication of the Network Development Plan (NDP). In it we share our assessment of long term network capacity for a full range of scenarios and a 10-year best view of required network developments. Our work on the NDP has shown that in many cases our existing infrastructure can accommodate our forecast customers' long-term requirements, however there are areas in the next 10 years where capacity will be required. To meet these different challenges, we must plan our future network to be agile and flexible, while continuing to be reliable.**

This document builds on our August 2021 publication of the Network Headroom Report (NHR), with updated capacity information in the 2022 NHR but also includes further information in the Network Development Report (NDR) on how we intend to provide demand and generation capacity across our network with specific interventions up to 2031. A detailed methodology is also presented to enhance visibility of our network planning approach; detailing how we forecast future requirements, evaluate network capacity and the optioneering process to determine the optimal network solution.

The purpose of the NDP is to share further information with our customers and industry stakeholders to enable identification of areas of the network where there is capacity to accommodate new connections and highlight where there are current and future forecast constraints to which deployment of flexibility services may be advantageous. It also shows our plans for the coming 10 years in constrained network areas to implement whole system solutions which create capacity in an efficient, smart and flexible way.

As the North West region's electricity distribution network owner (DNO), we will continue to serve our customers and communities by helping them build for the future and transition to a Net Zero carbon by using innovation, deployment of flexibility first and investment in key infrastructure. We submitted our final RIIO-ED2 business plan in December 2021 to Ofgem for approval. Our plan sets out our commitment to Net Zero and how we will lead the North West in this transition. We are responsible for the affordable development of a safe and reliable system in the North West and aim to continue doing this whilst reducing our part in customers' bills. The Net Zero transition will result in significant increase in distribution network demand by 2050 driven by new generation connections and new demand from low carbon technologies (LCTs) such as electric vehicles (EVs) and heat pumps (HPs).

The key challenge for us is to provide the network capacity for these new connections in an efficient and flexible way. The development of the network in the next 10 years (covering the ED2 and into ED3 regulatory periods) is very important to meet national targets and regional ambitions for Net Zero. We need to have well-developed but flexible plans in place to meet these future requirements. Sharing information on our network and our development plans with stakeholders is crucial in the low carbon transformation and it will help unlock value across the whole energy system.

We welcome your feedback on our first NDP publication as it will help shape our future publications and network information strategy.



Steve Cox, Distribution System Operator Director

## 2 Planning our future network

### 2.1 Network Planning Approach



The way we plan and develop our network is evolving to meet our customers' changing needs and in response to increasing Net Zero ambitions and the requirement for secure and affordable energy system. One of the prominent changes we are seeing as part of the transition to Net Zero is the connection of local embedded generation and storage and further flexibility options, which are vital tools if we are to reduce carbon emissions. We are also accommodating more LCTs including EV charge points to decarbonise transport and more HPs to decarbonise heating in the UK. The rate that these changes happen however are unsure and we factor this uncertainty into our network planning by considering the impact of a range of credible future forecasts. We develop a range of Distribution Future Electricity Scenarios (DFES) to capture the uncertainty associated with of the magnitude and speed of these changes occurring. Our scenarios utilise our bottom-up modelling methodology and we undertake a continuous cycle of engagement to understand stakeholder requirements which are then included into our forecasts.

These well-informed forecasts for each of our bulk supply points and primary substations provide the range of inputs into the network impact assessment stage and ultimately the production of the NHR. This stage involves detailed network studies to identify the network capacity and any associated constraints corresponding to each scenario. Initial views of our network's future capability are gained from investigations based on the Best View scenario, while our understanding of sensitivities is gained from examining all scenarios. Our analysis looks to the long term to provide foresight of future needs so that we can plan efficiently. We need to plan proactively rather than react to issues when they occur because of the time required to construct new assets and arrange commercial solutions.

When we have a view on requirements in a constrained area we then begin to consider the range of network options to create future capacity based on location, magnitude and 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. Options to address the issues identified in our network capacity analysis are compared using standard DNO approaches based on a common evaluation methodology (CEM) cost-benefit analysis (CBA) tool.

The use of flexibility is an essential tool to facilitate the Net Zero transition whilst keeping energy bills low for our customers. Procurement of flexibility services is a smart and efficient method for managing our network and we are supporting development of the flexibility market in numerous ways. This includes increasing the visibility of our needs by reporting network headroom and development plans in this report. This will give flexibility providers a future view of potential constraints across the network up to 2050 and opportunities to participate in areas requiring intervention in the coming 10 years. Our Network Development Report details all our intervention requirements for the next 10 years and presents our best view development plan inclusive of all asset-based solutions and alongside where appropriate flexibility options.

More detailed step by step information on how we plan our network for future capacity requirements can be found in the accompanying NDP Methodology Document and we will continue to share more information on this process to provide transparency and empower stakeholders.

## 2.2 Importance of sharing information

As DNO for the North West of England, we are responsible for the affordable development of a safe and reliable system which must continue to meet our customers' needs as they transition to a Net Zero carbon future. We have a dual role to play in this transition, in not only providing the right infrastructure but also by leading by example as an organisation in our own Net Zero actions. We have committed to demonstrating to our customers and stakeholders the actions that are needed and sharing our learning to help them on their Net Zero journeys. We are also committed to ensuring that our plans for the North West future network are based on the needs of our customers and stakeholders as they transition to Net Zero. We work closely with our strategic partners across the region, supporting the development of bespoke plans and projects to help meet their local targets, including the ambitions our three main County Councils to meet net zero carbon before 2040.

To support the transition to Net Zero, it is important we share information of future electricity trends and the impact of these trends on the electricity network across the North West. The sharing of information on the future network can support north west customers in taking positive actions towards Net Zero and in the planning of their new connections. In conjunction, developing visibility and understanding of future network requirements enables stakeholder participation in the solution. Customers developing flexible Distributed Energy Resources (DERs) can see ahead of time where their projects may have wider benefits and support a flexible services solution. In turn we can plan and operate a more dynamic network.

The NDP is therefore an important source of information on the future network as it shows where on our network new connections are suitable and where flexibility services may be advantageous. It also provides information on how we intend to create capacity over the next 10 years in constrained areas either using flexibility services or reinforcing our network with enhanced assets.

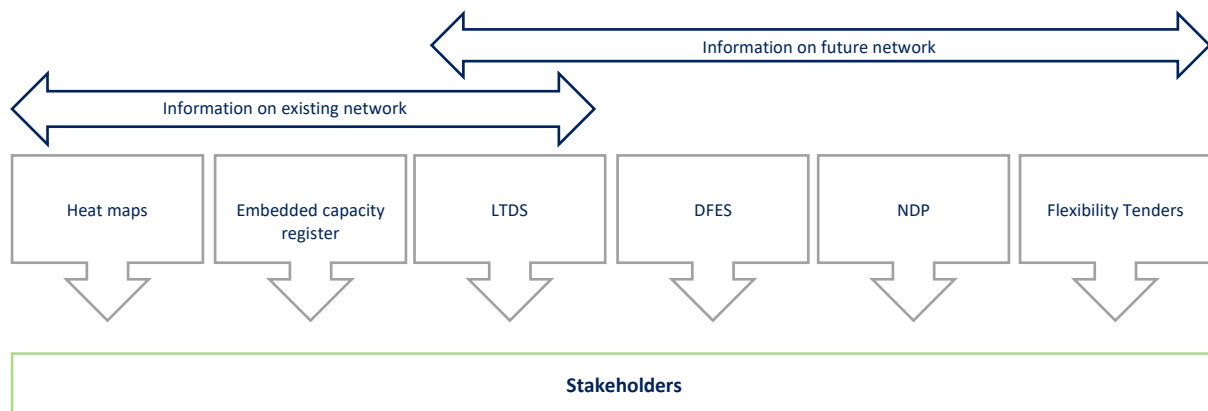
Sharing more planning and operational data in line with Ofgem's Data Best Practice guidance is one of our priorities and it is considered crucial to the transformation to a low carbon, affordable, flexible and digital energy system. We understand that network information is an important enabler in encouraging stakeholder participation and how it unlocks value from our system by allowing them to develop their capabilities.

## 2.3 Our suite of network information

DNOs already report on distribution network capacity to empower customers and stakeholders, some of whom need information on immediate connection applications, some who may be looking for opportunities to locate developments to provide network services and others looking at long-term forecasts and plans for our region. Different network reports, as shown in Figure 1 have different purposes and therefore have a range of timeframes and content.

All DNOs are currently required to publish information on network planning and development including strategic documents, Long Term Development Statements (LTDS) and DFES. The aim of the LTDS is to provide network information on the existing network and availability of capacity in the short-term (0-5 years), whilst the DFES provides long-term (up to 2050) forecasts of future electricity trends to capture the range of future uncertainties. This leaves a gap in information on network information and development plans in the medium-term.

The NDP will provide this medium-term view, with network capacity information up to 2050 and details of a best view development plan for the next 10 years considering both network reinforcement and flexibility options. In line with the new standard licence condition (SLC25B) we will publish a NDP every two years.



*Figure 1 Complementary suite of network information*

This NDP is consistent with our suite of documents which provide data for a range of time periods to support our customers and stakeholders with their development plans.

- Our Heatmap Tool provides information about the ability to accommodate additional connections on the present network, considerate of the connections accepted on to our distribution network but not yet realised.
- The Embedded Capacity Register complements the Heat Maps Tool which lists generation and storage resources ( $\geq 1\text{MW}$ ) that are connected, or accepted to connect, along with information on flexibility services and network reinforcements associated with connections.
- Our LTDS more detailed ratings of network components and forecast loadings for five years into the future.
- Our DFES presents future forecast electricity trends for all 5 scenarios and associated insights.
- We publish bi-annual tenders to invite response from flexibility service providers for identified network constraints.

## 3 Introducing our Network Development Plan

### 3.1 The scope of the NDP and document structure

The scope and format of our NDP has been collectively developed and agreed by all DNOs co-ordinated through the Energy Networks Association (ENA) Open Networks project namely Work Stream 1B (WS1B). The scope and requirements to produce the NDP are set out in Form of Statement<sup>1</sup> document. Consistency of each form of report prepared by each DNO is necessary so that stakeholders can become familiar with a common approach, and its content is recognisable and understood.

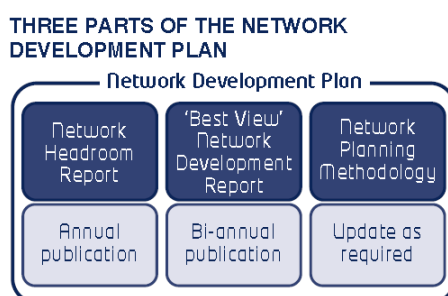
Our NDP is structured into three component parts and we have signposted the relevant information in each area:

- 1) Network Headroom Report (NHR),
- 2) Network Development Report (NDR)
- 3) NDP Methodology.

We will publish annually from May 2022 onwards a NHR to provide stakeholders with visibility on future network capacity and every 2 years we will present in the NDR our best view of planned network interventions for the next 10 years requiring both asset based and flexible network developments.

The NDP presented is part of our commitment to share more information to empower our stakeholders. It has been designed for the following audiences and is important to them because:

- Customers: insight into network opportunities for future connections and location requirements for flexibility services
- Local authorities and organisations: understanding of future network capabilities and support for regional developments
- Other network operators: Inform assessment for interconnected networks and understand future needs for considering synergies or whole system solutions
- Ofgem: appreciation of how our network may cope with the range of credible forecasts to identify available capacity and needs. The level of future requirements at an overall network level



<sup>1</sup> [https://www.energynetworks.org/industry-hub/resource-library/on21-ws1b-p5-network-development-plan-\(ndp\)-form-of-statement-template-and-process-\(22-dec-2021\).pdf](https://www.energynetworks.org/industry-hub/resource-library/on21-ws1b-p5-network-development-plan-(ndp)-form-of-statement-template-and-process-(22-dec-2021).pdf)

### 3.2 How the NDP overlaps with our RIIO-ED2 Business Plan

This first NDP comes a few months after we published our RIIO-ED2 Business Plan on 1 December 2021. There is overlap between the two publications: the work we did to produce this NDP is similar in nature to that was done to create our RIIO-ED2 Business Plan, and all the interventions that increase capacity that we included in our RIIO-ED2 Business Plan have been included within the NDP. However, the NDP goes beyond the RIIO-ED2 period of 2028 and includes projected requirements up to 2031.

As part of our DSO Strategy in ED2 we are making several interventions; including enhanced network visibility by deployment of additional monitoring and we will exploit the capabilities of our new network management system. These will support enhanced forecasting and real-time capacity release and incorporation of flexibility services, enabling us to make better use of existing asset capacity and reduce uncertainty on load-driven requirements.

### 3.2 Network Headroom Report

The NHR aims to provide an accessible and simple quantification of network capacity for demand and generation across our network for a range of possible but uncertain futures.

We first published our NHR in August 2021, this prior work gave us an opportunity to publish our NHR as a trial and refine our processes for update in the 2022 NDP. We know our stakeholder are already gaining benefits from the information and wish to continue to understand future headroom of the network. Some wish to know what is needed to meet Net Zero in our region while others are looking for a medium to long term planning view for major infrastructure developments.

This NHR update applies the 2022 DFES forecasts to indicate the future ability of our existing network to accommodate predicted demand and generation growth under all DFES scenarios up to 2051. The assessments which underlie the headroom values follow our normal network evaluation practices and the results are summarised for the networks served by each bulk supply point (BSP - typically 132/33kV) and primary substation (typically 33/11kV). Headroom for demand and generation is given recognising the needs of different types of customers and because of the vital role that they are playing in decarbonisation.

Headroom results signpost parts of our network most likely to be suited to new connections in the future. They also highlight the parts of the network where network interventions may be required to allow the forecast level of future growth and where we are more likely to require flexibility services or encourage energy efficiencies.

We have made available annual network capacity values out to 2031 as we have greater certainty in our forecasts during the next 10 years with visibility of connections pipeline and national policy. Results beyond the first ten years up to 2051 are given every five years to avoid a cumbersome dataset and it also reflects the uncertainty of the long-term forecasts of headroom. For stakeholders requiring information about making an imminent connection to the network, our Heatmaps and ECR provide the current picture with monthly updates to reflect the status of connection offers.

BSP and primary substation headroom values match our DFES which in turn align with where we currently have comprehensive system loading measurements that are a critical starting point for our forecasts. We are planning more widespread monitoring of our low voltage networks and we expect that this will be reflected in forecasts and more accurate LV network headroom reporting in the future.



### 3.3 Network Development Report

This our first publication of the NDR, will provide utility and understanding on the current baseline of development plans for the next 10 years across the North West network. This baseline development plan is informed by our “Best View” scenario and forms the basis of a more extensive optioneering and decision making process that among others includes the use of all scenarios in Common Evaluation Methodology (CEM) cost-benefit analysis (CBA) and the timing of changes in stakeholder and customer requirements, eg their action plans to accelerate transition to Net Zero . We have previously provided a long-term view of our network’s capability to accommodate forecast demand and generation in our Regional Insights documents, with the latest being published in February 2021. The NDR provides more granular information on the options for each required network intervention in the next 10 years. We believe it provide valuable information to stakeholders on the key planned projects set for delivery between 2022 and 2031 on the grid and primary networks.

The NDR report highlights where there are forecast capacity shortfalls in the next 10 years, a list of network interventions has been compiled based on this information. Each network intervention is listed in the NDR, with solution details provided for each of these key projects. The information is broken down to the new asset infrastructure required to reinforce the network, alongside where applicable the requirements for flexibility services. For several of our substations where capacity constraints are anticipated, we may be able to develop a whole system solution utilising capacity from adjacent networks. We have signposted this development work to evaluate the options in the NDR also.

Within the NDR we have aligned the information presented to our approach to strategic network planning, in that both asset and flexibility service are both considered as viable options. Final solution selection and investment decisions are made as close as possible to the capacity requirement to ensure decisions are made based on the latest most certain information.

The objective of the information is to provide stakeholders with a future view of network plans, so they can determine whether it may impact their projects and to signpost flexible service requirements for participation. In addition, a comprehensive list of intervention requirements provides a clear overview of network development across the north west and the overall investment needs.

### 3.4 NDP Methodology

The third section is the NDP Methodology, which serves to provide transparency on how the data is assembled and information that is presented within the NDP. The NDP Methodology section covers the end-to-end process which provides details to allow stakeholders to understand sensitivities and extrapolate the NDP results.