Network Development Plan Methodology

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DOCUMENT CONTROL

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Table of Contents

1 Executive Summary

Northern Powergrid is enhancing its electricity distribution network to address both current and future customer needs in alignment with the region's decarbonisation ambitions. When investing in network upgrades to accommodate the rising demand for electricity, we are dedicated to implementing a 'flexibility first' strategy and leveraging smart solutions for network reinforcement. This approach prioritises exploring flexible alternatives before introducing new assets to address load-related network constraints. Through the adoption of efficient and sustainable energy practices, Northern Powergrid is ensuring a smarter and more adaptable future for the region's electricity distribution network.

Our Network Development Plan (NDP) outlines the roadmap for network development to support net zero goals in the region. It details future network enhancements following the 'flexibility first' principle and opportunities for new connections, in compliance with Office of gas and electricity (Ofgem) standard licence condition SLC25B. By transparently sharing our analysis and insights, we aim to facilitate informed discussions and decisions that benefit our customers, communities, and network users. The NDP empowers stakeholders to incorporate our network plans and Flexibility Services requirements into their planning processes, fostering collaboration and value creation for all involved parties.

Our NDP adheres to the structure outlined by the Energy Networks Association's (ENA) Form of Statement (FoS) of NDPs.[1] It consists of three key documents: this NDP methodology document, the Network Development Report (NDR), and the Network Headroom Report (NHR).

In this NDP methodology, we elaborate on our 'flexibility first' approach and provide details about the systematic evaluation process we use to compare different options. Our goal is to make informed decisions for designing and optimising our electricity distribution network when we address current and future load-related network constraints, fault level issues, and asset health conditions. Additionally, this NDP methodology describes the calculation processes for the NHR.

The NHR provides our stakeholders with an insight into the available capacities across our distribution network for new connections in terms of generation and demand headroom, this is reported for each of our DFES forecast scenarios up to 2050.

The NDR outlines requirements for load-related, condition, fault level, and connection-driven network developments over the next ten years. It covers the entire Northern Powergrid network down to the primary substation level. The NDR also identifies areas where Flexibility Services may be necessary to overcome forecasted network constraints in the coming ten years. By sharing this information, we empower stakeholders to understand our Flexibility Service requirements and actively participate in the flexibility market. We have created a standardised NDR template for documenting the planned network enhancements. This uniform approach ensures that data is consistently presented, benefiting our stakeholders.

[1] https://www.energynetworks.org/assets/images/ON21-WS1B-P5NDP Form of Statement Template and Process (22Dec2021)Published.pdf

We evaluate fault levels and network development requirements by conducting fault level surveys and assessing asset health indices. In addition, we analyse load-related constraints, considering the impact of forecasted power generation and the growing demand for electricity driven by the growth of low carbon technologies (LCTs). Our Best View scenario outlines the most probable path to achieving net zero emissions in our region, informing our investment decisions over the next decade to enhance energy resilience and support decarbonisation within our communities. Further details of our Best View scenario can be found in our DFES Report[2].

Our dedication to sharing information on network developments through the NDP is in line with our Distribution System Operator (DSO) strategy (DSO3), which focuses on facilitating transparent energy system data sharing and collaborative planning with stakeholders. This supports our mission to empower our region to achieve net zero goals by providing valuable insights for local stakeholders to enhance their planning efforts towards net zero ambitions.

Stakeholder engagement

Our customer-centric approach and commitment to transparency drive our engagement with stakeholders to gather feedback on our NDP process and documents. This collaborative approach has been instrumental in shaping a well-defined and structured NDP that aligns with user expectations and provides significant value to our customers and stakeholders.

[2] https://northernpowergrid.opendatasoft.com/pages/home/

2 About Northern Powergrid

Northern Powergrid is responsible for the electricity distribution network that powers everyday life for 8 million customers across 3.9 million homes and businesses in the North East, Yorkshire and northern Lincolnshire.

Northern Powergrid operates a network that spans around 25,000 square kilometres and consists of 96,000 kilometres of overhead power lines and underground cables and more than 63,000 substations, including:

- 122 large substations (42 grid supply points and 80 supply points).
- 552 primary substations.
- 63,134 distribution substations.

Northern Powergrid plays a crucial role in society by powering people's lives and fostering economic growth in the communities it serves. We are proactively preparing for future demands by cultivating a diverse and skilled workforce capable of managing evolving energy systems that integrate smart and LCTs. Through innovative projects, we are exploring cutting-edge technologies to enhance our DSO functions and advance towards sustainable energy solutions in alignment with net zero emissions targets.

Figure 1 – Northern Powergrid network region and our business

3 Introduction

The NDP serves as a valuable resource for our customers and stakeholders. It provides comprehensive information about our planned network enhancements, including upcoming Flexible Services deployments and new infrastructure installations.

Our NDP also includes forecasted demand and generation headroom capacities across our distribution network, considering various scenarios up to 2050. We take into account factors such as projected power generation and the decarbonisation of transport and heat when calculating headroom capacity.

To ensure consistency with other Distribution Network Operators (DNOs), our NDP adheres to the structure outlined by the Energy Networks Association's (ENA) Form of Statement (FoS) of NDPs[3] so that our users are able to work with a familiar format.

The NDP comprises three key documents: the NDP methodology document, the Network Development Report (NDR), and the Network Headroom Report (NHR) as outlined in Figure 2. These documents are accessible on our Open Data Portal in downloadable formats.

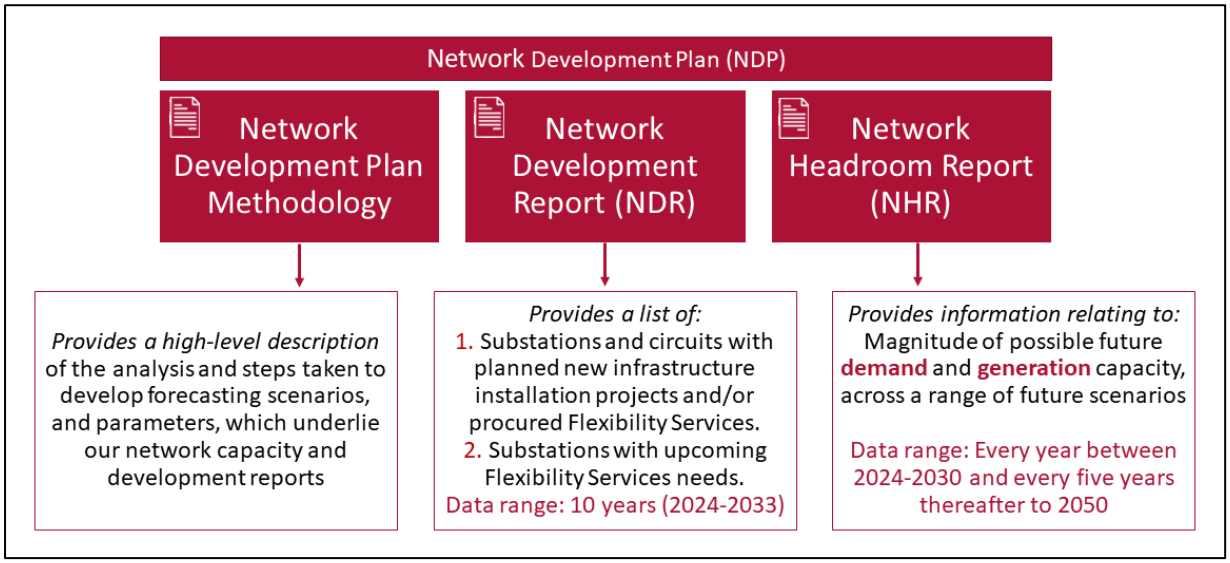

Figure 2 – NDP documents

In the NDP, we focus on essential interventions based on our Best View scenario. Our goal is to provide stakeholders with detailed information about planned network improvements over the coming years. This includes our strategies for new infrastructure and Flexibility Services deployments.

The NDR supplements this by offering stakeholders crucial additional details related to the network developments. It covers new infrastructure installations and upcoming Flexible Services, with a time horizon ranging from 1 to 10 years. While the NHR provides stakeholders with insights into the potential future demand and generation capacity headroom across a range of future scenarios. The

[3] https://www.energynetworks.org/assets/images/Resourcelibrary/ON21-WS1B-P5 Network Development Plan Form of Statement 19 Aug 2021

Network Headroom Report (NHR) encompasses each year from 2024 to 2030 (inclusive), and subsequently, every 5 years until 2050.

3.1 Our "flexibility first" approach

As we invest in our network to meet the growing demand for electricity, we are committed to adopting a 'flexibility first' approach[4] to network reinforcement. This strategy allows us to provide cost-effective solutions that align with our net-zero ambitions. Prioritising flexibility means exploring alternative options before adding new assets in response to load-related network limitations.

Flexibility Services play a crucial role by offering additional network capacity. When Flexibility Service Providers (FSPs) adjust their electricity usage during peak demand or generation periods, it helps balance the network. To ensure sufficient services are available, we assess the market for Flexibility Services.

Our 'flexibility first' policy[5] ensures a robust, transparent, and auditable framework. We have also established a suite of codes of practice within our organisation, guiding engineers to implement flexibility effectively as a solution to network constraints.

Figure 3 illustrates our economic strategy, emphasising proactive monitoring. Through monitoring, we can fully utilize our existing network and understand network loading, before we intervene with a 'flexibility first' approach in advance of resorting to conventional reinforcement where appropriate.

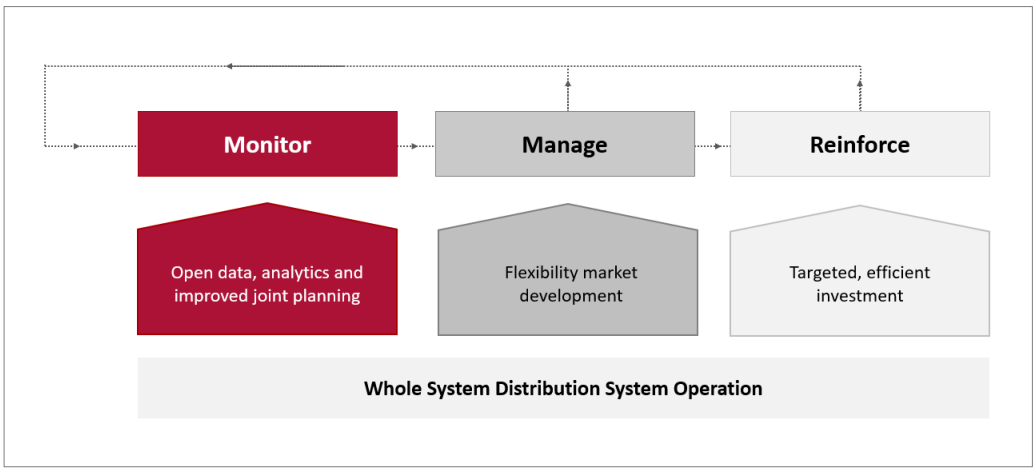

Figure 3 – Our Monitor, Manage, Reinforce approach to optimise network utilisation and flexibility

We welcome all interested customers in our region who may be able to provide Flexibility Services to Northern Powergrid to contact us via email at flexibility@northernpowergrid.com. Details of our flexibility needs are detailed on the Flexible Power website[6] and Piclo Flex market platform[7].

[4] https://www.northernpowergrid.com/sites/files/assets/NorthernPowergridFlexibilityFirstPolicy
[5] https://www.northernpowergrid.com/sites/files/assets/NorthernPowergridFlexibilityFirstPolicy
[6] https://www.flexiblepower.co.uk/locations/location/northern-powergrid
[7] https://picloflex.com/dashboard

3.2 NDP benefits

Our NDP aims to enhance transparency regarding our investment decision-making processes and network development strategies. By sharing this information, we empower our customers and stakeholders to:

- Collaborate with us to achieve our region's net zero goals by aligning their development plans with ours.
- Gain insights into our Flexibility Service requirements and actively participate in the flexibility market.
- Strategically plan connections based on available capacity or seize opportunities to provide network services.
- Engage with us by providing valuable feedback on our NDP.

3.3 Scope of the NDP

The requirements of the NDP are set out by the ENA Form of Statement (FoS)[8] under Ofgem standard licence condition SLC25B which requires DNOs to inform stakeholders of their future network developments through the NDP. Under The scope is summarised in the following table.

[8] https://www.energynetworks.org/assets/images/Resource%20library/ON21-WS1B-P5%20Network%20Development%20Plan%20Form%20of%20Statement%20(19%20Aug%202021).pdf

Table 1 – Summary of NDP scope

	Network Headroom Report	Network Development Report
Date range	Up to 2050 aligning with the final year of the DFES forecast. Every year to be covered individually between 1-10 years. After the 10th year, this requirement moves to every five years up to 2050.	Authorised and planned interventions for the next 10 years.
Frequency of updates	Every year in May.	Every two years in May.
Network coverage	All Primary substations and Supply Points. GSPs are not included.	All Primary substations and Supply Points. GSPs are not included.
Reporting granularity	Demand and generation headroom (available capacity) in MW per reported year per scenario.	Network infrastructure: - Location of intervention - Outline of the planned works - Reason for carrying out works - Impact on the distribution system capability - Equipment ratings (for transformers, the existing and new rating) - Expected start and completion data, and Equipment ratings Flexibility Services: - Location of intervention - Year of intervention
	Headroom calculations are considerate of financially approved network developments in delivery or planned for delivery, including asset-based enhancements and the use of Flexibility Services. This may include updates in network developments in the timeframe 0-5 years which were not included in the latest LTDS (November). If included, this must be stated in the accompanying notes and updated in the next LTDS (end May).	
	Headroom calculations are considerate of thermal loading and fault level constraints.	

3.4 Other network reports

Northern Powergrid publishes different types of reports on distribution network capacity to empower customers and stakeholders who are, for example, seeking information on immediate connection applications, looking for opportunities to locate developments to provide network services and others looking at long-term plans for our region. Thus, our different network reports have different purposes and therefore have a range of timeframes and content. The NDP aims to provide value to customers by aligning against existing and evolving reports. Our suite of documents is shown in Figure 4 and their data time horizons are shown in Figure 5.

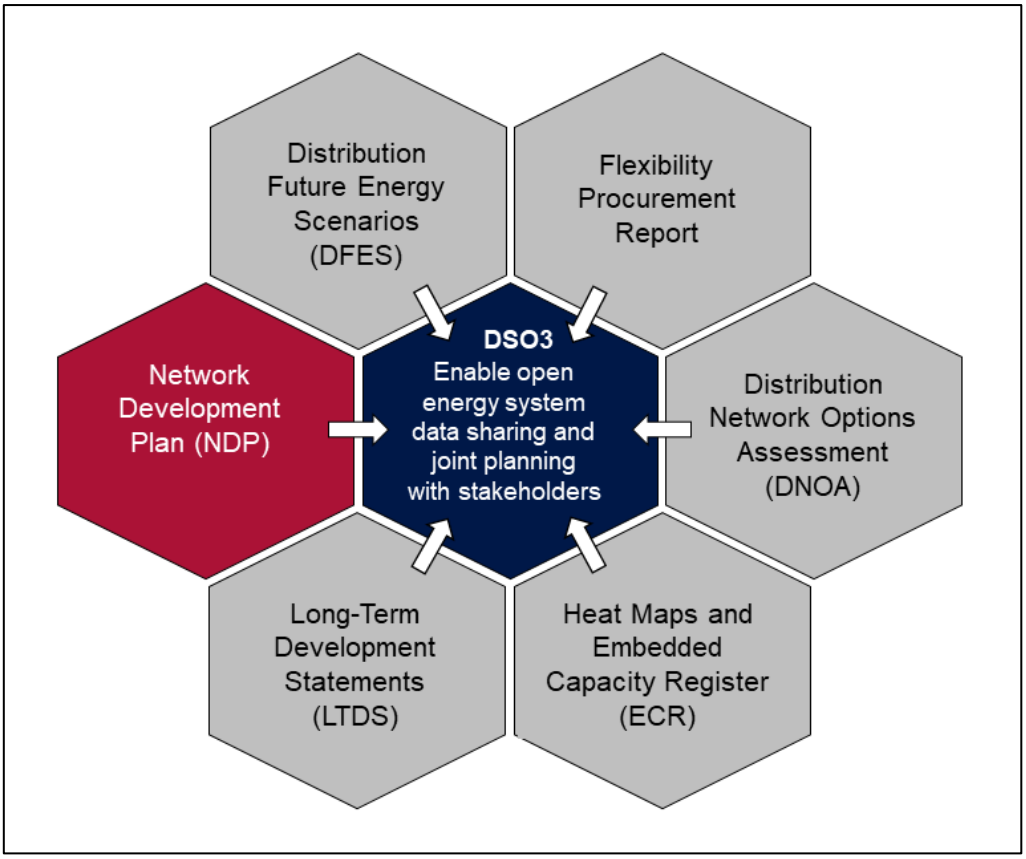

Figure 4 – Distribution network data and capacity reports

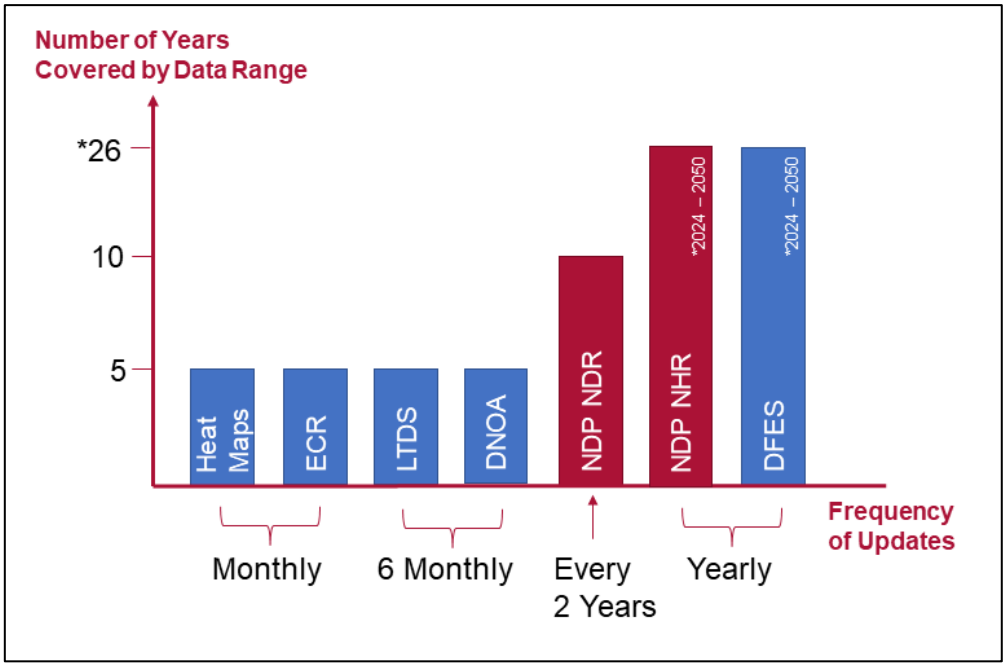

Figure 5 – Timeline of existing network capacity (demand and generation) reports (the years covered by Heat maps and ECR depend on when accepted generation actually connects)

Distribution Future Energy Scenarios (DFES) – DFES is produced once a year, in alignment with the annually published national Future Energy Scenarios (FES) from National Grid. We develop our own detailed breakdown of energy demand forecasts, LCT predictions, generation predictions which make

up our DFES for the region covered by Northern Powergrid. We have developed four DFES and our Best View scenario. Details are published on our Open Data Portal.

Flexibility Procurement Report (FPR) – Our FPR details the Flexibility Services we are actively procuring. Regularly, we forecast load and assess network capacity requirements to identify where load-driven constraints are anticipated. Based on this analysis, we determine our needs for Flexibility Services to defer network reinforcement. Presently, we conduct at least three tender rounds annually: spring, summer, and autumn.

Our FPR is available on our Open Data Portal. Our flexibility needs are also detailed on the Flexible Power website and Piclo Flex market platform.

Long-Term Development Statement (LTDS) – The LTDS is published twice a year (a partial update in May and a full update in November) and contains detailed information for our 132kV networks to the lower voltage busbars of primary substations. By covering the next 0-5 years, LTDS data is useful when assessing the feasibility of demand and generation connections, new or additional, to our network. The LTDS includes a wide range of information such as network asset technical data, schematic network diagrams, geographic maps, fault level information, demand and generation information, and network development proposals. The LTDS is available via request from our Open Data Portal.

Distribution Network Options Assessment (DNOA) – The DNOA provides details of our decisions on the optimal network solutions we are planning to deploy to address the predicted additional network capacity requirements for the next 5 years. The DNOA suite of documents includes a methodology document which provides an explanation of our network constraints identification process, which is primarily based on the forecast load growth of our publicly accessible Best View Distribution Future Energy Scenario[9] (DFES) and network capacity assessments. We aim to publish the DNOA at least twice a year on our Open Data Portal.

Embedded Capacity Register (ECR) – provides information on generation and storage resources of ≥50kW that are connected, or are accepted to connect, to our network. This is updated and published by the 10th working day of each month on our Open Data Portal.

Heat Maps - provides a geographical view with colour coding showing red / amber / green, showing a high level indication of the available network capacity to connect demand and generation. This is updated and published monthly on our Open Data Portal.

NDP Network Development Report (NDR) and NDP Network Headroom Report (NHR) – The NDR time horizon follows on from the LTDS and DNOA's 5 years, extending this to cover 10 years period with multiple forecasting scenarios. The NDR's objective is to address the capacity and network developments in the medium-term to longer-term.

The NHR provides stakeholders with information relating to the magnitude of possible future demand and generation capacity headroom across a range of future scenarios up to 2050. The NHR is updated annually while the NDR is updated biannually on our Open Data Portal.

[9] https://ed2plan.northernpowergrid.com/sites/files/document-library/Scenarios_and_Investment_Planning

4 Network Development Process

Northern Powergrid is committed to providing a network and energy system that effectively serves our region in a safe, efficient, and cost-effective manner, while also enabling decarbonisation our customers and stakeholders ambitions. It is imperative that we ensure the availability of thermal capacity to accommodate load growth on our network. In addition, we must uphold statutory voltage limits, maintain fault level duties within network asset ratings, adhere to national power quality standards, and minimise network losses to the best of our ability.

Our comprehensive network development process integrates the DNOA process, which is crucial in identifying optimal network investments to address projected constraints resulting from forecasted load growth and capacity assessments. This approach guides our network development plans consistently across our distribution network, as detailed in our in the DNOA methodology which is available on our Open Data Portal.

The simplified network development process comprises eight steps, as depicted in Figure 6, with a focus on prioritising flexibility as a key strategy for enhancing network capacity and potentially deferring or avoiding traditional network reinforcement. The DNOA process encompasses optioneering and decision-making steps 4 to 6, as illustrated in Figure 6.

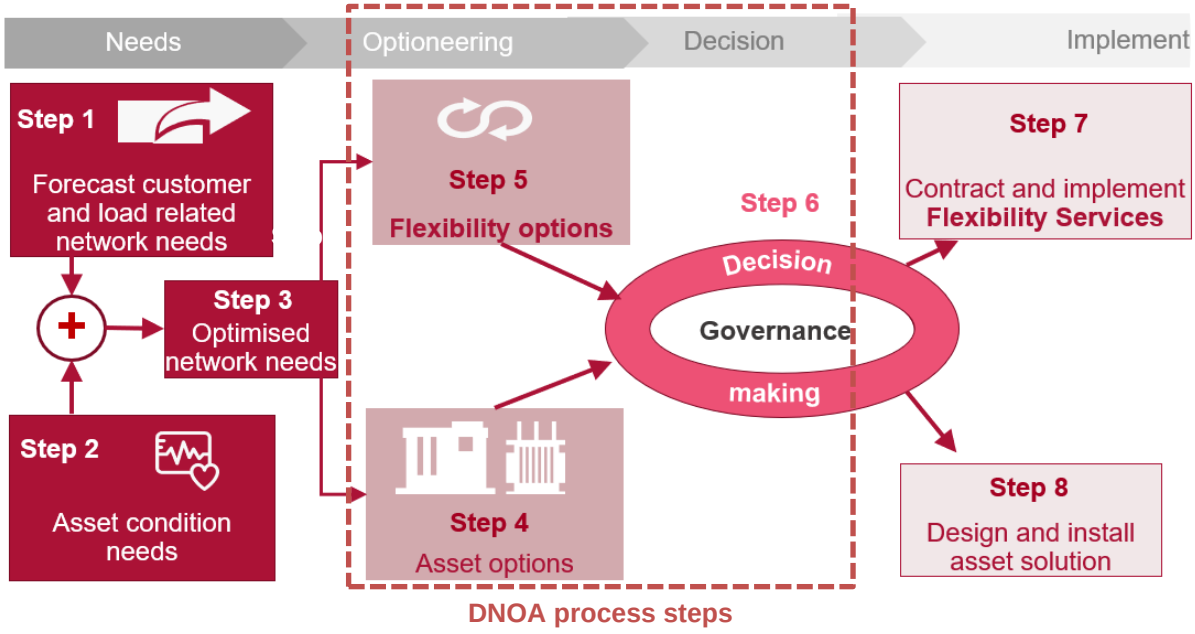

Figure 6 – The end to end network development process incorporating the DNOA process steps

Step 1 - Load related network needs: This process entails assessing network capacity to identify overloaded assets within our network. We achieve this by considering our long-term projections for demand and generation, as well as the profiled accepted connections pipeline with confidence factors and diversity factors are appropriately applied. We compare the current and projected operational range of our network assets with their capacities through our system performance modelling. By identifying overloaded assets our goal is to anticipate future network requirements.

Step 2 - Asset condition needs: At times, we must take action due to the health condition of our equipment. In this context, neglecting investment can lead to equipment failure, disrupting customer supplies and increasing safety risks. We assess the health of our assets by considering the results of asset condition assessments and anticipating deterioration. This helps us identify investment needs that are independent of load growth.

Step 3 – Optimised network needs: At overloaded sites, we take a holistic approach by considering both condition-related needs and anticipated load growth. By identifying areas where these requirements overlap, we create synergies that lead to investment efficiencies. Specifically, we combine the delivery of non-load-related investments (from step 2) with load-related reinforcement (from step 1) simultaneously. When demand is expected to increase, we enhance asset condition solutions by incorporating additional capacity. This often involves using equipment with higher ratings. It is essential to recognise that Flexibility Services are not suitable for deferring condition-driven reinforcement. However, by considering asset condition alongside load-related reinforcement, we optimise our investments.

Step 4 – Asset options: The geographical distribution and projected capacity needs across neighbouring sections of our network typically lead to a range of engineering and smart solutions for addressing capacity constraints. We thoroughly analyse all available options, create detailed designs, and estimate costs for these network solutions. By comparing their technical and economic advantages, we identify the optimal solution, whether it is a smart or conventional asset-based approach.

Step 5 – Flexibility options: We evaluate Flexibility Service options through procurement tenders, aiming to either meet or reduce demand on our network. To determine the maximum ceiling pricing for the flexibility option, we utilise the Common Evaluation Methodology (CEM) tool[10]. This calculation is based on the net present value (NPV) of the counterfactual conventional asset network solution (step 4). The required magnitude, frequency, and duration of Flexibility Services are derived from the analysis of half-hourly power flow time series data.

Step 6 – Decision-making: We thoroughly analyse the technical and economic aspects of both conventional network solutions and flexibility options with aim to identify the most cost-effective approach that maximises benefits for both customers and the network. We adhere to our 'flexibility first' approach, which involves addressing network constraints using flexible solutions until they are no longer viable. This means flexibility market response plays a crucial role in informing our decisions.

Step 7 – Flexibility: If we determine that Flexibility Services are the optimal path, we utilise the contracted Flexibility Service pricing from step 5 to operate these services.

Step 8 – Smart or conventional reinforcement: If we determine that a conventional asset solution is the most appropriate path, we will proceed with deploying the network solution. However, this typically occurs only when the Flexibility Services option is no longer feasible.

More information on this eight step process can be found in the DNOA methodology on our Open Data Portal.

[10] https://www.energynetworks.org/publications/on22-ws1a-p1-common-evaluation-methodology-tool-version-2.2-(25-aug-2022)

5 Network Development Report (NDR)

Our Network Development Report (NDR) and the data that it utilises are provided in downloadable pdf and excel formats, respectively, on our Open Data Portal. The NDR provides information on network developments including new infrastructure to be installed, upcoming flexible services to be employed, and locations where Flexibility Services will be needed over the coming years. The range covers the next 1 to 10 years.

The types of network interventions set out in the NDR include the following:

- DNO contracted flexibility service requirements;
- Smart network technology;
- Asset interventions (load, condition, fault level related and new connections driven).

Network reinforcement often increases the network capacity. The amount of capacity released from planned network reinforcements is detailed in our NDR.

For each network intervention reported in the NDR, the information listed in table 2 is provided.

Table 2 – Network development information included in NDR

Network Infrastructure	Flexibility Services
- Location of intervention - Outline of the planned works - Reason for carrying out works - Expected intervention start and completion data, and - Capacity additions from the planned interventions.	- Location of intervention - Year of intervention

In providing this information, it is important to recognise that these network intervention requirements are the most up to date information that we have available, but that they may change in the future due to a range of factors – including customers changing their accepted connections (for example cancelling or increasing the capacity), annual load forecasting updates indicating different dates of constraints occurring, future new customer connections resulting in increased network capacity, revised asset condition assessments indicating intervention may not be necessary and flexibility procurement not providing sufficient capacity.

Changes to the expected timeline for the network developments can occur for reasons, including:

- Delays in securing consents and wayleaves to install equipment on private land;
- Changes to system outage dates;
- Changes to customer requirements and/or timescales; and
- Changes to plant and materials supplier lead times.

We have created a standardised NDR template to effectively communicate and share data regarding our planned network developments in a consistent manner. This approach guarantees uniform presentation of data, benefiting our stakeholders. The NDR template organizes network developments within the same geographic area based on the Grid Supply Point (GSP) they are connected to. Figure 7 displays detailed information specific to a single GSP as presented in the NDR.

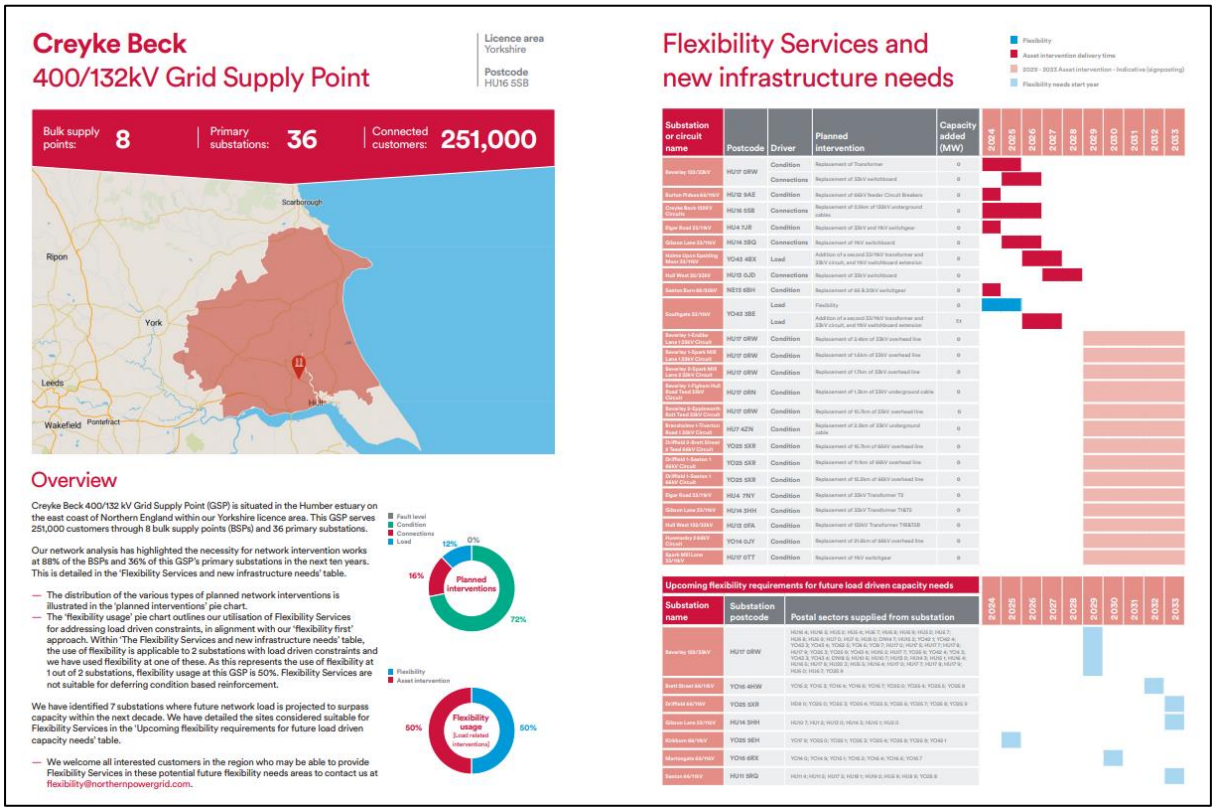

Figure 7 – Northern Powergrid's NDR template

Map: The map displays a red pin drop, marking the location of the constrained substation. The shaded red area represents the region served by the substation. At the top of the map, you will find details about the number of Bulk Supply Points, primary substations and the total number of customers supplied by the GSP. BSPs transform electricity from 132kV to 66kV or 33kV, while primary substations step down voltage from 66kV or 33kV to 20kV, 11kV, or 6.6kV.

Overview: This section provides a concise summary of the GSP, outlining the quantity and nature of network development needs.

Planned interventions pie chart: This showcases the distribution of various drivers influencing planned interventions. The drivers considered in this analysis encompass load, connections, condition, and fault level.

Flexibility usage pie chart: This illustrates the utilisation of flexibility for load-driven constraints within the 'Flexibility Services and new infrastructure needs' table where flexibility is applicable. For instance, in a scenario where a GSP has two overload-constrained substations and flexibility is applied to one of them, this represents the use of flexibility at 1 out of 2 substations hence the flexibility usage at this GSP would be 50%. Similarly, if a GSP has one substation with load-driven constraints and flexibility is

deployed to defer reinforcement at that substation, this represents the use of flexibility at 1 out of 1 substation thus the flexibility usage at this GSP would be 100%.

Flexibility services and new infrastructure needs table: Provides a list of substations and circuits with planned new infrastructure installation projects and/or procured Flexibility Services as well as the timing of the planned intervention in the ten year timeline of 2024 – 2033. Among the table headings is the 'capacity added' column which reflects changes to the network's firm capacity. Firm capacity refers to the network's capability to meet demand promptly after a first circuit outage hence it represents the capacity immediately available without any manual intervention.

Upcoming flexibility requirements for future load driven capacity needs table: Provides a list of substations with upcoming Flexibility Services needs and the flexibility needs start year. We have included the postcodes of the constrained substations, along with the postal sectors corresponding to the areas served by these substations. This information allows stakeholders to readily identify the locations where we may utilize and require flexibility over the next ten years. In the postal sector data, the last number of each post sector represents the first character of the second part of the postcode. For instance, DN19 7 encompasses all DN19 7xx postcodes, while LN7 6 includes all LN7 6xx postcodes.

6 Network Headroom Report (NHR)

The NHR has been produced to provide our stakeholders with an insight into the available network capacities available for new connections in terms of generation and demand headroom, which is reported for each of our DFES forecast scenarios.

The headroom calculations include the increased network capacity that is provided by our network developments in delivery (financially approved) or planned for delivery, including asset-based enhancements and the use of flexible services. The headroom calculations are considerate of thermal loading and fault level constraints.

Our headroom results have been provided for Bulk Supply Point (BSP) substations (typically 132/33kV or 132/66kV) and primary substations (typically transform down to 20kV, 11kV or 6.6kV).

Our NHR is available on our Open Data Portal which provides options to download the data, analyse in table formats and visualise the data in charts and maps.

6.1 Baseline data for generation and demand forecasting

Future generation and demand headroom presented in our NHR factors in forecast future generation and demand on our network.

Generation is forecasted using a combination of accepted generation in the short-term (weighted by predicted likelihood of proceeding) and future energy scenarios indicating the size and scale of generation likely to connect in our region in the longer-term – these future scenarios align with those used by National Grid as part of their FES process.

Demand is forecasted similarly based on our DFES and factoring in the connection pipeline appropriately. Our Best View scenario includes an assumption that even without intervention a high adoption of Time of Use Tariffs (ToUT) by residential and industrial energy will lower gross peak demand because customer price-driven flexibility through ToUT will help distribute power away from times of peak demand. For example, electric vehicle (EV) smart charging technology with a ToUT will determine the best time to charge assets such as EVs, to both avoid constraining the network at times of high demand and enable customers to take advantage of cheaper electricity prices at times of low demand.

The impact of network interventions are included in all of the forecast headroom scenarios, including all interventions types (DNO contracted Flexibility Services, smart network technology and load related network reinforcements).

6.2 Forecast demand headroom capacity calculations

The forecast network demand thermal headroom is provided in MWs for every substation in our region (covering 132kV to 6.6kV substations).

The forecast headroom is calculated for each of our future projected scenarios (defined in the DFES) using the gross peak demand. Planned and committed network interventions have been included in the forecast headroom predictions. Where the headroom value goes negative, this means that there

is zero headroom available and network development may be required to mitigate the predicted constraint. The range covers every year between the years 2024 to 2030 (inclusive) and every 5 years thereafter until 2050.

6.3 Forecast generation headroom capacity calculations

The forecast network generation thermal headroom is provided in MWs for every substation in our region (covering 132kV to 6.6kV substations) and is provided for each of our future projected scenarios (defined in the DFES). The headroom is a generation firm capacity value at the lower voltage busbars of the associated BSP or primary substation transformer.

The headroom is calculated by assessing our future projected generation capacities, substation potential reverse power flow capability and upstream network constraints. Where there are known fault level constraints the network generation headroom is defined as zero headroom available. Planned and committed network interventions have been included in the forecast headroom predictions. The range covers every year between the years 2024 to 2030 (inclusive) and every 5 years thereafter until 2050.

Our NHR format follows the structure set out by the ENA Form of Statement (FoS) of NDPs. As such, it is encompassing tables which include the headings shown in Table 3.

Table 3 – Network Headroom Report headings

Substation Name	Voltage (kV)	BSP Group	GSP	Substation Location	Headroom Capacity (MW)

7 Considerations and Limitations

1. The NDP is focused on the higher voltage primary network and the large-scale interventions. However, in addition to these a large amount of work will also be taking place on the low voltage (LV) networks to enable our customers to run their EVs and heat pumps at residential level. It is the needs at LV that are driving the requirement for more capacity at high voltage (HV). This data is not reported in the NDP.

2. Network constraints at the GSPs are out of the NDP scope and have not been included our headroom reports. Transmission network capacity is not factored into our headroom calculations.

3. Our headroom results do not account for the capacity released where we have Active Network Managements (ANM) schemes. We have a generation ANM scheme which has been developed and deployed within the Driffield (Yorkshire licence area). The Driffield ANM scheme manages the export from several generators to ensure that the power flows within the Driffield 66kV network and the local 132kV network remain within their design limits.

4. Our headroom capacity forecasts are subject to change in response to our customer generation and demand requirements, and hence the inherent uncertainty associated with ongoing transitions towards net zero.

Although every effort has been made to ensure the accuracy of the data provided in this NDP, Northern Powergrid does not accept any liability for the accuracy of the information contained herein, and neither Northern Powergrid nor its directors or its employees shall be under any liability for any misstatement or opinion on which the recipient of this statement relies or seeks to rely.

8 Stakeholder Consultation

Northern Powergrid prioritises a customer-centric approach, alongside a commitment to openness and transparency. We value input from stakeholders to enhance our decision-making and communication practices as we strive to develop a resilient and adaptable distribution network for the future.

8.1 Feedback from 2022 NDP

Stakeholder feedback is important to how we refine our NDP to ensure that the data is published in an accessible and flexible format which is helpful to all stakeholders. We have listened to the feedback we received from our most recent NDP, published in 2022.

Two key themes arose from this feedback, the first relating to data visualisation and the second to our methodology.

Data Visualisation

Respondents gave an average score of 3.3 out of 5 in response to "The format of the NDP allows me to view and understand the information easily". This shows that respondents neither agreed nor disagreed with the statement, thus suggesting scope for improvement to the format for accessibility of the information.

Northern Powergrid has taken this feedback onboard and have reviewed how the data is published to ensure maximum accessibility for all stakeholders. This means that the Network Headroom Report Microsoft Excel workbook has been improved to add further explanation of what each sheet is displaying, and the data has also been displayed in a visualisation tool on Northern Powergrid's open data portal. This allows the user to view the data in a geographical format which a red, amber and green system for displaying the generation and demand headroom in each location.

In addition, the Network Development Report has been published in an easily digestible pdf format alongside a Microsoft Excel workbook so that stakeholders can engage with the data in whatever is most suited to them.

Methodology Updates

The methodology has been refined to include minimum demand data when calculating the generation headroom.

In addition, Northern Powergrid has included greater visibility of asset condition related works where additional network capacity can be justified. This will inform stakeholders with all future development plans.

Respondents also queried why half hourly data was not published as part of the NDP. This has not been updated in the 2024 NDP as this is not with the scope of this exercise.

8.2 Upcoming stakeholder consultation

We are consulting on content, form and methodology of the NDP and encourage all stakeholders to give feedback.

Please reach out to our System Forecasting team via email at opendata@northernpowergrid.com to get in touch.

Alongside publishing the Network Development Plan, Northern Powergrid have circulated a short survey to gather feedback. Stakeholders may consider using the below questions as part of their feedback when contacting us at the above email address.

1. How will you use the Network Development Plan?
    a. To align your decarbonisation plans
    b. To assess the available capacity on the network for new connections (generation or demand)
    c. To inform potential future flexibility requirements
    d. To understand the impact of achieving Net Zero on distribution networks
    e. To inform whole systems interactions
2. What formats of the Network Development Plan will you find most useful?
    a. Network Development Report (pdf)
    b. Network Development Report (Microsoft Excel Workbook)
    c. Network Headroom Report (open data portal visualisation)
    d. Network Headroom Report (Microsoft Excel Workbook)
3. Do you understand and agree with the methodology we have followed to produce the Network Development Plan?
    a. Yes
    b. No
    c. Uncertain
4. What further improvements can we make to the Network Development Plan which would make it more accessible and relevant to your organisation?

9 Glossary

BSP	Bulk Supply Point
CEM	Common Evaluation Methodology
DFES	Distribution Future Energy Scenarios
DNO	Distribution Network Operator
DSO	Distribution System Operation
ECR	Embedded Capacity Register
ENA	Energy Networks Association
EV	Electric Vehicle
FoS	Form of Statement
FES	Future Energy Scenarios
GSP	Grid Supply Point
HV	High Voltage
LCTs	Low Carbon Technologies
LTDS	Long-Term Development Statement
LV	Low Voltage
NHR	Network Headroom Report
NDP	Network Development Plan
NDR	Network Development Report
NPV	Net Present Value
Ofgem	Office of gas and electricity
ToUT	Time of Use Tariffs