nationalgrid DSO

Distribution Network Options Assessment

March 2026

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Foreword

The role of electricity in helping to facilitate the UK's net zero transition is becoming increasingly important. One of the key roles of the Distribution System Operator (DSO) is to create a smarter, more flexible network to meet our customer's needs and facilitate the decarbonisation of heat and transport.

At National Grid DSO we have a strong track record of delivering best in class service and, as we continue to take a more and more active role in managing the electricity distribution system, we will continue to develop our business and remain at the forefront of Distribution Systems Operations.

Over the last few years we have opened up a plethora of opportunities for distributed energy resources to help support our network across multiple voltage levels, including the recent launch of the FlexUp product to manage generation constraints. By continuing to innovate and develop the Distribution Network Options Assessment (DNOA) process we will be able to expand opportunities to even more use cases in the future.

Developing successful markets also requires confidence in those opportunities continuing in the future and transparency in the process and outcomes of our decision making. This DNOA publication outlines our methodology for assessing the use of flexibility to manage constraints on the network and how we ensure every investment decision provides optimal value for stakeholders and customers.

The DNOA process provides transparency in our approach to ensuring the optimal investment pathway is taken for all load related expenditure (as well as capturing synergies with other investment drivers), minimising costs and maximising efficiency.

By providing more information to the growing distribution flexibility market about current and future network requirements across our region, we can help flexibility providers identify relevant opportunities to support the distribution network and bring forward investment in green technologies.

This DNOA builds on the 2024 publication of our Network Development Plan (NDP), which offers great insight into how changes in load will affect our network and could provide opportunities for flexibility providers to support the network. The plans outlined in this DNOA are aligned to the upcoming 2026 NDP publication in May.

To ensure our flexibility strategy continues to meet the needs of our customers as we push towards net zero, we are investigating new methods of valuing the use of flexibility. This could allow us to better target flexibility and further increase market opportunities. In particular, flexibility will be used more often to manage the distribution network in operations timescales (as outlined in the DNOA Roadmap).

The decisions made within this DNOA will show how we are optimising our investment to deliver secure, sustainable and affordable electricity to meet the evolving needs of the areas we serve.

We welcome any feedback that will help us to push the DNOA even further to drive value and benefit for our customers.

Cathy McClay
Managing Director of DSO

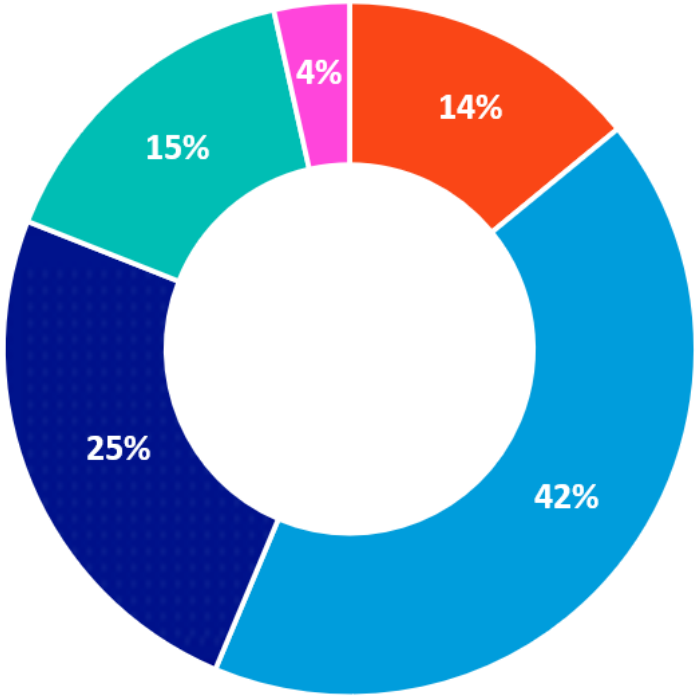
Executive summary

This DNOA report outlines the decisions made on the viability of utilising flexibility services to manage constraints across the Midlands, South West and South Wales. This includes the ceiling prices calculated using the Common Evaluation Methodology (CEM) for areas where managing constraints using flexibility services is feasible. In depth analysis of each constraint was carried out based on technical network data, load forecasts and financial inputs.

Below is a summary of the investment decisions reached across the four licence areas. Over 1,000 constraints at the primary voltage level and above were considered, with 142 demand constraints taken forward to individual assessment (as the remaining schemes were deemed not technically viable for flexibility).

Of the 142 individual demand primary schemes there are: 51 in the East Midlands, 22 in the West Midlands, 20 in South Wales and 49 in the South West. In addition to these, 23 FlexUp zones were opened to manage generation constraints across the four licence areas.

At the secondary voltage level 1,144 zones were assessed (240 in the East Midlands, 395 in the West Midlands, 141 in South Wales and 368 in the South West).



Total schemes assessed	142
Flexibility	20
Reinforce	60
Reinforce with flexibility	35
Signposting	22
Remove	5

Flexibility indicates a decision to procure flexibility or to maintain the flexibility contracts currently in place to manage constraints.

Reinforce indicates a decision to pursue traditional network reinforcement ahead of need without utilising flexibility.

Reinforce with flexibility is when reinforcement is underway or scheduled to begin but flexibility is required to manage network risk in the interim.

Signposting constraints are expected to require flexibility services in the future, but not in this current procurement cycle.

Remove signals a decision to remove a previously considered constraint from this DNOA as no flexibility requirements are seen in the next 10 years. These may be reassessed in the future.

Document overview

The strategic network planning process

National Grid DSO produces a number of publications on the future of electricity across the Midlands, South West and South Wales. The Distribution Future Energy Scenarios (DFES) provides data on the predicted growth in demand and generation across the four licence areas on an annual basis.

Forecasting

The Distribution Future Energy Scenarios (DFES) identify how customers will use our network in the future.

Network Impact Assessment

The Network Development Plan (NDP) uses forecasts to analyse and identify future network constraints.

Optioneering

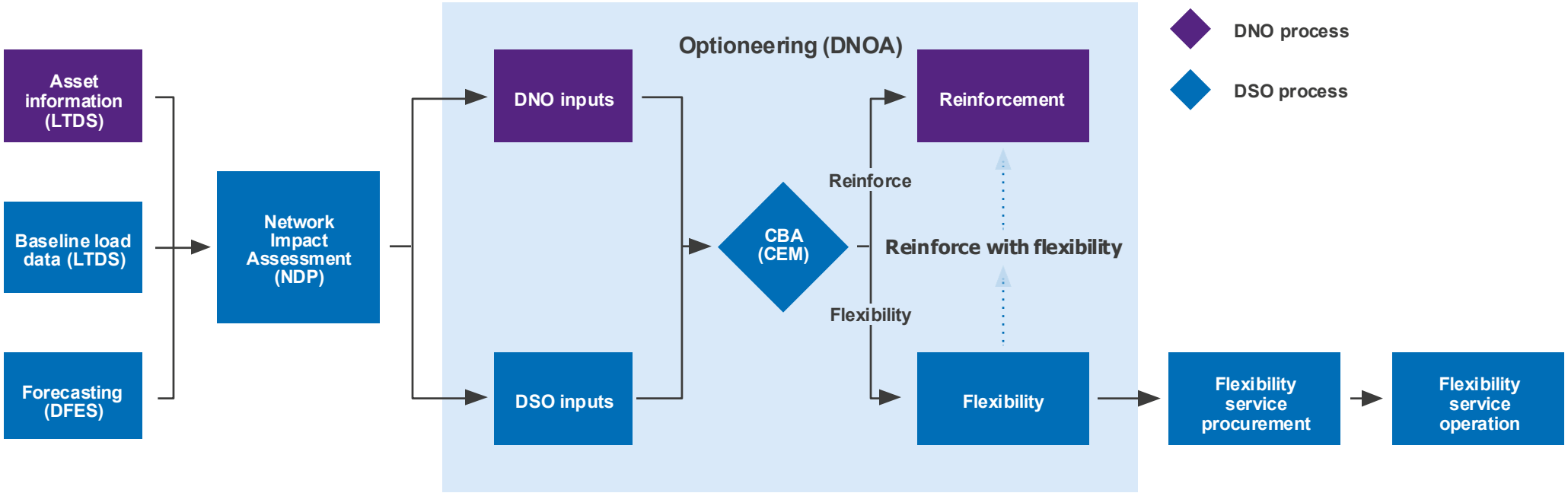
The Distribution Network Options Assessment (DNOA) outlines how we plan to invest in our network to manage or resolve constraints.

This scenario growth data facilitates the identification of areas on the network where constraints are expected through network impact assessment. This is carried out as part of National Grid DSO's Network Development Plan (NDP) published every two years, and as part of routine studies of the distribution network conducted by engineers.

Conventional reinforcement solutions are then developed, taking into consideration National Grid DSO's network asset data and the load forecasts from the DFES process to ensure the solution is enduring, efficient and strategic. These conventional reinforcement solutions are then assessed against the use of flexibility as part of the DNOA process.

The strategic network planning process

National Grid DSO's overall DNOA process from forecasting through to procurement is shown in the figure below. DNOA reports are published every year to look forward and identify which constraints should have services procured to help mitigate them, as well as looking backwards to ensure they continue to provide value. The DNOA process is managed by the DSO, with data inputs from the DNO.



Key:

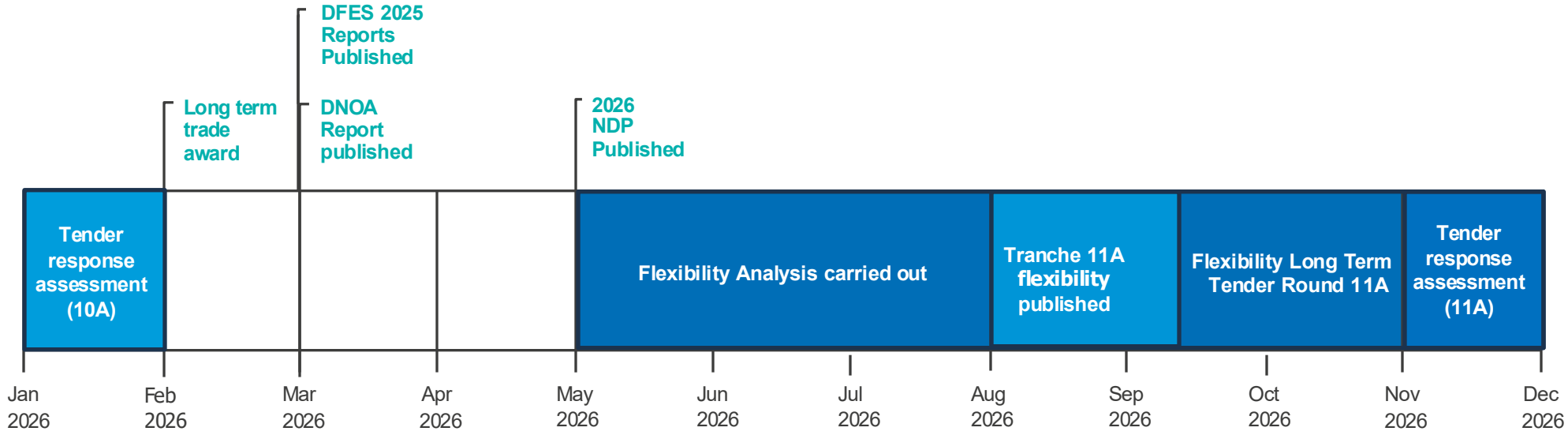
LTDS: Long Term Development Statement
DFES: Distribution Future Energy Scenarios
NDP: Network Development Plan
DNO: Distribution Network Operator
DSO: Distribution System Operator
CBA: Cost Benefit Analysis
CEM: Common Evaluation Methodology

DNOA process timeline

DNOA methodology reports are published once a year, aligned to National Grid DSO's flexibility procurement cycle. Each iteration is based on the latest DFES data published each year, with existing schemes being reassessed periodically to ensure the investment pathway remains optimal. Any new constraints identified on the network are also assessed in the DNOA process.

After each procurement cycle National Grid DSO checks that sufficient flexibility is available to manage each constraint. This will determine whether procurement will be needed in the next cycle (or if reinforcement should be triggered due to insufficient flexibility availability).

The DNOA process repeats annually. The processes and reports carried out as part of the strategic network planning process for 2026 are shown in the timeline below, from forecasting through to the publication of DNOA reports.



DFES overview

The Distribution Future Energy Scenarios outline the range of credible pathways for the change in connections to the distribution network out to 2050.

Using the National Energy System Operator (NESO) Future Energy Scenarios (FES) framework, these projections are informed by local and regional stakeholders and encompass changes in electricity generation, storage and demand.

For this DNOA we used the Distribution Future Energy Scenarios published in January 2025. This introduced a change in the framework from scenarios to pathways. Of the four FES pathways, three are compliant with the UK's target to reduce carbon emissions by 100% and achieve 'net zero' by 2050. A fourth non-compliant scenario is also modelled. This presents a shift in how we plan the distribution system, as pathways are more prescriptive and anticipatory than may be reflected in current uptake of specific technologies.

We supplement the scenario framework with an extensive programme of stakeholder engagement which includes consultation with developers, local authorities, technology companies, major energy users and community energy groups. This is supplemented by an additional analysis of existing trends, spatial data and future technology innovation to create granular load forecasts covering all of our networks.

Since the publication of our DFES, the transitional Regional Energy Strategic Plans (RESPs) have been launched. Ofgem have outlined in the Sector Specific Methodology Consultation that the transitional RESP will be used a key input to the business plan submission for the upcoming ED3 price control running from 2028-2033. As outlined in the methodology, the Holistic Transition pathway is used as the basis to create the short-term transitional RESP pathway. As a result, we have used the Holistic Transition as the base scenario for our technical assessment.

With the introduction of RESPs on an enduring basis, we will review the suitability of pathways for technical assessment of flexibility services in the DNOA process.

nationalgrid.co.uk/distribution-future-energy-scenarios-regional-information

Constraint identification

The load forecasts created as part of the DFES process are used to carry out network studies in order to monitor current and identify future constraints on the distribution network across NGED's four licence areas.

Comprehensive electrical analysis is carried out using load flow studies for each possible outage combination. This analysis is carried out for a variety of scenarios, half hours and representative seasons for both the existing and future network.

This process identifies where intervention is required to maintain compliance with National Grid's obligations and keep the network safely operating within its technical limits.

The primary activity for the network impact assessment is the Network Development Plan (NDP), part of Electricity Distribution Licence SLC 25B. This outlines where and how DNOs/DSOs plan to develop the distribution network over the next ten years to continue to meet customers' needs and facilitate the net zero transition.

More information on National Grid DSO's constraint identification process and the custom developed analysis tools used can be found in the latest NDP which can be accessed from the link below:

nationalgrid.co.uk/network-strategy/network-development-plan

Whilst the NDP process identifies the constraints that may occur, additional constraints can also be identified as a result of large new connection applications, which may not be captured in the current DFES projections.

Hence, there will be scenarios where New Connections that want to secure capacity and/or connect earlier bring forward a constraint, and in these instances the connection offers would be issued accordingly and in line with our policies and regulatory obligations. In some cases this may trigger a different solution altogether, which will be communicated to the affected parties as appropriate. Continuous DNO-DSO collaboration ensures that connections triggered reinforcement fits into any wider strategic plans for the network.

Reinforcement options

Reinforcement schemes aimed to alleviate constraints on the network can involve replacing a number of different assets, or installing new assets. Most conventional reinforcement will involve some combination of the four options below.

Build new circuits

Upgrade existing circuits

Build a new substation

Upgrade existing substation

Various traditional reinforcement options are evaluated to find the optimal solution. The chosen reinforcement solution must be economic and fit for the long-term so it delivers best value to customers. The cost for the optimal reinforcement scheme is determined so that it can be assessed against flexibility.

Substations considered for reinforcement include primary substations, Bulk Supply Points (BSPs) and Grid Supply Points (GSPs). This often involves upgrading switchgear and transformers to increase their capacity.

Circuit installations and upgrades can involve replacing or installing overhead line conductors and/or underground cables.

All reinforcement schemes are designed with customers and the environment as a top priority. Through our detailed network design process reinforcement solutions which minimise cost and disruption while providing enduring capacity for the network are identified.

Various other innovative solutions are utilised to manage constraints on the network, including the use of Active Network Management (ANM).

Flexibility analysis

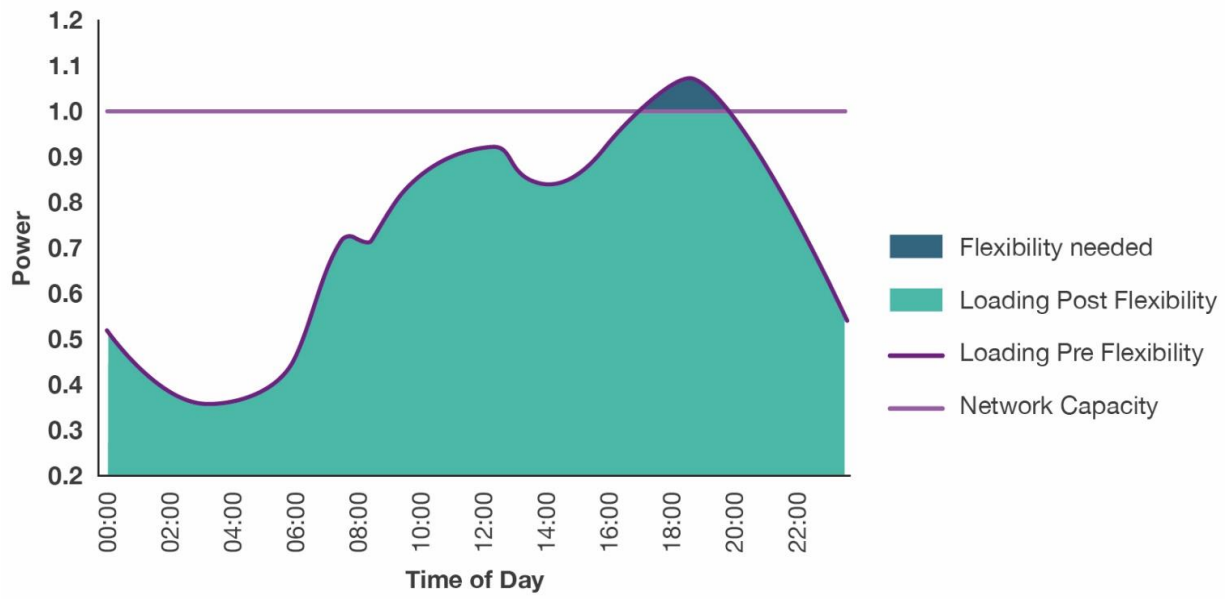
Once a constraint has been identified as part of routine strategic planning of the distribution network, options for managing the constraint are then assessed. Any constraints which can be technically managed through flexibility are taken forward for flexibility analysis to calculate how much flexibility is required.

The amount of flexibility required to manage a constraint is based on how much load is expected to exceed the capacity of the network. This is calculated using data on the network and projections from the DFES process in National Grid DSO's custom built Switch Level Analyser tool (which runs power flow analysis for every possible N-1 and N-2 network configuration). To reduce the exceedance for an identified constraint triggered by high levels of load, services are needed to change the import/export behaviour of generators or demand customers.

In order to calculate how much flexibility is required to support the network for a given constraint two inputs are needed. First, how much load the network can safely support (also known as its capacity), which is represented by the purple line in the graph below. Second, how much load the asset is expected to accommodate at different times of day across the year (also known as a load profile).

Flexibility requirements are calculated both for the current year and each year up to 2030 (aligned to analysis currently being carried out for the 2026 NDP). This allows National Grid DSO to procure the appropriate volumes of flexibility early enough to ensure the needs of the network are met and the correct investment decisions made.

The volumes of flexibility required to manage each constraint are then taken forward into the CBA, which is discussed in more detail in the next section.



Common Evaluation Methodology

To improve transparency in how DNOs reach decisions regarding flexibility procurement and the potential to delay conventional reinforcement, a Common Evaluation Methodology (CEM) CBA tool was created by Baringa Partners. This tool is used to assess the net benefit of flexibility against a baseline of conventional reinforcement for the range of DFES scenarios.

The economic analysis is based on the Time Value of Money whereby delaying reinforcement costs creates a significant economic benefit.

The amount of flexibility availability and utilisation projected to be required to manage a given constraint is taken from National Grid DSO's Switch Level Analyser tool and input into the CEM CBA tool.

The costs associated with the optimal reinforcement solution identified by the DNO are also fed into the CEM CBA tool to provide a baseline against which flexibility is assessed.

The CEM CBA tool is then used to calculate the ceiling price for flexibility (i.e. the break-even point at which the cost of flexibility is equal to the economic benefit of deferring reinforcement) for each year. Ceiling prices are calculated based on the Holistic Transition scenario.

Utilising ceiling prices means that flexibility services should always provide an economic solution to a constraint. The amount of available flexibility services is then compared to the requirement, which forms the decision point for whether flexibility is a viable solution.

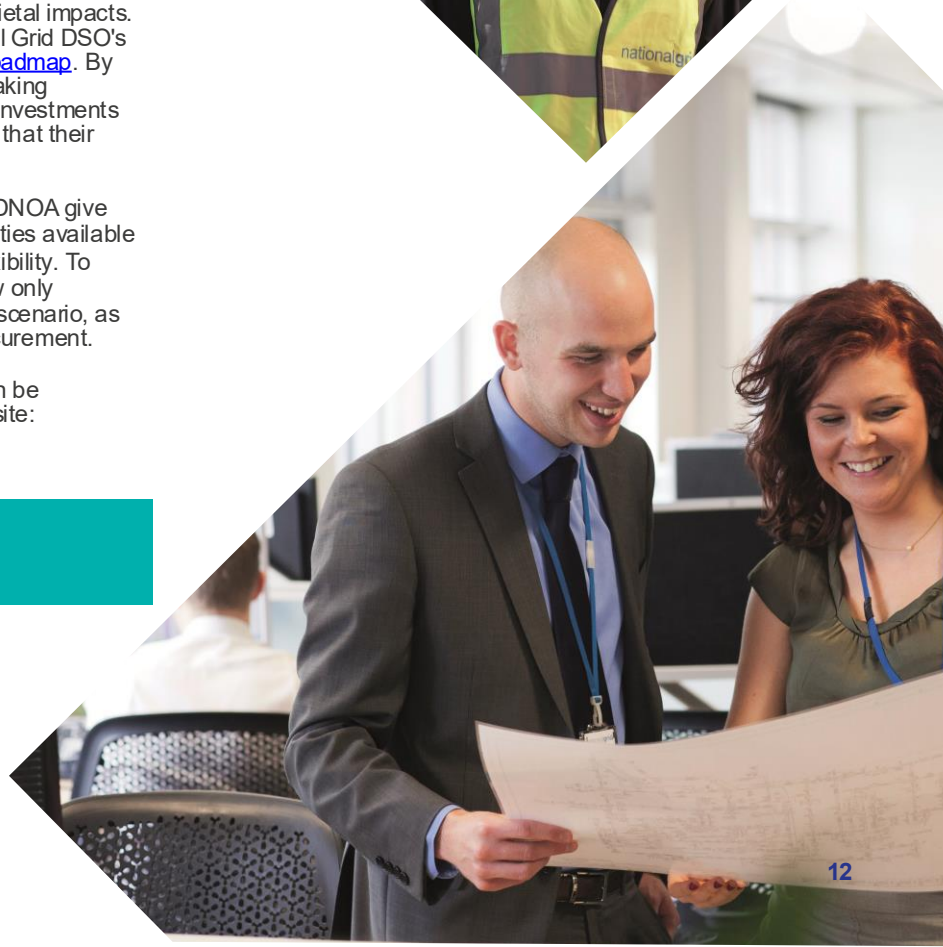
These ceiling prices are then used to inform the MWh prices for areas where we are procuring additional flexibility (for both availability and utilisation).

Additional functionality within the tool also allows for consideration of losses and other carbon and societal impacts. These impacts are being incorporated into National Grid DSO's optioneering processes as set out in the DNOA Roadmap. By cultivating greater transparency in the decision-making process and providing robust justifications for the investments made on the network, customers can be assured that their money is being utilised effectively.

Current and future ceiling prices published in the DNOA give flexibility service providers visibility of the opportunities available in each area, helping inform their investment in flexibility. To provide additional clarity the ceiling prices are now only published in the DNOA for the Holistic Transition scenario, as these are the ceiling prices which are used in procurement.

More information regarding the CEM CBA tool can be found on the Energy Networks Association's website:

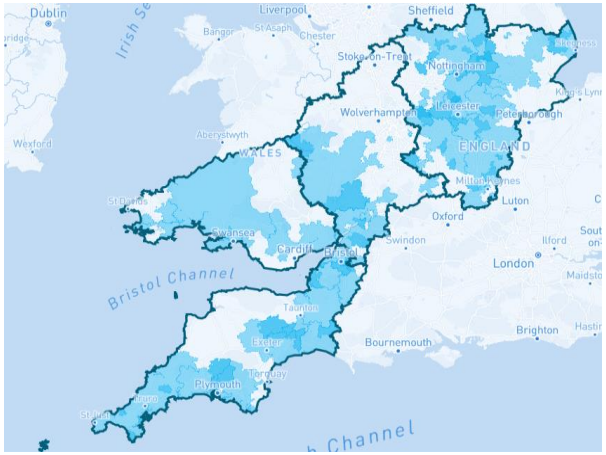
energynetworks.org/industry-hub/resource-library/



Flexibility services

National Grid has always used the flexibility inherent in the distribution network to provide economic and secure supply ahead of undertaking conventional reinforcement. For over five years National Grid DSO has also led the way in utilising market-provided flexibility.

This flexibility is sought as part of ongoing year-round procurement. The areas where flexibility is required are known as Constraint Management Zones (CMZs), the map below shows these areas as of January 2026 including the FlexUp areas (as described on the following page). To give providers and operators of flexibility services advanced notification of future needs, signposting information is provided for each area on the network with forecasted constraints. This additional visibility of future network needs will help inform the investment decisions of flexibility service providers, and aligns to the constraints identified in the Network Development Plan.



More information on our use of flexibility and any future developments can be found in our Distribution Flexibility Services Procurement Statement:

nationalgrid.co.uk/distribution-flexibility-services-reporting

The three main flexibility products offered to providers are standardised across the industry:

Scheduled Utilisation

This service is a scheduled constraint management service with fixed delivery periods. It offers a utilisation only payment.

Scheduled Availability, Operational Utilisation

This service has been developed to support the network in the event of specific fault conditions, such as during maintenance work. It offers an availability and utilisation payment.

Operational Utilisation

This service supports outage management mostly pre-event with some post event support . There is no availability payment, instead it offers a premium utilisation payment.

Long Term

Short Term

Market Gateway is National Grid DSO's in house platform for procuring Flexibility. FSPs will use Market Gateway for commercial qualification, registration of assets and to participate in Flexibility Auctions.

Once Flexibility is procured, the Flexible Power Portal is used to dispatch services via API and to calculate performance and settlement of the flex utilised.

Market Gateway

Flexible Power

Find out more at: **marketgateway.nationalgrid.co.uk** and **flexiblepower.co.uk**

FlexUp Service

Ahead of the ED3 price control period from 2028 to 2033, National Grid DSO are developing new flexibility use cases to unlock additional system value. A growing volume of weather-dependent, low-carbon generation is connected at distribution level and is at risk of curtailment during periods of high supply due to network and transmission constraints. Expanding flexible procurement into new use cases increases market access for FSPs and diversifies the flexibility portfolio.

National Grid DSO have designed a new Demand Turn Up (DTU) flexibility product to address this emerging need, branded FlexUp. We have assessed system need across the distribution network, identifying 23 FlexUp zones covering around 50% of the network, with requirements of up to 40 MW per zone. FlexUp Trade Opportunities were included in our latest round of flexibility procurement for DTU.

National Grid is the first DSO to procure flexibility specifically to reduce renewable energy curtailment. We have procured 52 GWh of flexibility from FlexUp zones in the most recent trade awards, demonstrating FlexUp's scalability and its growing role in maximising the use of low-carbon energy. The new service supports participation of vulnerable consumers in flex markets, lowers consumer energy costs and reduced grid carbon intensity.

The FlexUp service builds upon National Grid DSO's DTU flexibility zones trial. The 23 constraint management zones opened in this tender round are shown in the table to the right for all four of NGED's licence areas. These will sit alongside the existing 5 DTU zones (Boston to Donington, Checkerhouse to Tuxford, Moira Primary, Ollerton to Bilsthorpe and St Austell to Bugle).

Licence Area	Constraint Management Zone	Number of accepted Assets	Flexible Capacity (kW)
East Midlands	Bicker Fen Generation	2	3,400
	Chesterfield Generation	768	19,942
	Coventry Generation	1163	537
	Enderby Generation	289	1,437
	Grendon Generation	1444	1,737
	Ratcliffe On Soar Generation	934	6,312
	Staythorpe Generation	1	2,000
	Stoke Bardolph Generation	416	189
South Wales	Port Ham Generation	364	257
	Swansea North Generation	1373	1,301
	Upper Boat Generation	458	259
	Uskmouth Generation	569	345
South West	Axminster Generation	34	22
	Bridgwater Generation	1	4,000
	Exeter Generation	768	510
	Indian Queens Generation	1304	18,037
	Iron Acton SW Generation	1196	537
	Landulph Generation	480	2,281
	Sandford Generation	86	30
	Seabank Generation	618	7,916
West Midlands	Bishops Wood Generation	731	463
	Iron Acton WM Generation	368	207
	Lea Marston Generation	235	107

Secondary Network Flexibility

We continue to develop our flexibility opportunities on the secondary distribution network (specifically the distribution transformers which connect the HV and LV networks).

In order to accurately target flexibility at highly loaded areas and manage network risk we are installing monitoring equipment across a representative population of distribution transformers. The data from the monitors and smart meters will train our HV and LV network models to improve our understanding of network utilisation at a level where there has historically been very little visibility. As utilisation at each distribution transformer increases monitoring equipment will be installed, flexibility will be procured and utilised as required until reinforcement works need to commence.

The first LV tenders, alongside secondary network DNOA process reviews, highlighted an additional benefit of partial flexibility response when considering potential delivery challenges. Where flexibility has partially met the forecasted need, it allows us to reassess the priority of reinforcement areas and direct delivery resources at the highest priority sites. Depending on the speed and location of demand growth, this could help free up resources for reinforcement delivery.

This approach results in better network management as we can still defer reinforcement by targeting delivery resources to areas that are at higher risk than ones with partial flexibility support, reducing overall network risk.

In the latest analysis tranche, the secondary transformer constraints across the four NGED licence areas have been reassessed. 1,144 LV zones have been opened in September 2025, for service delivery in the next winter (2026/27). National Grid DSO carry out one long-term procurement round per year. Opposite is a summary of LV tenders across 2024 and 2025.

		East Midlands	West Midlands	South West	South Wales
January 2024 tender	Number of zones	740	288	297	101
	Tendered (kW)	70,732	10,893	6,279	4,413
	Contracted (kW)	2,033	284	46	44
	Number of zones deferred	454	74	31	33
September 2024 tender	Number of zones	203	258	193	90
	Tendered (kW)	9,105	7,416	2,494	2,923
	Contracted (kW)	1,350	1,064	322	374
	Number of zones deferred	23	26	14	15
September 2025 tender	Number of zones	240	395	368	141
	Tendered (kW)	8,154	9,224	3,289	3,537
	Contracted (kW)	559	839	217	266
	Number of zones deferred	2	2	0	0

We continue to engage with providers and look at how we can improve our internal processes to help balance our network risk with the service value to the market. We are working on improving our data, assumptions, and understanding of the secondary network risks, with the aim of releasing more value where possible.

Future developments

Cost Benefit Analysis

In order to accurately assess the financial impacts of utilising flexibility services to defer reinforcement a robust and periodically reviewed methodology is required.

By having a National Grid DSO representative as the workstream lead for the Energy Networks Association (ENA) working group which oversees the development of the Common Evaluation Methodology (CEM) we are leading the industry in the development of this process.

The DNOA Roadmap published in December 2025 outlines National Grid DSO's plans to develop the Cost Benefit Analysis and Optioneering processes which underpin the DNOA moving into the ED3 price control period.

Moving forward these processes will ensure all relevant factors are accounted for in investment decisions to maximise value for customers and support the net zero transition.

Day Ahead Trades

Our short-term trades are transitioning from the Week-ahead market to the Day-ahead market across all trading Constraint Management Zones. This shift will enable a more agile response to near-term system needs, allowing FSPs to commit using more accurate forecasts, and improves access for assets with variable demand and generation profiles.

Our Day-ahead timeline aligns with UK Power Network's noon gate closure and Scottish and Southern Electricity Network's 15:00 decision notice. As we gain further experience and scale in this market, we will continue to refine our processes and timelines to better align with wider markets, including NESO.

New Use Cases of Flexibility

As National Grid prepares for the upcoming ED3 price control period from 2028 to 2033, we are trialling new ways of utilising flexibility services to support the network for our customers. This includes a shift to more operational use cases of flexibility, with a number of trials planned for 2026, 2027 and 2028.

Through the ENA Approach to Flexibility in ED3 Task & Finish Group, which is chaired by a National Grid representative, alignment on the principles of using flexibility will be driven across the UK's DSOs. This will help to maintain consistency and market confidence for flexibility providers.

Upcoming DNOA publications will highlight how flexibility is being utilised as we transition from ED2 into ED3, and the new opportunities for flexibility providers that will be created.

Stakeholder engagement

We want to hear your views on the DNOA process and our report format as feedback from stakeholders will be valuable in shaping future publications.

In order to do this we aim to collect feedback after every publication and use this to improve the DNOA process and ensure the data we publish is relevant and valuable. A number of questions on the DNOA process can be found on National Grid's website:

nationalgrid.co.uk/dso/distribution-future-energy-scenarios/distribution-network-options-assessment

We are keen to get your feedback

It is important that we get a broad range of stakeholders' opinions and we are keen to get your feedback.

Responses should be returned to:

Primary System Planning Team
National Grid Electricity Distribution
Feeder Road
Bristol
BS2 0TB

Or emailed to:
nged.primarysystemplan@nationalgrid.co.uk

Interpretation of DNOA outcomes

The ceiling prices for each scheme across NGED's four licence areas are given in the scheme pages on the DNOA page on National Grid's website, along with information on the proposed reinforcement schemes. These ceiling prices are given for the Holistic Transition scenario for every year up to 2030. Other information pertaining to each zone is also given on these scheme pages. This section outlines how this information should be interpreted.

The decision tree to the right demonstrates the different choices our analysis can lead to. Firstly, the schemes that do not require any intervention are removed from future DNOAs (usually because reinforcement works have been completed).

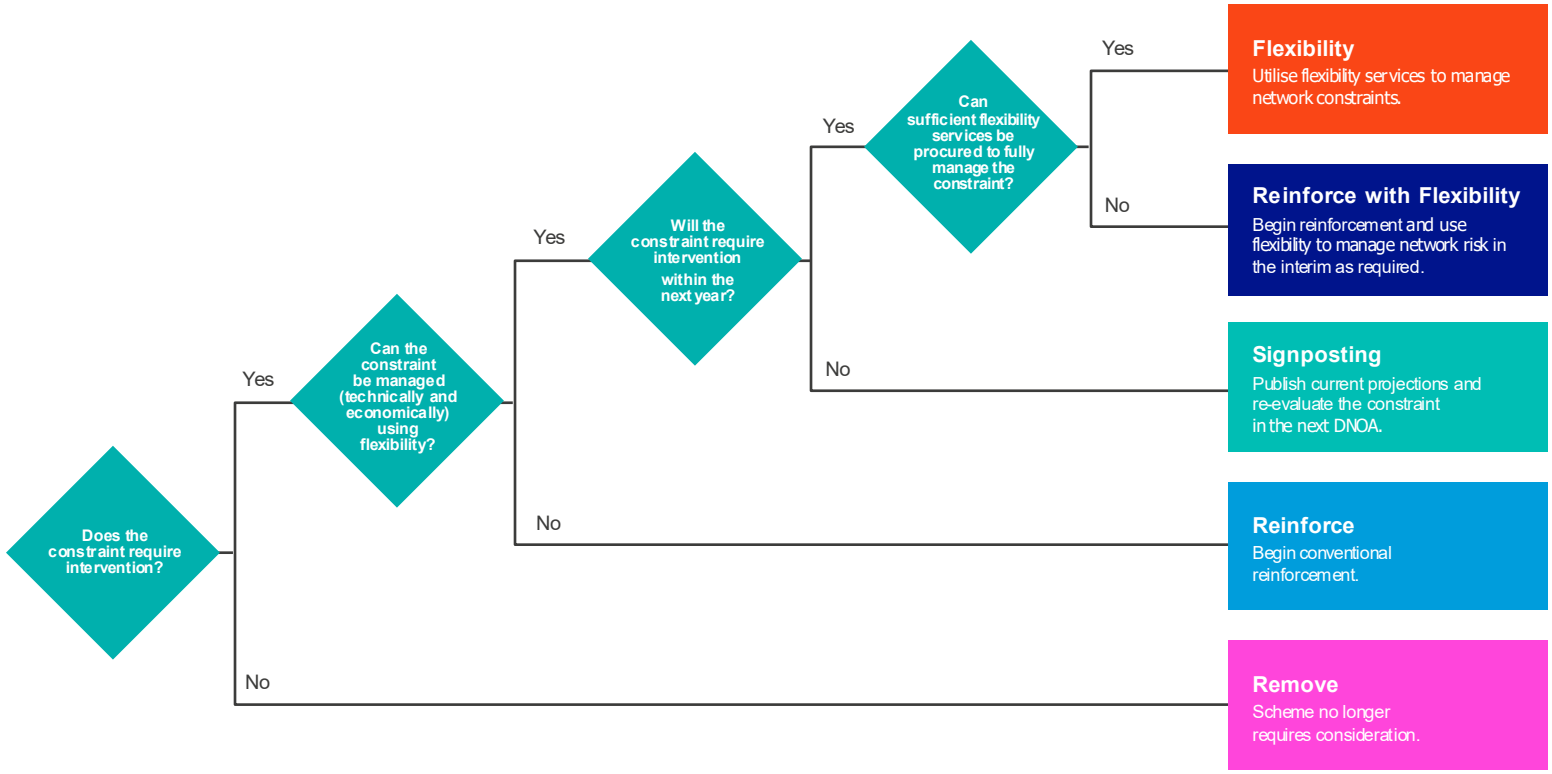
Among the schemes which do require intervention, if the constraint cannot be managed using flexibility then reinforcement is pursued.

If the constraint can be managed using flexibility but no intervention is required within the next year signposting is published.

The schemes which require flexibility services within the next year undergo CBA in order to calculate the ceiling prices for availability and utilisation of flexibility.

If sufficient flexibility cannot be procured to fully manage the constraint, reinforcement works will begin in order to be completed before the network need arises.

Flexibility may be used in the interim as required to manage the constraint and provide additional network security before the reinforcement is completed.



Interpretation of DNOA outcomes

Constraint Description

For each scheme presented in this DNOA this description will outline the constraint on the network that is being addressed.

Reinforcement Description

For each scheme an overview of the proposed or ongoing reinforcement works to deal with the constraint is provided.

Time to Reinforce

The estimated time (in years) that conventional reinforcement would take is provided for each scheme. This includes reinforcement projects which are underway and those which are planned to commence in the future.

The time taken to complete reinforcement projects is indicative and will be subject to a range of factors, including but not limited to asset lead times, third party consents, outage restrictions, and resourcing.

National Grid DSO will always endeavour to provide reinforcement timescales as accurately as possible, and where unforeseen factors impact delivery, flexibility will be considered as an option to maintain network safety and security.

Ceiling price

The ceiling prices are provided for each year under the Holistic Transition pathway. The ceiling price per MWh will usually drop year-on-year as the benefit of deferral remains constant but the volumes of flexibility required increases. Reinforcement will be deferred until sufficient flexibility is no longer available to manage the constraint.

Estimated flex utilisation required per year table

The estimated flexibility availability and utilisation volumes required per year are provided for each scheme in MWh. For Signposting schemes only the utilisation volumes are provided.

Constraint management timeline

The constraint management timeline shows what decision has been made for each scheme in each procurement cycle from when the scheme was created up to the upcoming procurement cycle.

Justification for decision

For each scheme the reasoning behind the DNOA decision is explained. For new schemes where flexibility is an option the decision will be driven by sufficient flexibility being procured to manage the constraint.

For reinforce schemes, the reason why flexibility is not viable will be given. Likewise, for remove schemes, the reason why the constraint no longer needs intervention will be provided (e.g. reinforcement works have been completed).

Other information

Also provided is the season (or seasons) the constraint being addressed is expected to arise (and therefore the season in which flexibility services are required) and the flexibility product expected to be utilised.

For signposting schemes the flexibility product may change closer to procurement to ensure the network's requirements are met.

Each scheme is also categorised based on the network condition the constraint is present under (intact, N-1 or N-2) and based on the constraint type (thermal, voltage, fault level, etc.).

DNOA Outcomes – East Midlands

Table 1 Summary of investment decisions in the East Midlands

A summary of the investment decisions made is provided below, with more in-depth information for each constraint available on National Grid's website.

Reinforcement and flexibility both have important parts to play in the efficient and economic development of the distribution system. This DNOA has both forwards and backwards looking elements when considering flexibility. Flexibility start years are based on the first year of network requirement under the Holistic Transition pathway.

Scheme	Constraint	Flexibility Start Year	DNOA Decision
Alford Primary	Both transformers at Alford are projected to exceed their thermal capacity following an outage on the other.	2026	Flexibility
Anderson Lane Primary	Following an arranged or fault outage on one of the transformers the full site demand is picked up by the other transformer.	2026	Flexibility
Braunston Road Primary	Both transformers are expected to exceed their thermal capacity following an outage on the other.	2026	Flexibility
Burton to Bretby	Arranged outages or faults on either Burton to Bretby 33 kV circuit leave the full demand of Bretby and Woodville primaries on the remaining circuit.	2026	Flexibility
Ilkeston	Under an N-1 condition (loss of one transformer) the load would be fully applied to the remaining transformer, potentially causing it to overload.	2026	Flexibility
Lawford Primary	Both transformers are expected to exceed their thermal capacity following an outage on the other. The 33 kV circuits would become the next limiting factor.	2026	Flexibility
Mansfield Primary	Overloads are expected on the primary transformers following an outage on the other.	2026	Flexibility
Olney Primary	Following an arranged or fault outage on one of the transformers the full site demand is picked up by the other transformer.	2026	Flexibility
Polesworth Primary	Following an arranged or fault outage on one of the transformers the full site demand is picked up by the other transformer.	2026	Flexibility

DNOA Outcomes – East Midlands

Table 1 Summary of investment decisions in the East Midlands

Scheme	Constraint	Flexibility Start Year	DNOA Decision
Quorn	Quorn is a two transformer primary with a firm capacity that is limited by its 33/11 kV transformers. Predicted demand growth is greater than the firm capacity of the site.	2026	Flexibility
Spilsby Primary	Following an arranged or fault outage on one of the transformers the full site demand is picked up by the other transformer.	2026	Flexibility
West Bridgford	For an arranged or fault outage on one of the transformers, the other picks up the full demand of the site.	2026	Flexibility
Wicken Primary	Following an arranged or fault outage on one of the transformers the full site demand is picked upby the other transformer causing it to be overloaded.	2026	Flexibility
Wigston BSP	Wigston BSP has two 132/33 kV GTs which are projected to be constrained due to demand growth for an N-1 (fault or arranged outage on either GT).	2026	Flexibility
Alfreton-Wessington	Due to high demand and generation growth, the 33 kV circuits from Alfreton BSP to Wessington, Ambergate and Ravensdale Park primaries are expected to have thermal and voltage constraints.	2026	Reinforce with Flexibility
Bradwell Abbey BSP	Bradwell Abbey BSP has two 132/33 kV GTs which are projected to be constrained due to demand growth for an N-1 (fault or arranged outage on either GT).	2026	Reinforce with Flexibility
Braunstone Primary	T2 at Braunstone Road primary is rated lower than T1, limiting the firm capacity of the site. The 33 kV circuits to the site are also projected to be constrained in the future.	2026	Reinforce with Flexibility
Grassmoor	Both transformers at Grassmoor primary are expected to exceed their thermal capacity following an outage on the other. The 33 kV circuits are the next limiting factor.	2026	Reinforce with Flexibility
Harbury to Banbury 132kV	The 33 kV circuits used to support the demand group of Harbury and Warwick BSPs are projected to become insufficient due to demand growth.	2026	Reinforce with Flexibility
Hawton BSP	For the loss of one of the GTs at Hawton the full demand is supplied by the remaining GT and 132 kV circuit.	2026	Reinforce with Flexibility

DNOA Outcomes – East Midlands

Table 1 Summary of investment decisions in the East Midlands

Scheme	Constraint	Flexibility Start Year	DNOA Decision
Irthlingborough to Higham Ferrers	For an arranged or fault outage on the Irthlingborough BSP to Rushden T2 33 kV circuit the circuit from Irthlingborough to Higham Ferrers Switching Station could overload based on demand projections.	2026	Reinforce with Flexibility
Loughborough	For certain arranged outages on the Enderby network, Coalville Bulk Supply Point (BSP) is transferred to Ratcliffe Grid Supply Point (GSP). A subsequent fault on one of the Ratcliffe-Loughborough tee 132 kV circuits can cause an overload on the other circuit.	2026	Reinforce with Flexibility
Stamford	For an arranged outage on the main 1 33 kV busbar at Stamford BSP the full demand of Stamford and Wittering primaries is supplied by a single transformer at Stamford primary.	2026	Reinforce with Flexibility
Stony Stratford BSP	Stony Stratford BSP has two 132/33 kV GTs which are projected to be constrained due to demand growth for an N-1 (fault or arranged outage on either GT).	2026	Reinforce with Flexibility
Tamworth to Polesworth and Atherstone	For an arranged or fault outage on the main 1 33 kV busbar at Tamworth Grid BSP the Tamworth to Polesworth main 2 33 kV circuit could overload.	2026	Reinforce with Flexibility
Victoria Road Primary	Following an arranged or fault outage on one of the transformers the full site demand is picked up by the other transformer.	2026	Reinforce with Flexibility
Ashbourne Primary	The transformers at Ashbourne primary and the two 33 kV circuits from Winster BSP and Longcliffe primary are projected to overload for an N-1 condition (the loss of either circuit or transformer).	2030	Signposting
Daventry Primary	Both transformers are expected to exceed their thermalcapacity following an outage on the other.	2030	Signposting
Irthlingborough Primary	Following an arranged or fault outage on one of the transformers the full site demand is picked up by the other transformer.	2030	Signposting
Kenilworth Primary	Both 33 kV circuits to Kenilworth primary are forecast to overload following the loss of the other.	2029	Signposting
Leicester East to Salutation Tee	Thermal overloads are projected to occur on the 33 kV circuits between Leicester East Bulk Supply Point (BSP) and the Salutation Tee for the loss of the other circuit.	2029	Signposting
Lutterworth Primary	Both transformers are expected to exceed their thermal capacity following an outage on the other. The 33 kV circuits would become the next limiting factor.	2029	Signposting

DNOA Outcomes – East Midlands

Table 1 Summary of investment decisions in the East Midlands

Scheme	Constraint	Flexibility Start Year	DNOA Decision
Chesterfield GSP	Demand, generation and fault level constraints at Chesterfield GSP.	-	Reinforce
Chesterfield Main	The Chesterfield – Grassmoor 33 kV circuits have limited capacity for an N-1 circuit outage.	-	Reinforce
Coalville to Mantle Lane T1	For the loss of the 33 kV circuit to Mantle Lane T2, the circuit to T1 could overload.	-	Reinforce
Coalville to Mantle Lane T2	For the loss of the 33 kV circuit to Mantle Lane T1, the circuit to T2 could overload.	-	Reinforce
Grendon - Corby 132kV	Under N-2 conditions for the loss of two of the Grendon – Corby 132 kV circuits, one of the remaining circuits potentially overloads.	-	Reinforce
Holme Carr	For an arranged or fault outage on either side of Holme Carr the remaining transformer could overload.	-	Reinforce
Hopton – Cromford	Load growth indicates that the Hopton – Cromford primary group will exceed its firm capacity under N-1 (loss of either transformer).	-	Reinforce
North Wheatley	The capacity of the 11 kV backfeeds at North Wheatley primary is forecast to be exceeded in the future.	-	Reinforce
Northampton East BSP	N-1 GT constraint at Northampton East BSP.	-	Reinforce
Northampton group	The Northampton group is approaching 300 MW of group load, at which point the existing circuits will not be able to meet the security of supply obligations.	-	Reinforce
Northampton West BSP	N-1 GT constraint at Northampton West BSP.	-	Reinforce
Spondon Primary	Following an arranged or fault outage on one of the transformers at Spondon primary the full site demand is picked up by the other transformer.	-	Reinforce
Walpole to Spalding Tee 132kV	Demand and generation thermal constraints on the 132 kV circuits between Walpole GSP and Spalding BSP.	-	Reinforce
Willington-Derby South-Spondon	Various outage conditions can overload the circuits from Derby South BSP to Spondon BSP.	-	Reinforce

DNOA Outcomes – East Midlands

Table 1 Summary of investment decisions in the East Midlands

Scheme	Constraint	Flexibility Start Year	DNOA Decision
Wingerworth	The capacity of the 11 kV backfeeds at Wingerworth primary is forecast to be exceeded in the future.	-	Reinforce
Wise Street	Following an arranged or fault outage on one of the transformers at Wise Street primary the full site demand is picked up by the other transformer.	-	Reinforce
Newport Pagnell	Following an arranged or fault outage on one of the transformers at Newport Pagnell the full site demand is picked up by the other transformer.	-	Reinforce
Langrick Primary	Langrick primary has a single transformer which limits its firm capacity under intact running conditions. Under N-1 outage conditions the site also relies on 11 kV backfeeds to maintain supply.	-	Remove
Towcester Primary	Following an arranged or fault outage on one of the three transformers at Towcester primary the site demand is picked up by the other transformers.	-	Remove

DNOA Outcomes – West Midlands

Table 2 Summary of investment decisions in the West Midlands

Scheme	Constraint	Flexibility Start Year	DNOA Decision
Bartley Green BSP	An outage of GT1 is forecasted to cause an overload on GT2 and vice versa at Bartley Green BSP.	2026	Reinforce with Flexibility
Hammerley Down Primary	An outage of either of the two transformers at Hammerly Down primary substation is forecasted to cause an overload of the other transformer.	2026	Reinforce with Flexibility
Hereford - Ledbury Ring	An outage of one of the infeeds to the 66 kV Hereford - Ledbury ring can cause voltages to drop below statutory limits.	2026	Reinforce with Flexibility
Knighton	Single transformer primary with firm capacity reliant on 11 kV interconnection, which is expected to be exceeded for an outage of the transformer.	2026	Reinforce with Flexibility
Netherhills Primary	An outage of either of the two transformers at Netherhills primary substation could cause an overload of the other transformer.	2026	Reinforce with Flexibility
Albrighton Primary	An outage of T1 is forecast to cause an overload on T2 and vice versa.	2029	Signposting
Bentley BSP	Arranged outage of either transformer at Bentley overloads the other.	2030	Signposting
Bromyard Primary	Following an arranged orfault outage on one of the transformers the full site demand is picked upby the other transformer causing it to be overloaded.	2030	Signposting
Brockworth Primary	An N-1 condition oneither circuit between Castle Meads and Brockworth could overload the remaining circuit.	2030	Signposting
Craven Arms Primary	Transformer T4 at Craven Arms Primary is forecasted to overload when there is an outage of T1.	2030	Signposting
Ludlow to Craven Arms	An outage of the 33 kV cable circuit between Ludlow BSP and 1L3 at CravenArms primary substation is forecasted to cause an overload on the 33 kV circuit between Ludlow BSP and 4L3 at Craven Arms primary substation.	2030	Signposting
Princess Royal Primary	Following an arranged or fault outage on one of the transformers the full site demand is picked up by the other transformer causing it to be overloaded.	2029	Signposting

DNOA Outcomes – West Midlands

Table 2 Summary of investment decisions in the West Midlands

Scheme	Constraint	Flexibility Start Year	DNOA Decision
Alderton Primary	The transformers at Alderton overload for the loss of the other transformer.	-	Reinforce
Barlaston / Meaford BSP	Both N-1 and N-2 constraints seen at Meaford BSP (N-1 for either GT and N-2 for both GTs).	-	Reinforce
Bayston Hill to Malehurst	Part of the Shrewsbury ring has thermal, voltage, step change, and generation driven constraints.	-	Reinforce
Berrington Primary	The transformer at Berrington primary is expected to overload under intact and N-1 conditions.	-	Reinforce
Cellarhead Network	The constraints on the Cellarhead 132 kV network include thermal (demand and generation), fault level, and operability limitations.	-	Reinforce
Chipping Sodbury	Both N-1 and N-2 constraints at Chipping Sodbury BSP (N-1 for either GT and N-2 for both GTs).	-	Reinforce
Lea Marston to Copt Heath	An outage affecting supplies to the Lea Marston-Elmdon 132 kV circuit causes a thermal constraint on the Lea Marston-Copt Heath circuits.	-	Reinforce
Shrewsbury GSP	Thermal constraint following an N-2 outage on two SGTs at Shrewsbury GSP.	-	Reinforce
Stockton	Stockton is a single transformer site with an N-1 constraint triggered for loss of its transformer.	-	Reinforce
Stowfield – St Weonards	St Weonards is a single transformer site with an N-1 constraint triggered for loss of its transformer.	-	Reinforce

DNOA Outcomes – South Wales

Table 3 Summary of investment decisions in South Wales

Scheme	Constraint	Flexibility Start Year	DNOA Decision
Merlins Bridge Primary	Both transformers at Merlin's Bridge primary are rated at 7.5/15 MVA and overload for the loss of the other.	2026	Flexibility
Steynton circuits	There are N-1 outages when either of the two circuits overload when required to support the demand of both primaries (Steynton and Milford Haven).	2026	Flexibility
Golden Hill to St Florence	An N-1 outage for the loss of the Golden Hill – St Florence circuit results in the Pembroke South – Broadfield circuit and connected primaries dropping below the statutory voltage limit.	2026	Reinforce with Flexibility
Lime Street and Garngoch group	A 33 kV fault to Main 2 busbar at Garngoch can result in both Garngoch and Lime Street being supplied entirely by a single 33 kV circuit from Swansea North.	2026	Reinforce with Flexibility
Golden Hill Primary	Golden Hill primary comprises two 33/11 kV transformers, which are expected to overload following an outage on the other.	2030	Signposting
Neyland Primary	For an arranged fault or outage on one of the transformers, the other picks up the full demand of the site.	2030	Signposting
Pontllanfraith and Cwmfelinfach	The 33kV circuits from Crumlin BSP to Cwmfelinfach and Pontllanfraith eachoverload for the loss of the opposite circuit.	2030	Signposting
St Florence to Tenby Tee	The St Florence – Tenby Tee 33 kV circuit overloads when supporting bothTenby and Broadfield primaries under N-1 conditions.	2029	Signposting
St Twynells Primary	An outage of either of the 33/11 kV transformers at St Twynells primary substation is forecasted to cause an overload of the other transformer.	2029	Signposting

DNOA Outcomes – South Wales

Table 3 Summary of investment decisions in South Wales

Scheme	Constraint	Flexibility Start Year	DNOA Decision
Aberaeron	For an N-1 outage of the transformer at Aberaeron, the site is limited by the 11 kV backfeeds.	-	Reinforce
Ashgrove	Ashgrove primary substation is supplied by a pair of mismatched 33/11 kV transformers. The loss of the higher rated transformer means the lower rated unit must supply the full demand.	-	Reinforce
Llanfyrnach	For an N-1 outage of the transformer at Llanfyrnach, the site is limited by the 11 kV backfeeds.	-	Reinforce
Llandrindod Wells Primary	An N-1 scenario for the loss of one transformer at Llandrindod Wells primary causes and overload of the remaining transformer.	-	Reinforce
Swansea North GSP to Rhos BSP	An N-2 constraint for the loss of the dual circuit 132 kV H route between Carmarthen and Rhos, leaves customers at risk of rota disconnection until a circuit is restored.	-	Reinforce
Llanfoist	N-1 constraint for the loss of one of the Super Grid Transformers (SGTs) at Rassau Grid Supply Point (GSP) will result in the remaining SGT overloading in the future.	-	Reinforce
Golden Hill to Broadfield	An N-1 outage for the loss of the Golden Hill – St Florence circuit results in the Pembroke South – Broadfield circuit and connected primaries dropping below the statutory voltage limit.	-	Reinforce
Rhos to Newcastle Emlyn	An N-1 condition for the loss of one of the 33 kV circuits to Newcastle Emlyn primary heavily loads the remaining circuit.	-	Reinforce
Pembroke GSP to Milford Haven BSP	Under N-2 scenarios the entire group could be fed via just one 132 kV circuit.	-	Reinforce
Penblewin Primary	For a first circuit outage (arranged or fault) which results in the loss of either Penblewin 33/11 kV primary transformer the remaining transformer in service begins to overload in-line with the load growth projections. The 33 kV circuit supplying the primary is also projected to overload under intact network conditions.	-	Reinforce
St Davids Primary	St Davids primary is a single transformer site with constraints on the 11 kV interconnection.	-	Reinforce

DNOA Outcomes – South West

Table 4 Summary of investment decisions in the South West

Scheme	Constraint	Flexibility Start Year	DNOA Decision
Tavistock and Yelverton	In the event of the loss of one of the infeeding circuits the remaining circuit overloads	2026	Flexibility
Merrivale Primary	Merrivale has two transformers; there is an overload for the loss of either one.	2026	Flexibility
Stentaway Primary	In the event of a 33 kV busbar outage at Stentaway, transformer T2 becomes overloaded (due to loss of T1 at Stentaway & Plymstock South).	2026	Flexibility
Woodland Way Primary	A fault outage on Feeder Road BSP 33 kV main 1 or reserve 1 would result in the loss of two of the four transformers at Woodlands Way, potentially overloading the remaining two in-service.	2026	Flexibility
Abham to Totnes Tee	The 132 kV cable circuits between Abham GSP & Totnes Tee become overloaded under N-2 outage conditions.	2026	Reinforce with Flexibility
Bradley Lane Primary	For an N-1 outage for the loss of one of the transformers, the remaining transformer will become overloaded.	2026	Reinforce with Flexibility
Camborne Treswithian	The constraint at Camborne Treswithian primary is where peak demand exceeds the primary transformer capacity.	2026	Reinforce with Flexibility
Clevedon Primary	Clevedon has two transformers; there is an overload for the loss of either one.	2026	Reinforce with Flexibility
Falmouth Bickland Hill Primary	Falmouth Bickland Hill primary capacity for a loss of one transformer.	2026	Reinforce with Flexibility
Feeder Road A Primary	Loss of two transformers at Feeder Road A coupled with lack of 11 kV busbars.	2026	Reinforce with Flexibility
Feeder Road BSP	For the loss of two GTs at Feeder Road BSP the remaining GTs are projected to overload.	2026	Reinforce with Flexibility
Hemyock	Single transformer primary with firm capacity reliant on 11 kV interconnection, which is expected to be exceeded for an outage of the transformer.	2026	Reinforce with Flexibility

DNOA Outcomes – South West

Table 4 Summary of investment decisions in the South West

Scheme	Constraint	Flexibility Start Year	DNOA Decision
Keynsham East Primary	An N-1 fault for the loss of the T2 transformer means the whole load must be supplied by T1.	2026	Reinforce with Flexibility
Mullion	Single transformer primary with firm capacity reliant on 11 kV interconnection, which is expected to be exceeded for an outage of the transformer.	2026	Reinforce with Flexibility
Taunton to Culmhead Tee	33 kV circuit overload under N-1 outage conditions.	2026	Reinforce with Flexibility
Tavistock Primary	In an N-1 outage for the loss of one of the transformers at Tavistock primary, the remaining transformer will become overloaded.	2026	Reinforce with Flexibility
Tiverton	For an N-1 outage of either GT at Tiverton BSP, the winter peak demands exceed the nameplate rating of the remaining GT.	2026	Reinforce with Flexibility
Tiverton to Bridge Mills and Cullompton circuits	An outage of one of the infeeds to the ring supplying Bridge Mills and Cullompton primaries subsequently leads to low voltage on the 33 kV circuits.	2026	Reinforce with Flexibility
Weston Super Mare	The current demand at the site exceeds the continuous rating of the transformers so for an N-1 scenario the remaining transformer would be overloaded.	2026	Reinforce with Flexibility
Yeovil to Martock	Martock's T2 alternative feed is currently from Yeovil BSP; however, due to load growth on both the Yeovil ring and Martock T2, in future years the group demand will begin to exceed the agreed supply capacity under this outage condition.	2026	Reinforce with Flexibility
Hayle Local Primary	In an N-1 outage for the loss of one of the transformers, the remaining transformer will be overloaded in the future.	2030	Signposting
Helston Primary	In an N-1 outage for the loss of one of the transformers, the remaining transformer will be overloaded in the future.	2029	Signposting
Portishead to Weston in Gordano	A 33 kV circuit overload is predicted under intact conditions.	2029	Signposting
Pyworthy to Stratton	Pyworthy 27L5 to Stratton 1L5 circuit and Pyworthy 34L5 to Stratton 2L5 33 kV circuit capacity.	2030	Signposting

DNOA Outcomes – South West

Table 4 Summary of investment decisions in the South West

Scheme	Constraint	Flexibility Start Year	DNOA Decision
Weston to Lypstone Farm	There is a 33 kV circuit overload under N-1 between Weston and Lypstone Farm.	-	Reinforce
St Germans to Liskeard 33kV Ring	For an N-1 outage of one of the circuits that feeds the group or a fault on main 1 or 2 at St Germans the remaining circuit could overload.	-	Reinforce
Exeter Main to Exeter City	Constraint present due to 132 kV tower line clearance infringement (along the Exeter Main 905 feeder) with an 11 kV overhead line.	-	Reinforce
Fraddon to Newquay Trevamper	An N-1 condition for the loss of one of the 33 kV circuits to Newquay Trevamper primary heavily loads the remaining circuit and leads to low volts.	-	Reinforce
Witheridge	Demand growth takes the 11 kV backfeeds over their capacity.	-	Reinforce
Exminster Primary	Demand growth takes the 11 kV backfeeds over their capacity.	-	Reinforce
Alverdiscott GSP and K Route	Several constraints have been identified in this area including GT overloads at East Yelland, Barnstaple and St Tudy BSPs.	-	Reinforce
Iron Acton to Seabank	Seabank and Bradley Stoke BSPs are fed via two 132 kV circuits from Iron Acton GSP. For N-2 conditions, back energisation could lead to operational, earthing and safety risks.	-	Reinforce
Barnstaple BSP	N-1 constraint for the loss of a transformer at Barnstaple BSP.	-	Reinforce
Alverdiscott to East Yelland and Barnstaple	For an N-2 outage the entire group demand is lost and interconnectivity is insufficient to restore it to meet P2 requirements.	-	Reinforce
Penryn / Falmouth Bickland Hill / Falmouth Dock Ring	A busbar outage taking out a circuit supplying the group overloads one of the remaining circuits on the Penryn / Falmouth Bickland / Falmouth Dock ring.	-	Reinforce
Feeder Road to Bedminster and Bower Ashton	One circuit supplies both Bedminster and Bower. For an N-2 condition for the loss of two other circuits this circuit overloads.	-	Reinforce
Hayle to Penzance	An N-1 fault on the Main 1 busbar at Hayle overloads several of the 33 kV circuits, and lead to low voltage constraints.	-	Reinforce

DNOA Outcomes – South West

Table 4 Summary of investment decisions in the South West

Scheme	Constraint	Flexibility Start Year	DNOA Decision
Exeter City to Folly Bridge Ring	An N-1 outage of one of the infeeds (or a busbar) overloads one of the other two infeeds.	-	Reinforce
East Yelland to Penn Hill Tee	For an N-1 outage on one of the four circuits that supply the group, the circuit between East Yelland and Penn Hill Tee potentially overloads.	-	Reinforce
Bridgwater to Bath Road Circuit	There is a 33 kV circuit overload under N-1.	-	Reinforce
Blagdon Primary	There is liability on Blagdon to feed some of Churchill Gate primary demand for a fault at Churchill gate. This causes an overload of the Blagdon transformer.	-	Reinforce
Moretonhampstead	The N-1 restoration capacity of Moretonhampstead primary is restricted by 11 kV backfeeds.	-	Reinforce
Shapwick Primary	The N-1 restoration capacity of Shapwick primary is restricted by 11 kV backfeeds.	-	Reinforce
East Brent Primary	East Brent is a single transformer primary which is anticipated to overload under intact conditions.	-	Reinforce
Newton Abbot to Teignmouth Gasworks and Higher Woodway	Overload on the circuit from Newton Abbot 8L5 to Teignmouth Gasworks 1L3 and Newton Abbot 3L5 to Higher Woodway.	-	Reinforce
St Mawgan	Demand growth takes the 11 kV backfeeds for St Mawgan primary over their capacity.	-	Reinforce
Core Hill Primary	In an N-1 outage for the loss of one of the transformers at Core Hill primary, the remaining transformer will be overloaded in the future.	-	Remove
Edgarley Primary	Single transformer primary with firm capacity reliant on 11 kV interconnection, which is expected to be exceeded for an outage of the transformer.	-	Remove
Gunnislake	An N-1 condition for the loss of one of the 33/11 kV transformers at Gunnislake primary would overload the remaining transformer at peak loading.	-	Remove

DNOA Outcomes – NGED-wide

Table 5 Summary of investment decisions for NGED-wide schemes

The following categories of constraints were not taken forward for individual assessment as part of the DNOA process as they are not currently viable for mitigation with flexibility services. A list of each of these constraints is given in the relevant scheme pages. Managing asset condition related constraints using flexibility is not technically viable. Managing generation constraints with flexibility is technically feasible in some cases.

Scheme	Constraint	Flexibility Start Year	DNOA Decision
Asset replacement	Condition based issues on NGED assets across all four licence areas.	-	Reinforce
Fault level	Fault level constraints on substations across NGED's four licence areas.	-	Reinforce
Generation	Generation driven constraints across NGED's four licence areas (which are not suitable for mitigation with flexibility through DTU / GTD).	-	Reinforce
Voltage	Voltage driven constraints across NGED's four licence areas.	-	Reinforce

Glossary

Flexibility related terminology

Acronym / Initialism	Term	Definition
CBA	Cost Benefit Analysis	A process used by NGED to measure the benefits of a business decision compared to the costs associated with taking that action. Used to determine the optimal reinforcement solution, which is then tested against market provided flexibility by the DSO as part of the DNOA process.
CEM	Common Evaluation Methodology	A methodology developed under the Open Networks project to compare options and identify low regret pathways. The CEM tool is used in the DNOA process to assess flexibility against conventional reinforcement.
–	Ceiling Price	A price calculated based on the value of reinforcement deferred that represents the maximum National Grid DSO is willing to pay for flexibility. Given in units of £ / MWh.
CMZ	Constraint Management Zone	Constraints on the electricity network are confined to specific geographical locations, we call these locations Constraint Management Zones (CMZs).
–	Flexibility	Reducing loads on the network by using customers' ability to change their usage patterns by either switching on generators or reducing consumption.
–	Flexibility Payments to service providers	Flexible service contracts to manage network capacity constraints. Expenditure should include payments made for the availability of flexibility services and payments made for service utilisation. The volumes relate to total MVA of flexible services contracted during the reporting year.
FSP	Flexibility Service Provider	Flexibility service providers enter into contractual agreements with network operators to temporarily alter their import or export behaviour to help mitigate network constraints.

Glossary

Forecasting related terminology

Acronym / Initialism	Term	Definition
–	Forecast	A prediction of future events that, in the balance of probabilities, National Grid DSO believes will occur.
–	Scenario	A hypothesis of future events that would or could occur given certain political, economic, social, technological and environmental conditions.
–	Pathway	A prescriptive set of growth projections for different technologies that are required in order to meet specific government decarbonisation targets.
FES	Future Energy Scenarios	A set of scenarios developed by National Grid to represent credible future paths for the energy development of the United Kingdom.
DFES	Distribution Future Energy Scenarios	The Distribution Future Energy Scenarios outline the range of credible futures for the growth of the distribution network. It is the first stage of the National Grid Electricity Distribution (NGED) investment planning process.
RESP	Regional Energy Strategic Plan	Plans created by the National Energy System Operator (NESO) to ensure that local areas get the energy infrastructure required to meet local net zero and growth ambitions. Used to inform National Grid DSO's DFES.
–	Holistic Transition	A pathway under which net zero is met through a mix of electrification and hydrogen.
–	Electric Engagement	A pathway under which net zero is met predominantly through electrified demand.
–	Hydrogen Evolution	A pathway under which net zero is met through fast progress for hydrogen in industry and heat.
–	Counterfactual	A counterfactual pathway under which net zero by 2050 is not achieved.
ESA	Electricity Supply Area	The area supplied by a single primary substation, or a dedicated 33 kV, 66 kV or 132 kV customer.

Glossary

Network infrastructure related terminology

Acronym / Initialism	Term	Definition
–	Distribution Network	The electric lines, cables, plant and equipment used to distribute electricity from the transmission network to NGED's 8 million customers in the Midlands, South West and South Wales.
SGT	Super Grid Transformer	Transformers used at a Grid Supply Point. Typically used to step down from 400 kV to 132 kV.
GSP	Grid Supply Point	A substation comprising of one or more Super Grid Transformers and associated switchgear.
–	Subtransmission	The sections of an electrical distribution network which provide the interface between transmission and Primary or Secondary Distribution. In NGED's network the GSPs, 132 kV circuits and BSPs are considered Subtransmission.
GT	Grid Transformer	The transformers used at a Bulk Supply Point. Typically used to step down from 132 kV to 11 kV or 132 kV to 33 kV.
BSP	Bulk Supply Point	A substation comprising of one or more Grid Transformers and associated switchgear.
–	Primary Distribution	The sections of an electrical distribution network which provide the interface between transmission and Primary or Secondary Distribution. In NGED's network, the 33 kV circuits and Primary Substations are considered Primary Distribution.
–	Primary Transformer	A transformer that steps voltage down from 66 or 33 kV to 11 or 6.6 kV.
–	Primary Substation	A substation comprising of one or more primary transformers and associated switchgear.
–	Secondary Distribution	The 11 kV or 6.6 kV network used to distribute electricity from the primary network to customers on the low voltage distribution networks (or directly connected at 11 kV or 6.6 kV).
–	Cable	A conductor used to distribute electrical power, typically buried directly in the ground, installed in ducts or troughs or strung up in the air between poles or pylons. This excludes under eaves or mural wiring.
OH (or OHL)	Overhead Lines	An overhead line is a cable for the transmission of electricity, via wooden utility poles or metal pylons. A cable that typically transmits electricity a few metres above the ground.

Glossary

Network operations related terminology

Acronym / Initialism	Term	Definition
–	Demand	The consumption of electrical energy.
–	Generation	The production of electrical energy.
–	Constraint	Any limit on the ability of the licensee's Distribution System, or any part of it, to transmit the power supplied onto the licensee's Distribution System to the location where the demand for that power is situated.
FCO	First Circuit Outage	P2/8 defines a First Circuit Outage as: *…a fault or an arranged Circuit outage…* Also referred to as "N-1" in some contexts (All FCOs are N-1 but not all N-1s are FCOs).
SCO	Second Circuit Outage	P2/8 defines a Second Circuit Outage as: *…a fault following an arranged Circuit outage…* Also referred to as "N-1-1" or "N-2" in some contexts (all SCOs are N-2 but not all N-2s are SCOs).
MVA	Mega volt amperes	Volt-ampere is a unit of electric power equal to the product of one volt and one ampere, equivalent to one watt at unity power factor (pf) is a unit used for measuring apparent power.
MWh	Megawatt hours	Megawatt hours (1,000,000 Watt hours). Megawatt hours is a measure of electrical energy.
GWh	Gigawatt hours	Gigawatt hours (1,000,000,000 watt hours). Gigawatt hours is a measure of electrical energy.
ANM	Active Network Management	The Energy Networks Association Active Network Management Good Practice Guide summarises ANM as: *Using flexible network customers autonomously and in real-time to increase the utilisation of network assets without breaching operational limits, thereby reducing the need for reinforcement, speeding up connections and reducing costs.*
–	Load Flow	A study conducted on a model of the distribution network to calculate the electrical flows through each asset. Carried out by engineers to identify thermal and voltage constraints on the network which may require intervention.

Glossary

Publications and documents

Acronym / Initialism	Term	Definition
DFES	Distribution Future Energy Scenarios	The Distribution Future Energy Scenarios outline the range of credible futures for the growth of the distribution network. It is the first stage of the National Grid DSO strategic investment planning process.
NDP	Network Development Plan	A plan published every two years as required by SLC 25B to provided stakeholders with transparency on network constraints and needs for flexibility.
NDR	Network Development Report	A component of the NDP that provides readers with valuable additional information on potential development projects.
DNOA	Distribution Network Options Assessment	A document published once a year by National Grid DSO that provides transparency in the investment decision making process.
LTDS	Long Term Development Statement	An annually published document that sets out the use and likely development of the distribution network and the DNO's plans for modifying the distribution system for the following two years.
ER P2	Engineering Recommendation P2	'Engineering Recommendation P2 – Security of Supply' (ER P2) is a distribution network planning standard. It sets the minimum levels of security of supply that Distribution licensees must achieve on GB distribution networks.
C31E	Electricity Distribution Standard Licence Condition 31E	In line with licence condition C31E, National Grid DSO is required to report on the Flexibility Services we intend to procure and have procured. As part of this requirement we produce two documents - a forward looking Distribution Flexibility Services Procurement Statement and a backwards looking Distribution Flexibility Services Procurement Report.

Glossary

Relevant organisations

Acronym / Initialism	Term	Definition
NGED	National Grid Electricity Distribution	National Grid Electricity Distribution is a DNO that is licenced by Ofgem to distribute electricity in the East Midlands, West Midlands, South West, and South Wales.
DNO	Distribution Network Operator	A company, licenced by Ofgem, which distributes electricity in the United Kingdom who has a defined Distribution Services Area.
DSO	Distribution System Operator	A directorate within NGED that creates an efficient and more flexible electricity network to meet future energy demands as well as co-ordinating transmission and distribution services at a local level with other network and system operators. Responsible for the DFES, NDP and DNOA processes.
NESO	National Energy System Operator	The public entity responsible for balancing electricity supply and demand in Great Britain.
NGET	National Grid Electricity Transmission	National Grid Electricity Transmission owns the electricity transmission network in England and Wales.

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September 2024.
BLU28575/XX