Distribution Flexibility Services Procurement Report 2022/23

April 2023

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EXECUTIVE SUMMARY

Northern Powergrid has a 'flexibility first' commitment. This means prioritising flexibility solutions where we can and only implementing infrastructure solutions where flexibility is not viable. By taking this flexibility first approach, we will mitigate the need for costly traditional network reinforcement and maximise the use of low carbon electricity.

In 2022/23 we ran two tenders for flexibility services in line with the intentions we set out in our Flexibility Services Procurement Statement for 2022/23. We appointed our first provider who commenced operations in early 2023, and the second tender round is still underway at the time of writing.

This report describes our programme of stakeholder engagement with flexibility services market participants, and how we have responded to their feedback in our ongoing efforts to support the development of distribution flexibility markets and capabilities in our region. The learning from those engagements, along with our plan to implement a market platform, provide a foundation for growth in flexibility markets in our region. Our plans for the year ahead are set out in our Distribution Flexibility Services Statement 2023/24

1. INTRODUCTION

1. Northern Powergrid is responsible for the electricity network that powers everyday life for 8 million customers across 3.9 million homes and businesses in the Northeast, Yorkshire and northern Lincolnshire. Our team of around 2,700 colleagues operates 24 hours a day, 365 days a year to maintain a safe, reliable and efficient electricity supply. From pandemics to pouring rain, heat waves to hailstones, we work around the clock for our customers – no matter what the circumstances. We are responsible for circa 100,000 kilometres of overhead power lines and underground cables, spanning c. 25,000 square kilometres and more than 63,000 substations.

2. The energy system is changing as we transition towards net zero, and electricity networks are at the heart of this change. For our region to meet the national commitment to net zero emissions by 2050, we need to enable whole energy system decarbonisation, including setting up the power system so that it can play a major part in decarbonising transport, heat and industry.

3. Our vision, developed collaboratively with our customers and stakeholders, is to deliver a smarter and more flexible energy system for our customers to decarbonise efficiently. To achieve this, we are expanding our capabilities and taking on the functions of distribution system operation (DSO) to actively manage the increasingly complex power flows on our network that result from decarbonisation, reduce the need for conventional reinforcement, and ensure that transition to net zero is efficient and affordable.

4. This report focusses on distribution flexibility services whereby we pay connected customers to vary their electricity use or production where this can help us to economically expand our network, reduce costs or help us manage customer demand uncertainty. The scope of this report excludes other aspects of customer flexibility such as active network management (ANM), flexible connections (such as generation curtailment or curtailed connections) or price driven customer flexibility (for example customer load shift in response to time-of-use tariffs).

5. In this report on the 2022/23 year, you will find information on:

    - our procurement and use of flexibility services;
    - stakeholder engagement during the year;
    - economic viability and market assessments; and
    - reporting on the carbon impact of our flexibility services.

6. We would value your views on the information in this document and welcome feedback. You can contact us at flexibility@northernpowergrid.com .

2. FLEXIBILITY PROCUREMENT AND USE SUMMARY

7. We tendered for 16 MW of Sustain and procured 1.4MW. We were unable to contract more that this due to the low volumes bid. Although there we accepted a further bid for 30kW from another bidder, this has not yet proceeded to contract at the time of writing.

Delivery Year: 2022/23	Sustain	Secure	Dynamic	Restore	Reactive Power
	MW	MW	MW	MW	MVAr
Contracted in prior years	0				
Tendered in reporting year	16.2				
Contracted in reporting year	1.4				
Needs not met	14.8				
Dispatched in reporting year	1.4				

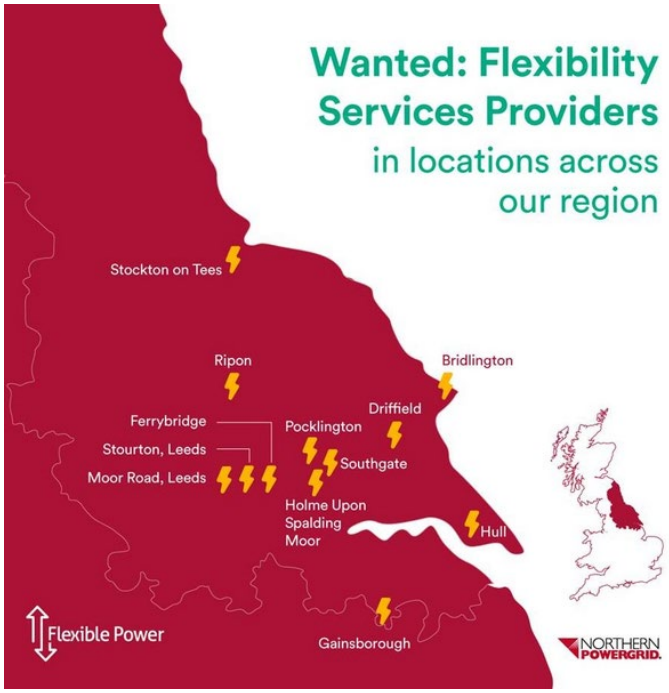
Table 1: Summary of tender outcomes

8. In our 2022/23 Procurement Statement we projected that we would tender for flexibility services as an alternative to network reinforcement, using either Sustain or Secure. We identified 19 zones with a combined maximum requirement five years ahead of up to 82MW, and our intention to procure at some or all of those. In section 4 we explain how our assessment of economic viability led us to exclude seven zones from our tenders. We tendered for 12 zones for a combined total of 16MW.

Location	Zone (Primary Substation)	Projected max requirement (MW)	Tendered (MW)
Beverley	Beverley 132/33kV	20.6	Not tendered
Bridlington	Martongate 66/11kV	3.3	0.8
Driffield	Kirkburn 66/11kV	1.9	1.4
Featherstone	Commonside Lane 33/11kV	7.6	Not tendered
Ferrybridge	Ferrybridge A 66/11kV	4.0	2.2
Gainsborough	Harpswell 33/11kV	0.8	0.8
Hull	Ellifoot Lane 33/11kV	0.3	0.3
Knottingley	Weeland Road 33/11kV	4.6	Not tendered
Leeds	Moor Road 33/11kV	2.7	1.1
	Stourton 132/11kV	2.0	1.8
Market Weighton	Holme Upon Spalding Moor 33/11kV	0.7	0.5
	Southgate 33/11kV	0.9	0.2
Pocklington	Hayton 66/11kV	2.6	0.3
Ripon	Ripon 33/11kV	6.1	4.9
Scunthorpe	Crowle 66/11kV	3.3	Not tendered
Sheffield	Wheatacre Road 66/11kV	2.4	Not tendered
Stockton on Tees	Norton 132/11kV	9.8	1.9
Washington	High Barmston 66/11kV	1.3	Not tendered
Whitley Bay	Monkseaton	7.2	Not tendered
	Total	**82.1**	**16.2**

Table 2: Potential flexibility needs

9. We tendered for the Sustain product in 12 flexibility zones.



Location	Postal sectors	Zone	Capacity requirement (MW)	Utilisation fee ceiling price £/MWh	Contract start date	Months	Days	Hours
Bridlington	YO140; YO149; YO151; YO152; YO164; YO166; YO167	MARTONGATE 66/11kV	0.8	300	01/04/2025	Feb, Oct	Mon - Fri	18:00 - 20:00
Driffield	YO179; YO250; YO251; YO253; YO254; YO258; YO259; YO421	KIRKBURN 66/11kV	1.4	54	01/12/2022	Feb-Mar, Nov	Mon, Tue, Thu, Fri	06:00 - 18:00
Ferrybridge	LS255; WF102; WF103; WF110; WF118; WF119; WF81; WF82; YO89	FERRYBRIDGE A 66/11KV	2.2	300	01/12/2022	Nov	Thu, Fri	15:30 - 19:30
Gainsborough	DN209; DN213; DN214; DN215; LN12; LN13; LN82; LN83	HARPSWELL 33/11kV	0.8	300	01/12/2022	Dec-Mar	Sat - Sun	15:00 - 18:00
Hull	HU128; HU129	ELLIFOOT LANE 33/11kV	0.3	83	01/12/2022	Oct-Mar	Mon - Sun	10:00 - 22:00
Leeds	LS165; LS167; LS168; LS42; LS53; LS61; LS62; LS63; LS64	MOOR ROAD 33/11kV	1.1	300	01/12/2022	Feb	Mon - Fri	17:30 - 19:30
Leeds	LS101; LS102; LS260; LS268; LS90	STOURTON 132/11KV	1.8	172	01/12/2022	July	Tue - Thu	00:00 - 01:30 07:30 - 24:00
Market Weighton	DN147; HU152; YO421; YO424; YO433; YO434; YO625; YO86; YO87	HOLME UPON SPALDING MOOR 33/11kV	0.5	300	01/12/2022	Nov-Dec	Mon - Fri	05:00 - 08:00 15:00 - 18:00
Market Weighton	HU152; HU177; YO259; YO424; YO43; YO433; YO434	SOUTHGATE 33/11kV	0.2	300	01/12/2022	Nov-Feb	Everyday	16:30 - 19:00
Pocklington	YO259; YO415; YO42; YO421; YO422; YO424; YO433; YO434; YO45; YO86	HAYTON 66/11kV	0.3	300	01/04/2025	Jan-Feb	Mon - Fri	15:00 - 20:00
Ripon	DL79; DL82; HG33; HG41; HG42; HG43; HG44; HG45; YO73; YO74	RIPON 33/11kV	4.9	18	01/12/2022	Oct-Mar	Mon - Fri	07:00 - 19:30
Stockton on Tees	DL13; DL21; TS160; TS181; TS182; TS183; TS184; TS185; TS190; TS197; TS198; TS199; TS201; TS202; TS211; TS213; TS225	NORTON 132/11KV	1.9	88	01/04/2026	Oct-Dec, Feb	Mon - Thur	16:00 - 18:30
		Total	**16.2**					

Table 3: Flexibility needs tendered

10. The table below sets out the variance between our Procurement Statement for the year, and the actual flexibility services requirements tendered.

Location	Zone (Primary Substation)	Projected max requirement (MW)	Tendered (MW)	Reason for variance
Beverley	Beverley 132/33kV	20.6	Not tendered	Not needed until ED3
Washington	High Barmston 66/11kV	1.3		
Whitley Bay	Monkseaton	7.2		
Featherstone	Commonside Lane 33/11kV	7.6	Not tendered	Insufficient value available for flexibility to be attractive to flexibility providers
Knottingley	Weeland Road 33/11kV	4.6		
Scunthorpe	Crowle 66/11kV	3.3		
Bridlington	Martongate 66/11kV	3.3	0.8	Flexibility capacity tendered was lower than projected following reanalysis of recent and forecast demand, and a decision to procure based on demand over the first 2 years rather than for projected requirement after 5 years
Driffield	Kirkburn 66/11kV	1.9	1.4	
Ferrybridge	Ferrybridge A 66/11kV	4.0	2.2	
Leeds	Moor Road 33/11kV	2.7	1.1	
	Stourton 132/11kV	2.0	1.8	
Market Weighton	Holme Upon Spalding Moor 33/11kV	0.7	0.5	
	Southgate 33/11kV	0.9	0.2	
Pocklington	Hayton 66/11kV	2.6	0.3	
Ripon	Ripon 33/11kV	6.1	4.9	
Stockton on Tees	Norton 132/11kV	9.8	1.9	
Sheffield	Wheatacre Road 66/11kV	2.4	Not tendered	Post fault service required
Gainsborough	Harpswell 33/11kV	0.8	0.8	No variance – tendered as projected
Hull	Ellifoot Lane 33/11kV	0.3	0.3	
Total		**82.1**	**16.2**	

Table 4: Potential and actual flexibility needs tendered

11. We said that we expected to operate two flexibility procurement cycles per year with key dates as per the table below. The summer cycle was replaced by an expressions of interest process which enables us to engage with potential flexibility providers in the run up to the winter cycle.

	1st tender round		2nd tender round	
Stage	**Planned dates**	**Actual**	**Planned dates**	**Actual**
Signpost tender requirement	30 Jun 22	7 Jul 22	30 Jan 23	2 Jan 23
Technical PQQ closes	15 Aug 22	17 Aug 22	20 Mar 23	31 Mar 2023 additional time allowed to facilitate participation
Bidding Closes	22 Aug 22	9 Sep 2022	30 Mar 23	In May 2023
Contract Award	30 Sep 22	2 Nov 2023	30 Apr 23	In June 2023
Invite feedback from potential service providers on the tendering process	Oct 22	Survey issued Dec 2022, later than planned due to procurement process being extended to facilitate participation	May 23	In July 2023
Announce procurement outcomes	31 Oct 22	3 March 2023, later than expected due to extended time needed from contract award to contract execution.	31 May 23	To be confirmed, depending on time to execute contracts

Table 5: Procurement timetable

12. We tendered for the Sustain product with a utilisation payment with zero availability payments, and for two-year contracts with an optional two-year extension.

						When flexibility is required		
Location	**Zone (Substation)**	**Voltage (or below)**	**Capacity requirement (MW)**	**Utilisation ceiling price £/MWh**	**Contract start date***	**Months**	**Days**	**Hours**
Bridlington	Martongate 66/11kV	11kV	0.8	300	1 Apr 25	Feb, Oct	Mon - Fri	18:00 - 20:00
Driffield	Kirkburn 66/11kV	11kV	1.4	54	1 Dec 22	Feb-Mar, Nov	Mon, Tue, Thu, Fri	06:00 - 18:00
Ferrybridge	Ferrybridge A 66/11kV	11kV	2.2	300	1 Dec 22	Nov	Thu, Fri	15:30 - 19:30
Gainsborough	Harpswell 33/11kV	11kV	0.8	300	1 Dec 22	Dec-Mar	Sat - Sun	15:00 - 18:00
Hull	Ellifoot Lane 33/11kV	11kV	0.3	83	1 Dec 22	Oct-Mar	Mon - Sun	10:00 - 22:00
Leeds	Moor Road 33/11kV	11kV	1.1	300	1 Dec 22	Feb	Mon - Fri	17:30 - 19:30
	Stourton 132/11kV	11kV	1.8	172	1 Dec 22	July	Tue - Thu	00:00 - 01:30 07:30 - 24:00
Market Weighton	Holme Upon Spalding Moor 33/11kV	11kV	0.5	300	1 Dec 22	Nov-Dec	Mon - Fri	05:00 - 08:00 15:00 - 18:00
	Southgate 33/11kV	11kV	0.2	300	1 Dec 22	Nov-Feb	Everyday	16:30 - 19:00
Pocklington	Hayton 66/11kV	11kV	0.3	300	1 Apr 25	Jan-Feb	Mon - Fri	15:00 - 20:00
Ripon	Ripon 33/11kV	11kV	4.9	18	1 Dec 22	Oct-Mar	Mon - Fri	07:00 - 19:30
Stockton on Tees	Norton 132/11kV	11kV	1.9	88	1 Apr 26	Oct-Dec, Feb	Mon-Thur	16:00 - 18:30

Table 6: Specification of flexibility services tendered

* Contract start date changed to 1 April 2023 when these same requirements retendered in the Spring 2023 tender round

3. STAKEHOLDER ENGAGEMENT

13. Our programme of stakeholder engagement has created important relationships with market participants. It has also yielded valuable insights which continue to inform the development of our approach to flexibility services. We engaged directly with a wide range of stakeholders including end consumers seeking to optimise their own assets, EV charging operators, developers of storage projects, and aggregators (spanning domestic demand, EV charging, commercial demand, generation and storage). Our approach is largely centred on bilateral meetings with

stakeholders and direct mailings, supported by online resources and supplemented by speaking engagements and discussion at relevant conferences and industry forums.

Stakeholder engagement on flexibility requirements and procurement

14. Previous stakeholder feedback indicated that aggregators need time to engage with their clients about participation in DNO markets, and understanding future opportunities is important for parties interested in planning, building and connecting assets in our region. As a consequence, a long lead time ahead of a tender is helpful. We therefore signposted upcoming tender rounds several months in advance and tendered for flexibility requirements up to 4 years ahead.

15. We published information on the Flexible Power website about our flexibility requirements and the procurement process, supported by resources on baselining of EV charging. We emailed our stakeholders directly so that they would be aware of the flexibility requirements, the process and how to contact us. In addition we promoted our tender activities through press releases[1,2] to trade media.

16. The full tender pack including the flexibility requirements (see Table 6), prequalification questionnaire and tender evaluation criteria were made available to market participants upon completing registration as a supplier on our procurement platform. We made it clear that there would be a utilisation payment with zero availability payments. We tendered for two-year contracts with an optional two-year extension, in response to previous stakeholder feedback that contracts longer than one year were preferred.

Industry engagement on common rules for the procurement and use of flexibility services

17. We have participated in Open Networks activity to develop and enhance common approaches for the procurement and use of flexibility services. Stakeholder engagement in these developments has been managed through the Open Networks project. The table below sets out the relevant topics addressed in the year, many of which are still ongoing throughout 2023, and a status update on our adoption or planned adoption.

[1] Businesses offered opportunity to generate income and support transition to low carbon energy future

[2] Northern Powergrid celebrates first flexibility services contract

Planning and network development workstream	
Open Networks initiative	**Northern Powergrid progress**
Carbon Reporting: the development of common methodologies for carbon reporting and monitoring of flexibility markets for implementation by 2023.	We have adopted the methodology and used it in for the carbon reporting in section 5 of this report.
Common Evaluation Methodology (CEM) used to evaluate flexibility and traditional intervention options.	We have adopted the CEM to provide consistency and transparency on how we choose the optimal solution, and to demonstrate where flexibility services are the most economic and efficient solution to meet network needs.
Network Operation workstream	
Open Networks initiative	**Northern Powergrid progress**
Primacy Rules: the development of rules to manage issues that can arise when both the DNO and the ESO are seeking to procure flexibility from the same provider and/or managing issues in the same parts of the network or, in some cases, where localised actions may affect the ability to balance the overall system on a national basis	There have been no service conflicts in our licence areas to date, but we will actively monitor this through engagement with our customers and the ESO and use the primacy rules to manage any conflicts.
Dispatch systems interoperability: An action plan was developed in 2022 to deliver interoperability across systems (incl. ESO, DSO, and third-party platforms) in the short, medium, and longer term, with considerations to include the development of common systems, processes, standards, and APIs.	We will adopt the standardised API when it is ready for implementation.
Common baselining methodologies for all DNOs.	We have adopted the methodology and supporting tool. However, due to the types of flexibility offered in tender rounds so far, we have not needed to use the tool as nominated baselines were the most appropriate.

Market Development workstream	
Open Networks initiative	**Northern Powergrid progress**
Standard Contract: development and improvement of the standard contract for procuring flexibility services across DSOs and ESO.	We adopted the standard contract and used it for contracting for flexibility services, with an understanding that some variation may be required when the service provider is an aggregator, particularly of domestic participants where data protection becomes more relevant. We will adopt the next version of the standard contract when it is ready for implementation.
Procurement process: Aligning sign-up and pre-qualification processes for flexibility service procurement, ensuring a simpler and more consistent user experience across the country	The timing of our twice-yearly tender rounds was chosen to align with the majority of others through discussions at Open Networks. We will adopt other aspects of standardisation when they are ready for implementation.
Flexibility products: common definitions and common parameters for four active power services that are being procured by DNOs.	We have committed to use of the standard products and have used the Sustain product in our tenders.
Settlement: standardising definitions and processes for settlement of flexibility services.	The Open Networks team is developing the detailed delivery plan and governance timeline for the standardisation of the settlement process. We will adopt the common settlement process for the standardised flexibility service products when they are ready for implementation.

Table 7: implementation status of Open Networks deliverables

Summary of engagement

18. As well as bilateral engagements with stakeholders, we carried out the following communications and engagements

- A number of direct emailings with information about flexibility requirements, tender rounds and the procurement process
- Survey after the 2022 tender seeking feedback on the experience of engaging with us and participating in the tender process, and barriers to participation
- Speaking engagements – focus on flexibility services:
  - Power Responsive conference, July 2022
  - UKRI Energy efficiency workshop, July 2022
  - Northern Powergrid stakeholder panel, October 2022

  - Connections stakeholder workshop, March 2023
  - Faculty AI Digital Evolution event, March2023
- Press releases and social media

19. The key issues from our engagements and our resulting actions are set out below.

Summary of engagement	
Feedback	**Resulting Action**
1. In market engagement leading up to and during the 2022 procurement round, a number of parties asked if they could bid in a flex capacity below 50kW, and we received bids from 2 flexibility providers where the capacity they could offer in some or all of the zones they were bidding in were below the 50kW threshold.	In the Spring 2023 tender round we reduced the threshold to 30kW, with a minimum of 10kW per zone, to encourage more market participants.
2. In market engagement leading up to and during the 2022 procurement round, a number of parties asked about our approach to baselining flexibility from domestic EV chargers.	We developed our EV charging baselining approach and published the methodology and data in advance of Spring 2023 tender round to enable participants to develop a bid with a clear understanding of our approach. One stakeholder said that the "EV baseline is one of the most appropriate baseline methodologies that we have seen"
3. In the 2022 tender round, we offered the terms and conditions of the Open Networks standard contract, and we required potential bidders to accept these to pass the pre-qualification process. In the subsequent contract negotiation stage it was clear that there were features of the common contract that the aggregator provider of flexibility services found inappropriate for a service based on flexibility from domestic customers and for a contract of relatively low value compared to the standard liability clauses.	Processes need to be streamlined and accessible and appropriate for aggregators as well as for asset owners/operators. To facilitate the participation of domestic aggregators, we made acceptance of the terms and conditions in our Spring 2023 tender round an evaluation criterion rather than a pass/fail question at the pre-qualification stage, thus enabling us to make potential amendments to the contract where these would be appropriate for aggregators.

Summary of engagement	
Feedback	**Resulting Action**
4. In 2022's market engagement and procurement round we provided information linking postcode sectors to each flexibility zone to enable potential bidders to check whether the flexibility assets they wished to include in a bid were indeed in a flexibility zone. During the procurement process we found the postcode sector was a less reliable method of checking flexibility zone per asset than we had believed. The impact of this was that the flex capacity offered by aggregator bidders in each zone bid were less than expected. Different stakeholders use different data to identify the location of their assets: • Latitude/longitude of premises • Distribution substation that premises is served by • Full post code • MPAN • Shape files	We developed a more accurate checking method and deployed this for the Spring 2023 tender round, and we encouraged potential bidders to send us their site details as soon as possible so that we could carry out the check before they submit a bid. We are continuing to develop the accuracy and accessibility of tools to verify whether an asset is located in a flexibility zone, including consideration of the different types of location data.
5. Stakeholders indicated that there is insufficient value or longer-term certainty for them to participate in flexibility services tenders. Higher prices and longer-term contracts (10 years plus for developers) would be more attractive. For generators and suppliers with a power purchase agreement, providing flexibility can create an imbalance at significant cost. Most DNOs contract for flexibility services in a way that isn't sufficiently long term and doesn't provide certainty over whether, when and how often the service will be dispatched.	While it would be uneconomic for us to pay more for flexibility when an engineering solution offers better value, we recognise that information is valuable. For primary substation constraints expected from 2025/27 to 2028/29 we will seek in 2023/24 expressions of interest from potential providers of flexibility services. We will also consider whether we can provide more visibility of our anticipated longer-term flexibility needs and the circumstances in which we would offer longer term contracts.

Summary of engagement	
Feedback	**Resulting Action**
6. Stakeholders reported that there were limited options for them to take part in tenders as the number of flexibility zones we tendered was relatively low and these didn't align with location of their assets, and also due to the cost and time to connect assets. In addition, a challenge from one stakeholder that all DNOs fail to see the link between connectivity of flexible assets and the benefits they can bring to the DNO through flexibility services.	We were already aware that connections delays are an issue so we ran a webinar to provide more information for stakeholders about the issue and measures being taken to address this. We are undertaking an innovation project 'Diversified Flexible Queue Management' which aims to accelerate the connection of renewables and flexible resources.
7. Some stakeholders were deterred from bidding due to concerns about the complexity of the procurement process, and about the automation of dispatch.	We intend to adopt a market platform in 2023 for prequalification, bidding and contracting. This provides an opportunity to streamline processes, including implementing the standardisation of pre-qualification processes being developed through the Open Networks project. While automation is key to efficiency and scale of flexibility services, these comments indicate the importance of continuing to provide support for stakeholders throughout procurement, onboarding and operations.
8. Providers of flexibility from EV chargers have access to different measurement data, depending on whether the provider has access to MPAN data as the registered supplier. Data from the MPAN relates to the whole premises including general domestic load as well as EV charging, but where data is retrieved from the EV charger it excludes general domestic load	We ensure that it is clear whether the data from the provider is just for the EV demand, or whether it includes general domestic demand too, and we set the baseline accordingly.
9. Aggregators expect to significantly increase the volume of flexibility they have available during the contract term and are asking how this increase in volume could be contracted.	Options include bidding in a subsequent tender round to have the incremental volume contracted for, or to have an opportunity to redeclare volumes under the existing contract. For the latter, we will need to take account of the need to ensure that our procurement processes are fair and transparent.
10. An interest in having a nominated account manager for flexibility matters	We are considering how to move towards more of an account management approach to enable stakeholders to engage more effectively with our DSO business unit.

Summary of engagement	
Feedback	**Resulting Action**
11. More engagement needed to drive development of the market	We will extend the scale and variety of our stakeholder engagement activities. This includes enhancing the Northern Powergrid website and the Flexible Power website, and targeted engagement through the new market platform and through webinars and surgeries for flexibility service providers and other interested parties.
12. Battery storage operators are increasingly looking at DSO markets as well as ESO ancillary services and the wholesale market. Most of their optimisation decisions are taken day ahead which may limit their interest in the Sustain product that we have tendered for in 2022-23. 13. An aggregator has the capability to request demand turndown from its client base at 4 to 24 hours notice, but this the Sustain product that we have tendered to date for can't utilise this capability	We recognise that moving towards shorter term trading will be enable participation of flexibility assets optimised days or hours ahead. To this end we intend to implement a market platform, to pilot and seek to roll-out nearer to real time flexibility products, and we are participating in an Open Networks working group on how to progress towards flexibility procurement in near real time.
14. A request for information about our emerging and future priority areas for flexibility so that aggregators can recruit participants.	We will tender in 2023/24 for flexibility services to defer reinforcement at primary substations where the constraint is expected within the next three years i.e., by 2025/26. For primary substation constraints expected from 2025/26 to 2028/29 we will seek expressions of interest from potential providers of flexibility services.

Table 8: Summary of engagement

Signposts to relevant information

Information	Link
An introduction to Northern Powergrid and flexibility services	Flexibility Services - Northern Powergrid
Find information on our current flexibility requirements	Where We Are Procuring Flexibility
Understand how we procure flexibility services and to take part in our tenders	How are we procuring flexibility?
Read our annual procurement statements and reports, and reports on procurement outcomes.	Useful documents
Sign up to our mailing list to receive updates on procurement opportunities, news and information any upcoming events	flexibility@northernpowergrid.com
Get in touch to provide feedback or discuss any aspect of flexibility services	flexibility@northernpowergrid.com

Table 9: Relevant information

4. ECONOMIC VIABILITY

Determining where flexibility services may be economically viable

20. In our Procurement Statement for 2022/23 we identified 19 primary substations where we expected intervention would be needed by 2028, and where we were interested in exploring flexibility services as an alternative to deferring or avoiding network reinforcement. We indicated that our tenders would include zones for all or some of these sites, dependent on their economic viability.

21. The process of identifying those 19 primary substations started with a detailed analysis of existing and predicted future demand patterns. For recent years we calculated load index and distribution

load estimates, based on known new load connections and load growth. We used the DFES load growth forecasts and distribution load estimates to identify constraints on the network: constraint peak demand, the number of constraint events that exceed the asset limits and when they occur (time of day hour, day of the week, weeks and months of the year). It was from these network studies and findings that we determined the need for flexibility services (i.e. volume and time windows) in each zone, and we confirmed whether flexibility services could be deployed whilst still ensuring that voltage remains within statutory limits and that there would be no adverse impact on upstream distribution or transmission assets.

22. Projected half hourly demand growth above the firm capacity (i.e. the asset limits) of a primary substation was used to fix the volume of demand reduction that would need to be secured by a flexibility service; peak requirement (MW); total energy requirement (MWh); and time of day, time of week and monthly requirements. These flexibility requirements formed the basis for market engagement through signposting and the tendering process.

23. When a substation group is identified as requiring intervention a detailed assessment of the existing site capability is undertaken in the form of a revised Firm Capacity assessment. The optioneering in this assessment considers a range of suitable solutions which will include traditional (asset based) solutions, smart (i.e., technological items, for example Real Time Thermal Rating) and flexibility services. The options are not deployed in isolation and the optimal solution could consist of a combination of different approaches.

24. We used the Common Evaluation Methodology (CEM) to provide a consistent and transparent method for choosing the optimal solution, and to demonstrate where flexibility services could be the most economic and efficient solution to meet network needs. We used the financial benefit of deferring the engineering solution by two years and the total energy requirement to calculate for zone a £/MWh for flexibility services that would deliver a flexibility services solution at equivalent cost to the engineering solution. This 'ceiling price' is maximum economically viable price for flexibility services in each zone: above this, the alternative engineering solution would be more cost efficient.

25. There were five zones where the number of hours that flexibility was required was very low, so the calculated ceiling price was therefore very high, higher than £300/MWh. Our market assessment indicated that this is a price at which others have procured distribution flexibility services. For these zones we used £300/MWh as a ceiling in our procurement process as, if flexibility services were available, this should be sufficient to procure the services, so maximising

value for money for our customers. We also extended the times when flexibility would be sought to provide a higher level of certainty that the service would be in use when the primary substation was at risk of operating beyond its firm capacity. We extended the hours up to the point that the total cost per annum of the flexibility services equalled 50% of the benefit of deferring reinforcement with the objective of achieving a balance between attracting flexibility providers, obtaining value for money for our customers, and managing the risk of the substation operating beyond its firm capacity.

26. There were three zones where the ceiling price was below £20/MWh, a level that would be unattractive to service providers, and another three where flexibility was not needed until ED3. In one zone the need was for a post-fault service which would be more effectively pursued when we have developed our capabilities in nearer-to-real-time forecasting and procurement. Therefore, there were seven zones where it was not economically viable to tender for flexibility services or it would be more appropriate to pursue this at a later date, and we tendered for flexibility services at 12 zones as described in chapter 2.

Procurement and dispatch of flexibility services

27. We tendered for the same flexibility requirements in the tender round in 2022 and in the first tender round of 2023. We assessed bids in the 2022 tender round using the following evaluation criteria, in this order:

    1) Pre-qualification criterion: pass/fail on acceptance of T&Cs

    2) Pre-qualification criterion: technical compliance: the flexibility is of the right type, in the right place, meets minimum flexibility capacity of 50kW

    3) Pre-qualification criterion: Delivery risk (e.g. age/reliability of technology, other commercial conflicts)

    4) Bid evaluation criterion: Price and volume: can the bid form part of a cost efficient and carbon efficient mix of tender responses to meet our flex requirements? In the event of tiebreaker, we will have a preference for less carbon intense technologies.

28. The post tender survey for potential and actual bidders included questions about the tender process. While the number of survey participants was low, we did not receive any feedback through the survey, or via other dialogue, that indicated that the tender evaluation criteria were not well understood by stakeholders.

29. However, we found that the parties who bid then sought changes post-bid in the T&Cs. We also observed that there are a large number of intermediaries providing flexibility services from aggregated domestic premises, predominantly EV chargers, with the implication that for us to access that flexibility capacity we would need to access it via a number of providers, which implies a lower capacity per flexibility service provider.

30. To reduce the barriers to participation and to encourage development of the local flexibility services market, for the first tender round in 2023 we reduced the minimum flexibility capacity to 30kW across all zones and 10kW per zone, and we made acceptance of the T&Cs a bid evaluation criterion rather than a binary pass/fail element of the pre-qualification.

31. The evaluation criteria used to assess bids were included in the package of information for each tender round that was available to those who registered on our procurement system as a supplier of flexibility services. The outcomes of the 2022 procurement round, i.e. contracts placed, were made available in the Procurement Outcomes Report on the Useful Documents page of the Flexible Power website. The outcomes of the Spring 2023 tender round will be published when it has concluded.

32. We contracted for flexibility services in one zone, Kirkburn, sufficient to meet that zone's flexibility requirements in full so no other network management actions in that zone were needed or taken.

Links to core documents and/or methodologies used to support decision making process for financial viability

33. The principles for forecasting, network impact assessment, optioneering and identifying solution are set out in both the Network Development Plan and in the Scenarios & Investment Planning Annex (4.1) of the ED2 business plan. Information on DFES is available here.

Total system considerations

34. Flexibility services are widely recognised as providing value to the wider energy system as well as to the distribution system. This wider value and how the distribution system can contribute to whole system efficiency has been explored by a number of studies including the Flexibility in Great Britain report and in our Customer-Led Distribution System innovation project[3]. However,

[3] Results to be disseminated shortly

there is a need to manage potential conflicts when a flexibility asset is participating in multiple markets. As part of the procurement process, we asked flexibility service providers about any other markets their assets were participating in, to understand any potential conflicts and so that they could be managed. None were identified.

5. CARBON REPORTING

35. In 2022/23 we despatched flexibility services from just one provider, a generator using biofuel Applying the Open Networks developed Carbon Reporting Methodology, the carbon impact of the flexibility services is as follows.

LC31 Technology Category	Requested energy (MWh)	Delivered energy (MWh)	Direct carbon impact (kgCO2e)	Consequential carbon impact (kgCO2e)
Biofuel - Biogas from anaerobic digestion (excluding landfill & sewage)	571	490	326,746	-134,417

Table 10: Carbon reporting