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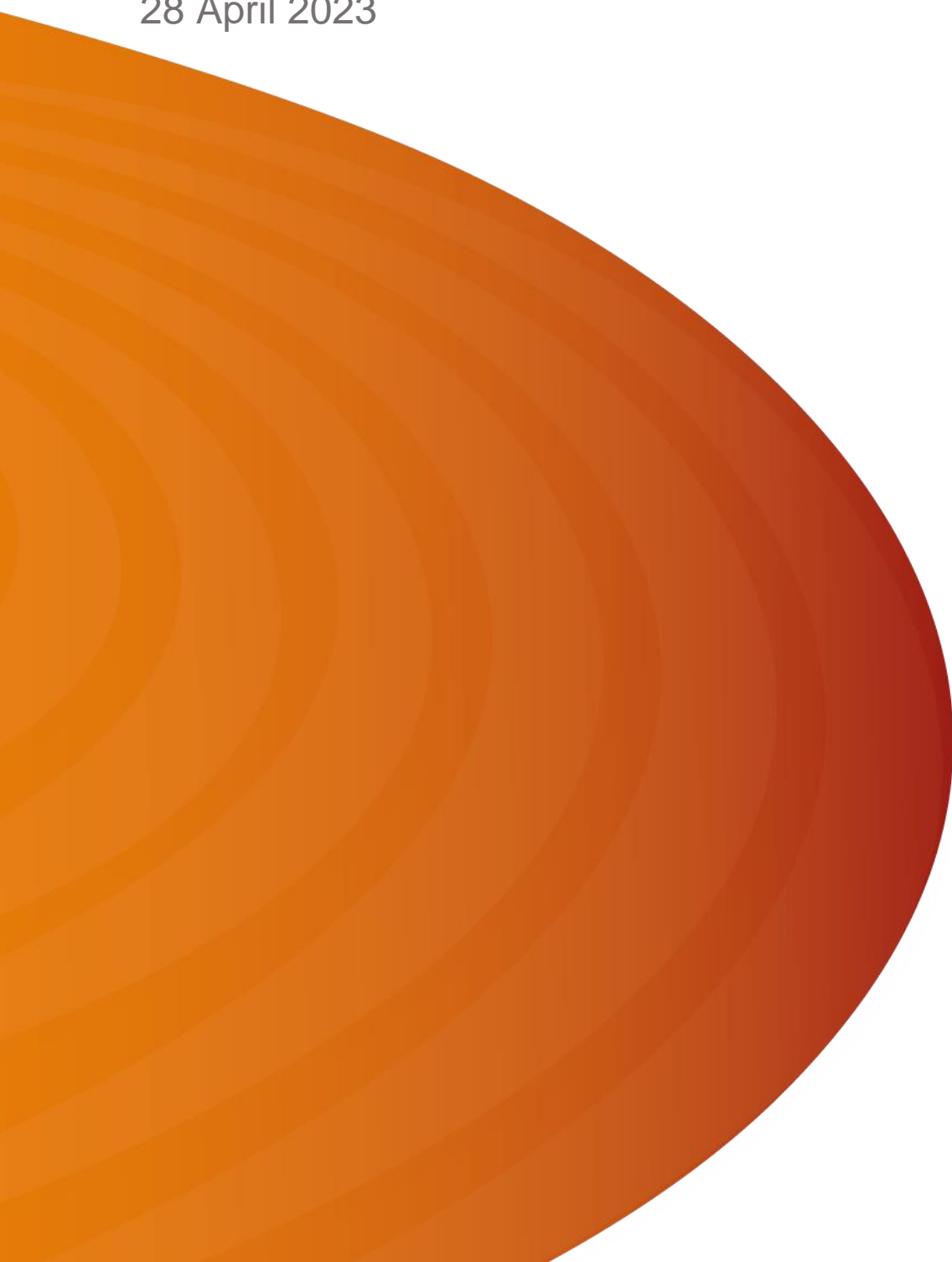
Company:  
UK Power Networks  
(Operations) Limited

Registered in England and Wales No: 3870728

# Flexibility Services Procurement Report

Our procurement and use of flexibility in 2022/23

Standard Licence Condition 31E Reporting Requirement  
28 April 2023



Contents

Purpose of this document ..... 3

Executive Summary ..... 4

1. Introduction..... 5

2. Flexibility procurement and use summary ..... 6

3. Stakeholder engagement ..... 11

4. Economic viability ..... 14

5. Carbon reporting ..... 16

6. Key documents and references ..... 17

Appendix A: ..... 18

Appendix B: ..... 18

## Purpose of this document

This document is one of three key reporting requirements under SLC31E of the electricity distribution licence for the 'Procurement and use of Distribution Flexibility Services'. SLC31E was implemented in December 2020 and transposes into the GB regulatory framework Article 32 of the Clean Energy for all Europeans Package. This procurement report sets out:

1. What flexibility we tendered, contracted and dispatched in the 2022/23 regulatory period including information on service types, volumes and carbon impacts; and
2. How we complied with the licence condition by demonstrating transparency of flexibility procurement and use, and coordination across industry participants.

## Executive Summary

We are the UK's biggest electricity distributor delivering power to over 8.4 million homes and businesses across London, the East and South East of England. We keep the lights on across 29,250 square kilometres, serving 19 million people from Cromer in the east to Brighton on the South Coast.

Flexibility is a critical tool in enabling net zero at lowest cost for the customers we serve. In our Business Plan for RII0-ED2 (2023-28), we set out ambitious commitments for the procurement and use of flexibility to defer or avoid £410m of network investment. This builds on our track record of leadership in this space. In 2018, we were the first DNO to publish a Flexibility Roadmap<sup>1</sup> that describes how we will develop flexibility markets. We were also the first DNO to commit to market testing all of our HV and EHV reinforcement before we invest in any new assets<sup>2</sup>, subsequently we were also the first DNO to tender for LV needs, and now the first to large-scale tender for needs to cover export constraints at a HV and EHV level.

This Procurement Report document describes the types of flexibility we procured and dispatched in 2022/23.

Key highlights contained in this document:

- **Flexibility procurement and use summary (Section 2):**

While we continue to see significant volume attrition between awarding contracts and flexibility being made available, we are pleased to report that we increased our dispatch volumes by 79% to 552MWh. We also completed two tenders during the year, awarding contracts to 1.4GW of flexibility (400MW to support import-constrained zones, and 1GW to support export-constrained zones). This is our most successful flexibility procurement year to date. We expect to see continued growth in both procured and dispatched volumes in future years as we tender for more flexible capacity and more existing contracts become operational.

- **Stakeholder engagement (Section 3):**

We engaged throughout the year with flexibility providers to improve our products and processes and increase participation in tenders. We also released a consultation providing our plans for upcoming flexibility procurement and to receive stakeholder feedback on priorities.

We have continued to coordinate with the National Grid Electricity System Operator (ESO) through multiple projects to maximise the capacity of DER that can connect to our network. We agreed with ESO the initial scope of a transmission constraint management solution which will be implemented for the South Coast in 2023. In the East of England we delivered solutions at two GSPs, enabling more than 600MW to connect ahead of transmission reinforcements. We have used the learnings from these solutions to develop proposals for new flexible connection products and are working with the ENA through the Strategic Connections Group to develop a coherent cross-industry approach.

- **Economic viability (Section 4):**

This section describes key assessments we undertook as part of the 2022/23 tender process to ensure economic procurement and dispatch. We discuss how we determined the levels of flexibility we tendered and how these link to the Distribution Future Energy Scenarios (DFES) and Network Development Plan (NDP). We describe the site-specific Cost-Benefit Analysis (CBA) we carried out, aligning with the Electricity Network Association (ENA) Common Evaluation Methodology (CEM)<sup>3</sup>, and signpost the CBA results which we have been publishing to the market for all our tenders since 2019. We describe our commitment to competition in flexibility procurement and dispatch, and provide a detailed worked example of our bid assessment methodology.

- **Carbon reporting (Section 5):**

This section provides an estimate of carbon emissions from our dispatch activities in the 2022/23 period. We have used the methodology agreed by all DNOs through Open Networks in 2022.

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<sup>1</sup> <http://futuresmart.ukpowernetworks.co.uk/wp-content/themes/ukpnfuturesmart/assets/pdf/futuresmart-flexibility-roadmap.pdf>

<sup>2</sup> Please see p. 5 of our Flexibility Roadmap.

<sup>3</sup> The CEM is a framework to deliver consistency in how DNOs evaluate network investment options and ensure network operators conduct procurement in an open and transparent manner. More details here: [Common Evaluation Methodology and Tool](#).

## 1. Introduction

### Introduction to the company

We are the UK's biggest electricity distributor delivering power to over 8.4 million homes and businesses across London, the East and South East of England. We keep the lights on across 29,250 square kilometres, serving 19 million people from Cromer in the east to Brighton on the South Coast.

The nature of our business means we are responsible for keeping the lights on, safely and sustainably, and caring for our customers, especially those in the most vulnerable circumstances across our communities. Our key responsibilities include:

- Maintaining the safety and reliability of our electricity networks by doing no harm to people and places and making sure power cuts are rare;
- Taking care of the environment by reducing the environmental impact of our operations and enabling the country's transition to net zero carbon emissions;
- Meeting our customers' evolving needs by improving existing services and shaping new ones;
- Going above and beyond for our communities by ensuring we remain legitimate and responsible in the eyes of our customers;
- Supporting our customers in vulnerable circumstances and ensure they are not left behind during the complex energy transition.

Our vision is of a dynamic distribution system, with electricity demand and supply flexing in response to distribution-level conditions and wider market signals. We expect to see market based solutions incentivising customers to utilise available network capacity efficiently, being supplemented with traditional network investment that results in the lowest costs for customers overall. This will lead to a smarter and more highly utilised distribution network, with faster and cheaper access for DERs facilitating the transition to net zero.

We have established an independent Distribution System Operator (DSO), delivering clear accountability and transparency for how we unlock capacity to connect more low carbon technologies in a timely and cost effective way. A key role of the DSO is the development of flexibility markets. In our RIIO-ED2 Business Plan<sup>4</sup>, we made a commitment to a flexibility first strategy through which we committed to market testing all future network needs for non-network asset solutions.

### Why flexibility?

Using customer flexibility is one of our five key DSO priorities as outlined in our DSO strategy<sup>5</sup> and will allow us to manage planning, network development and operations in a more economic and efficient way. DSO flexibility services sit at the core of the DSO evolution, with market development being one of the three core DSO roles, as specified in the Ofgem DSO incentive governance:

*Role 3: Market development:*

*Activity 3.1 Provide accurate, user-friendly and comprehensive market information;*

*Activity 3.2 Embed simple, fair and transparent rules and processes for procuring distribution flexibility services.*

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<sup>4</sup> <https://ed2.ukpowernetworks.co.uk/#business-plan>

<sup>5</sup> UK Power Networks RIIO-ED2 Appendix 18 - [Additional Information – UKPN RIIO-ED2 \(ukpowernetworks.co.uk\)](#)

## 2. Flexibility procurement and use summary

In this section, we provide a high-level summary of our procurement and dispatch activities in 2022/23 along with supporting commentary. More granular information can be found in Appendix A, Supporting Data spreadsheet. We also publish detailed reports after each tender, and will introduce a monthly dispatch report during 2023/24.

### Major achievements in 2022/23

This year has been a year of transition. Preparing for the RIIO-ED2 period and the changes resulting from the Access Significant Code Review (SCR), we focused on growing our procured flexibility and learning by doing to prepare for the larger scale needs of the future. Key highs of the year included:

- Dispatched flexibility grew by 79% year on year, to 552MWh;
- Operational flexibility grew by a third, to 44MW;
- We launched our biggest tender yet, building on learning from the previous six and acting proactively to manage changes in network access and charging;

### Procurement in 2022/23

We ran two tenders during the 2022/23 Reporting Period with a total of 1,528MW awarded contracts<sup>6</sup>. 1,479MW of this capacity is awarded using the Dynamic product which acts in a similar way to a framework contract, with utilisation decisions happening close to real time, and price-competition at the point the utilisation decision is made.

The first was a tender focused on topping up requirements for previously tendered zones, managing risks of short term capacity shortfall, and procuring some larger assets in preparation for the requirements of the Access SCR. We tendered for 292MW of need using only a one year contract duration and the Dynamic product. For this tender 389MW of Dynamic contracts were awarded, of which 324MW were larger assets which were out of zone. These contracts were awarded with no commitments to enable us to learn more about flexing large assets.

The second tender was our largest tender so far. It was run over Winter 2022/23 and covered the broadest range of needs with the opportunity for Flexibility Providers to choose which product they wanted to use to provide us with flexibility. In the second tender we tendered for a total of 610MW of capacity across 1,037 flex zones with a contract length of up to two and a half years. This procurement was for Secure, Sustain and Dynamic services across Extra High Voltage (EHV), High Voltage (HV) and Low Voltage (LV) levels. For the first time we tendered for flexibility to support export-constrained zones through procurement of demand turn-up (generation turn-down) services.

Further information about the zones and the capacity required can be found in the tender information section of our Flexibility Hub<sup>7</sup>. By the end of the reporting year, the pre-qualification and bidding periods for this tender were completed, but official contract award and the contracting process will take place at the start of the regulatory year 2023/24, as such, this tender is also discussed in the flexibility statement. We will publish the post-tender report early in 2023/24.

### Comparison of MW capacity tendered and awarded contracts in our 2022/23 tenders

Figure 1 compares the volumes tendered with the volumes awarded in 2022/23 split between the type of constraint zone being tendered for<sup>8</sup>. It also shows the proportion of zones of each type where we met our volume needs.

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<sup>6</sup> We calculate total awarded contracts as the total capacity of unique assets that is bid (so if an asset is bid into two competitions it is only counted once in total capacity). For multi-year contracts with different capacities in different years, the capacity from the year with the greatest capacity is used.

<sup>7</sup> [Flexibility Hub - UKPN Smart Grid \(ukpowernetworks.co.uk\)](https://ukpowernetworks.co.uk/flexibility-hub)

<sup>8</sup> We held competitions per flexibility zone per product type. We provide more details in Section 4.

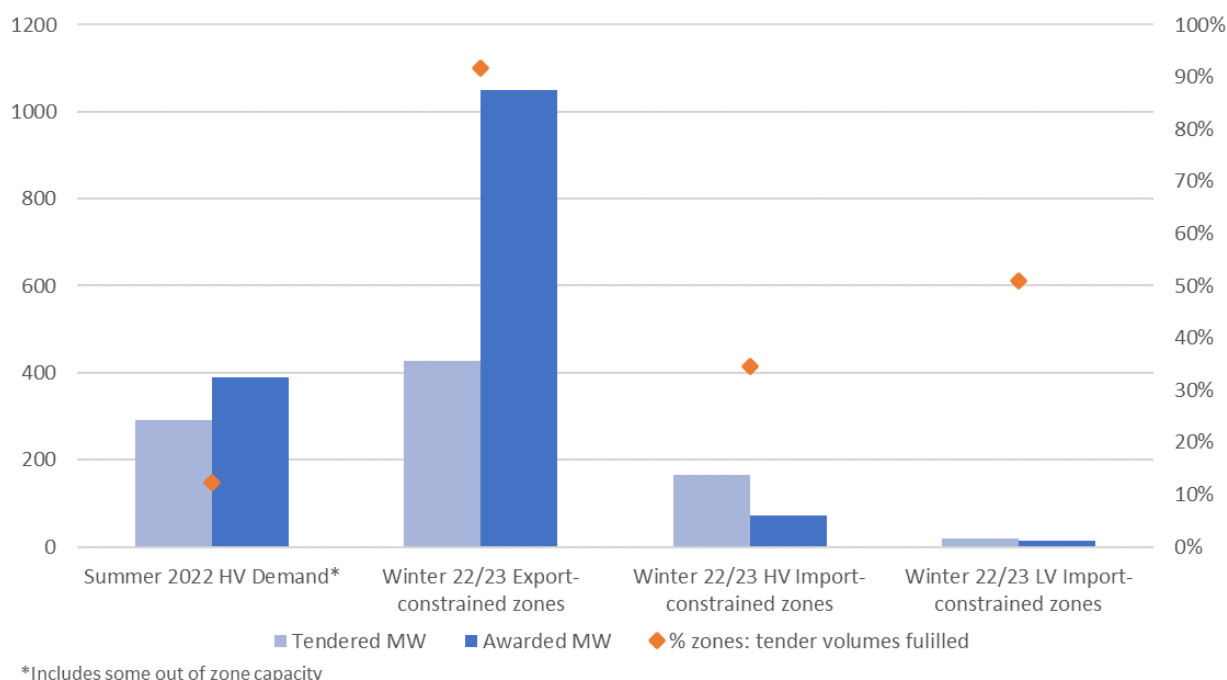


Figure 1: Tendered MW and awarded MW in the 2022/23 tenders

We were able to meet our requirements across 544 out of 1,150 zones (47%). This continues the year on year trend of increasing success in our procurement, as last year we met requirements across 35% of zones, and the previous year we met requirements across 15% of zones. This also meant we were able to increase competition in some zones by awarding greater-than-tendered capacity using our Dynamic product which is a continuous market with competitive close-to-real-time pricing. The growth in participation was driven by a number of things – firstly each year we have learnt lessons about engagement with the Flexibility Providers; secondly we have built on a base of trust with a high proportion of Flexibility Providers who already have contracts with us now tendering for new zones; and finally Flexibility Providers with distributed assets such as EV charging are starting to reach capacities that are closer to our level of needs and their technology solutions are increasingly tested and proven. Another positive from the most recent tender was the 48% of the capacity that has been awarded contracts is for assets that are already existing, therefore we expect conversion from contracted to operational capacity to be higher.

## Changes to 2022/23 flexibility procurement plans

In our 2022 Procurement Statement, we described plans to run two tenders in 2022/23. The details of the first tender were already identified and so procurement was in line with that outlined in the Statement. The plans for the second tender included multi-year procurement of 155MW across 40 EHV / HV import-constrained zones. As part of the final review of requirements, there was a small adjustment to the final number and capacity of EHV / HV import-constrained zones, so the tender included 158MW across 51 zones. Key changes to plans was the decision to:

- Also tender for wide-spread LV import-constrained zones. We identified and tendered for 962 LV zones, with a total capacity of 19MW.
- Capture the opportunity to start procuring the flexibility we will need to support export-constraints zones to support requirements that come from the Access SCR. We tendered for 24 EHV / HV export-constrained zones with a total flexibility requirement of 426MW. As this is the first wide-spread tender for export-constrained zones we have chosen the Dynamic product.



## Comparison of MW awarded contracts for use during 2022/23 and dispatched MWh

Figure 2 illustrates flexibility volumes we procured for use in 2022/23. We show the evolution of volumes through different stages of procurement: bidding and award. Furthermore, we show the energy volumes we dispatched in 2022/23 under each product. Note that Figure 2 presents all MW capacity bid in or contracted to deliver in 2022/23 across all our tenders to date, to facilitate comparison with MWh volumes dispatched in 2022/23. This contrasts with Appendix A which focuses on procurement activities in the 2022/23 period. As such, MW capacities presented there relate to tenders held within 2022/23 only.

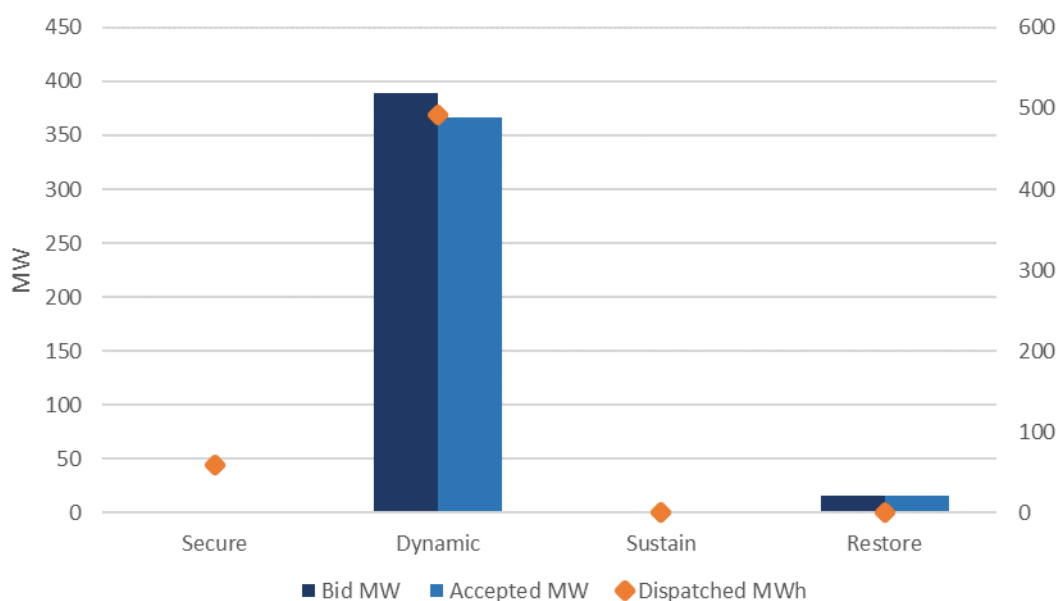


Figure 2: MW procured for use in 2022/23 and MWh dispatched

We had 591MW of flexibility awarded contracts for delivery in 2022/23 which compares with 220MW contracted for 2021/22 and 35MW contracted for 2020/21. This rapid growth has been driven by the build up of capacity from tenders year on year.

We are pleased to report that the capacity successfully dispatched during 2022/23 grew by 79%, totalling 552MWh from a total of 44MW of operational contracts. This has been driven by the large pipeline of contracted capacity from our tenders as well as the support we provided to contracted flexibility providers. We understand the challenges that flexibility providers have faced in delivering their solutions. Therefore, we have taken a pragmatic approach when monitoring contractual milestones, giving providers time to get their solutions ready rather than penalising them or terminating contracts.

In the previous year we started dispatching flexibility services in earnest, with a total of 308MWh delivered. This year we built on this through integrating flexibility dispatch into our control room. We have established a dedicated team of eight with the appropriate focus and skills to manage the operation of flexibility services and flexible connections in the context of live network conditions. As dispatch volumes increase, we will equip this team with enhanced tools to manage that scale. The team has developed plans for more transparent reporting which will be published in 2023/24 – including a day-ahead operational forecast and monthly dispatch report.



We have also increased our support for Flexibility Providers during the onboarding process to maximise the operational capacity by supporting them in achieving their commitments. We expect to continue this trend of significantly increasing dispatch volumes in regulatory year 2023/24 as outlined in our LC31E Procurement Statement.

We also have our first operational Sustain contract. For this reporting year the capacity is small (29.8kW), but it is a key step as part of onboarding a significantly larger capacity over 2023/24.

## Key developments

As highlighted in last year's Procurement Report, whilst market developments have been promising, flexibility providers continue to face challenges in translating contracted flexibility into operational flexibility ready for dispatch. This year we have focused on working with flexibility providers to mitigate the impacts of these as much as possible.

We have in particular continued to see the impact of the delay in EV growth compared to forecasts (both industry-wide forecasts of EV growth and aggregator forecasts of market share). This translates to lower than expected EV flexibility volumes but also indicates that EV demand growth remains moderate, thus delaying the onset of network constraints. As such, contract delays are non-critical at this point in time and we expect to see operational flexibility volumes pick up in line with EV demand growth in future, helping us to mitigate constraints when they arise.

Over the past year we have worked through internal analysis, through innovation and through collaboration with Flexibility Providers to get a better understanding of what is a realistic forecast of what can be achieved by individual assets/solutions, and a realistic growth forecast of assets/solutions within each zone. Key achievements during the past year include:

- The implementation of an EV baseline for Sustain calculated based on large scale, real world smart charging trials within the Shift Innovation project.
- Significant progress in onboarding flexibility from a number of Flexibility Providers who until now had not had the internal capabilities to deliver on the contracts they had committed to. We have seen growing maturity across multiple sectors.

We have decided to maintain our policy of no penalties (other than lost revenues) in order to be supportive of delivering high volumes of participation by lowering barriers to entry. However as part of stakeholder engagement for this year's tenders we have worked with Flexibility Providers to encourage realistic growth forecasts through increased transparency and validation of assumptions of market growth and market share.

As part of the tenders we ran during 2022/23 we also implemented targeted strategies to capture more existing flexibility where it is present, including larger scale, established generation, storage and demand side flexibility. This was in two stages:

1. For our first, one year Dynamic only, tender, we had significant interest from Flexibility Providers with larger low-carbon assets out of zone. In the face of growing transmission constraints and ahead of (at the time) uncertain Access SCR requirements we took this as an opportunity to "learn by doing" in a contained low-risk way. So in order to develop our capabilities and build relationships with these Flexibility Providers, we awarded contracts to a number of them, with a total capacity of 324MW. This capacity was awarded contracts under our Dynamic product which is a close-to-real-time market with no guarantee of procurement. This has enabled us to build trust with these Flexibility Providers and learn the requirements of contracting with and flexing large low-carbon assets.
2. For our second tender we introduced flexibility zones to support export constraints. These focused on areas where we have the backstop of DERMS. We also introduced greater clarity around dispatch timescales and volumes, for example by providing a commitment to running a number of test dispatches during the first year.

## Locational breakdown of 2022/23 procurement

We became the first DNO to launch an Open Data Portal<sup>9</sup> in November 2021, showing our commitment to improving transparency and quality of network data for our stakeholders. We continue to publish our Post Tender Reports on the Open Data Portal<sup>10</sup>. As shown in Figure 3, stakeholders can visualise our flexibility procurement activities on a map and can access a granular breakdown of tender results by location and product type. Furthermore, stakeholders can overlay other UK Power Networks data sets onto the Post Tender Report, such as the Embedded Capacity Register. We believe that this ability to combine and visualise multiple data sets will promote participation and innovation in flexibility markets.

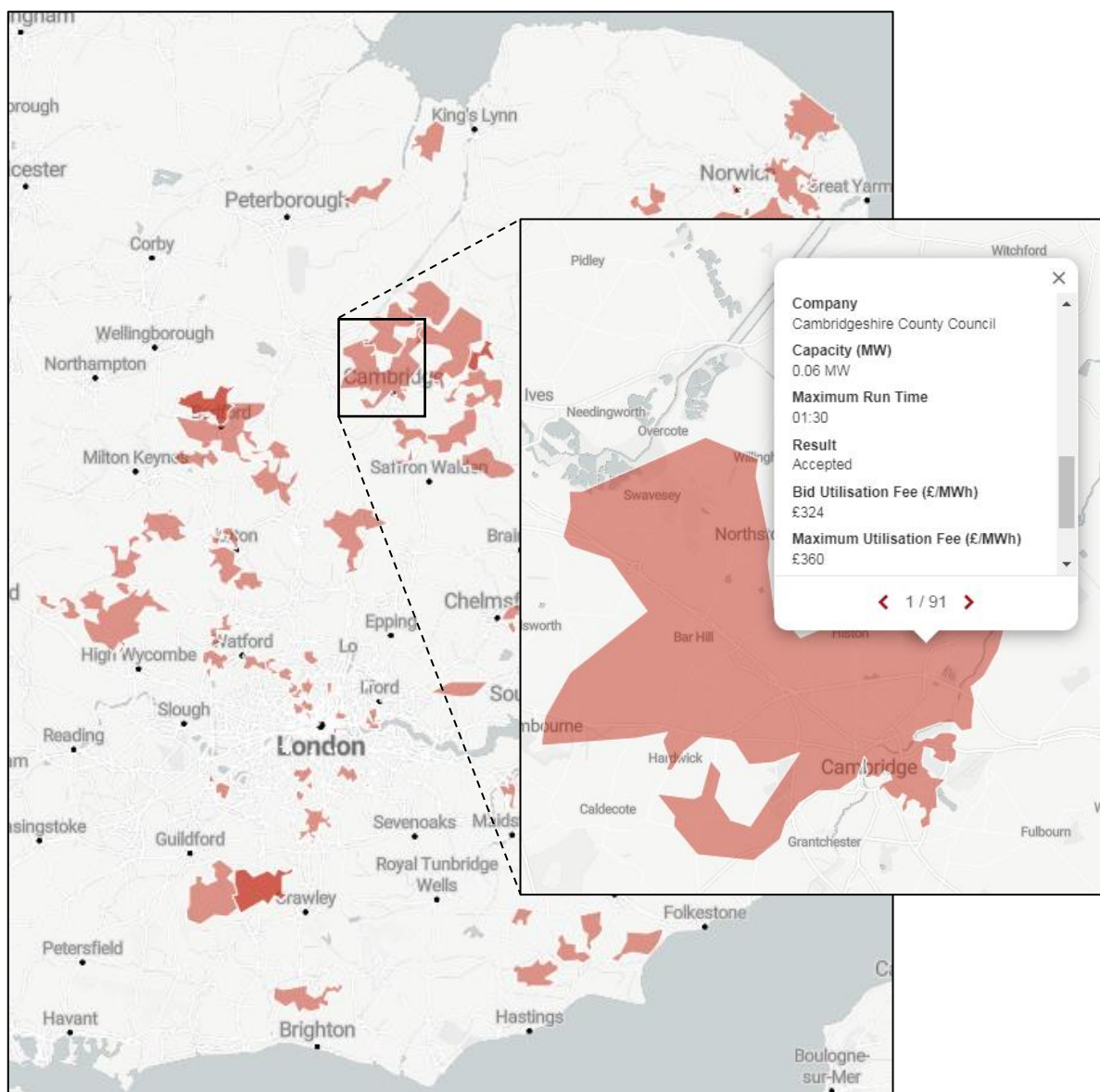


Figure 3: Post Tender Report on the Open Data Portal

<sup>9</sup> <https://www.ukpowernetworks.co.uk/open-data-portal>

<sup>10</sup> [https://ukpowernetworks.opendatasoft.com/explore/dataset/flexibility-post-tender-report/information/?disjunctive=competition\\_date](https://ukpowernetworks.opendatasoft.com/explore/dataset/flexibility-post-tender-report/information/?disjunctive=competition_date)

## 3. Stakeholder engagement

Stakeholder engagement is crucial to the growth of the flexibility marketplace, to maximise participation in our tenders and assist with co-design of products and services. During 2022/23, we spoke with a wide and varied audience, including, but not limited to DER developers/owners, energy efficiency stakeholders, and energy users. We continued to work with other DNOs and the ESO to establish standardised approaches for the procurement and utilisation of flexibility, thus creating an open and accessible market which delivers optimal whole system outcomes for the end consumer.

### Description of stakeholder engagement

We will continue to engage with flexibility providers, customers, and interested stakeholders through multiple channels:

- **Flexibility forum and webinars<sup>11</sup>:** We held two UK Power Networks Flexibility Forums, one joint forum with Piclo, SPEN and ENWL, and one webinar. Our Summer Forum was our first in-person forum post-COVID, attended by 50 companies, where we shared the results of our Summer 2022 tender, and our plans for the year. Our Winter forum and webinar were timed to coincide with the Winter 2022/23 tender to encourage maximum publicity and participation. The Webinar was held in December 2023, and the Winter Forum attended by 68 companies) was held in January 2023. We used these events to provide further information about the Winter 2022/23 tender which was open, and shared insights into our plans for the coming year and beyond. Event attendees were invited to give their feedback, fostering a collaborative approach to flexibility market design.
- **Surgeries and bilateral meetings:** We offered dedicated bilateral meetings with interested providers throughout the year and during the Pre-Qualification phase we helped providers prepare for the tenders. In 2022/23, we held 87 surgeries or bilateral meetings with 59 companies and 89 individuals. These meetings also provide an important opportunity to hear direct feedback on how we can improve flexibility services.
- **Flexibility Mailing list<sup>12</sup>:** We kept flexibility providers and other stakeholders updated on flexibility services and tender activities through our mailing list, which has over 360 stakeholders subscribed.
- **Industry events:** We attended and presented at industry conferences and workshops organised by third parties. During 2021, we presented flexibility services at events including Power Responsive, the Energy Storage summit and one hosted by the Major Energy Users Council.
- **Biannual Connections and DER Forums<sup>13</sup>:** These forums cater for our connections and DER customers where we cover a wide range of topics including Flexibility Services. We welcomed 42 customers at our most recent Connections and DER Forums in March 2023.
- **Market Platform:** Recognising the need to invest in more capable digital platforms, we engaged directly with more than 25 companies to develop and validate plans to increase participation in DSO flexibility. This included bilateral meetings and a formal consultation exercise<sup>14</sup>, covering a diverse mix of flexibility providers, system operators and technology providers. The results have helped shape our plans and those of Open Networks for 2023. Our engagement confirmed that day-ahead procurement was viewed very positively by a broad range of stakeholders and reinforced the needs for greater standardisation between DNOs and coordination between DNOs and the ESO.
- **Open Data Portal:** We continued to publish our post tender information on our Open Data Portal. This provides enhanced transparency of information. Interested parties are able to layer multiple data sets (such as the Embedded Capacity Register), which allows them to visualise and appreciate how different elements of our network interact.
- **Social Media:** We launched a social media campaign during the pre-qualification phase to further broaden our audience for market communications.
- **Stakeholder Engagement and Consumer Vulnerability (SECV):** Every year we take the opportunity through the SECV Incentive to summarise how we engage with our wide range of stakeholders and address key

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<sup>11</sup> Forum and webinar slides in the events section - <https://smartgrid.ukpowernetworks.co.uk/flexibility-hub/>

<sup>12</sup> Providers can sign up to the Flexibility Mailing list by contacting the Flexibility Mailbox ([flexibility@ukpowernetworks.co.uk](mailto:flexibility@ukpowernetworks.co.uk)).

<sup>13</sup> Connection and DER forum slides - <https://www.ukpowernetworks.co.uk/engaging-with-our-connections-customers>

<sup>14</sup> [https://smartgrid.ukpowernetworks.co.uk/wp-content/uploads/2023/02/1010610-UKPN-Consultation-Response-02.2023\\_v2.pdf](https://smartgrid.ukpowernetworks.co.uk/wp-content/uploads/2023/02/1010610-UKPN-Consultation-Response-02.2023_v2.pdf)

consumer vulnerability issues. These reports can be found on our website<sup>15</sup>. We always encourage and are receptive to stakeholder feedback.

## Responding to market feedback

The more significant changes we have made to our offering based on market feedback in 2022/23 are laid out below:

- We provided greater clarity on dispatch timescales and aligned with wider day-ahead markets.
- We extended the Sustain product to cover energy efficiency and HV requirements.
- We implemented a revenue calculator which allowed Flexibility Providers to understand more easily the financial opportunity.
- We shared a complete postcode list, allowing Flexibility Providers an alternate approach to identifying in-zone assets.
- We simplified our tender documents, introducing a 12 slide presentation to complement existing detailed participation guidance. Winter forum participants rated this as our most useful tender documentation.
- We aligned our forum and webinar timings with the Winter 2022 tender timings ensuring communication was timed to be most valuable.

We collaborated with the ESO on Regional Development Programmes (RDP) and with the ESO and the other DNOs on the ENA's Open Networks Project.

- **Regional Development Programmes:** Following the successful rollout of N-3 scheme, we have continued to collaborate with National Grid ESO on the South Coast RDP to scope out the delivery of MW Dispatch solution as part of the Connect and Manage scheme. To date, this has enabled c.1GW of DER capacity to connect in the region. We have set up a project delivery team and have jointly published a Project Initiation Document with the ESO with an agreed scope for a Minimum Viable product. This scope reflects the collaborative work undertaken with the ESO in 2022 in agreeing principles for enhanced T&D data sharing and coordination to enable whole system benefits and implementation of primacy rules. We have also been collaborating with the ESO and NGET to accelerate the RDP in the East of England, where significant constraints on transmission capacity are driving long lead times for new connections. We have successfully delivered solutions at two GSPs, enabling more than 600MW to connect ahead of transmission reinforcements. We have used the learnings from these solutions to develop proposals for new flexible connection products and are working with the ENA through the Strategic Connections Group to develop a coherent cross-industry approach.
- **Open Networks Project:** The project managed through the ENA brings together all the UK local distribution networks and transmission networks to standardise approaches, processes and to improve whole system coordination. Through the Open Networks project we have worked closely with other DNOs, the ESO and other stakeholders to establish common rules for procurement and use of flexibility. Over the last 12 months, the programme has expanded to look at how networks can best innovate and remove the barriers to developing a more flexible, smarter grid. During 2022/23, 28 organisations and over 200 experts collaborated across six workstreams. Highlights included:
  - Delivering key actions identified for Open Networks in the Smart Systems and Flexibility Plan through 12 distinct working groups.
  - Enabling more participation in flexibility services by improving the consistency of service delivery and contracts, by taking the first steps to deliver true interoperability between grid systems. Primacy rules are being developed which, when implemented will help to manage service conflicts across markets.
  - Improving the way data management works across companies to harmonise how data can be anonymously shared and used to generate insights.
  - Improving the transparency of network operators, including more consistent carbon impact reporting, the publication of Network Development Plans (NDP), and the creation of several explainer guides on topics including Common Evaluation Methodology (CEM) that introduce the wider industry to key network processes.

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<sup>15</sup> <https://www.ukpowernetworks.co.uk/engagement/engaging-with-our-stakeholders>

# Flexibility Services Procurement Report

28 April 2023



- Supporting the roll out of a whole system cost benefit analysis tool and publishing the first ever whole electricity system coordination register to deliver system wide operational benefits.



## 4. Economic viability

### Determining the level of flexibility services we required

We identified sites by assessing the impact of load growth forecasts on our substations. These sites were forecasted to go over firm network capacity (the capacity guaranteed to be available under all probable operating conditions) between now and the end of the RIIO-ED2 period considering two peak demand forecast scenarios published in 2020. Note that these forecasts have since been updated in our DFES which we are using to determine flexibility requirements for future tenders and in our Network Development Plan (NDP)<sup>16</sup>. Our DFES is now generated through enhanced modelling and capture four different future load growth scenarios.

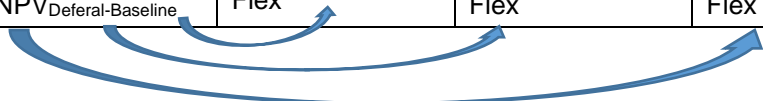
### Ensuring flexibility services were the most economic solution

We undertake the CBA using the CEM and supporting MS Excel based CEM tool, which was developed through the Open Networks project to deliver consistency in how DNOs evaluate different network investment options used to market test flexibility solutions. The CEM is based on the Ofgem CBA which we use to evaluate flexibility.

The methodology sets out to analyse the Net Present Value (NPV) of discounted cash flows of each solution. The difference between the NPV of the network reinforcement versus the NPV of the deferred reinforcement represents the amount that could be spent on flexibility services to achieve the deferral. The simplified schematic below shows this calculation where reinforcement has been deferred into year four.

Note that the actual CBA is more complex since it models the TOTEX (total expenditure) cash flow DNO funding model where a proportion of the expenditure is returned in the year it is incurred and the rest is returned over time. The CEM tool also enables consideration of multiple scenarios and deferral periods.

	NPV	Year 1	Year 2	Year 3	Year 4
Baseline	NPV <sub>Baseline</sub>	Reinforcement			
Deferral	NPV <sub>Deferral</sub>				Reinforcement
Flexibility budget	NPV <sub>Deferral-Baseline</sub>	Flex	Flex	Flex	



The flexibility budgets were converted into indicative prices to help the market translate value into offers by dividing the budget by the required availability and utilisation volumes. These volumes were determined from site-specific load profile analysis and forecasts. The site specific budgets and prices resulting from the CBA process can be found in the Revenue Ranges<sup>17</sup> spreadsheet which we published to the market ahead of the tender to increase transparency and help inform flexibility business models.

### Assessment of competitive bidding

We publish our bid assessment methodology for the Secure and Sustain products within the participation guidance on our website<sup>18</sup>. The assessment of bids seeks to meet the volume requirement, at a cost that is within budget and as economically as possible as shown in .

<sup>16</sup> <https://www.ukpowernetworks.co.uk/open-data-portal>

<sup>17</sup> Revenue Ranges spreadsheet available on the Flexibility Hub – <https://smartgrid.ukpowernetworks.co.uk/flexibility-hub/>

<sup>18</sup> <https://smartgrid.ukpowernetworks.co.uk/flexibility-hub/>

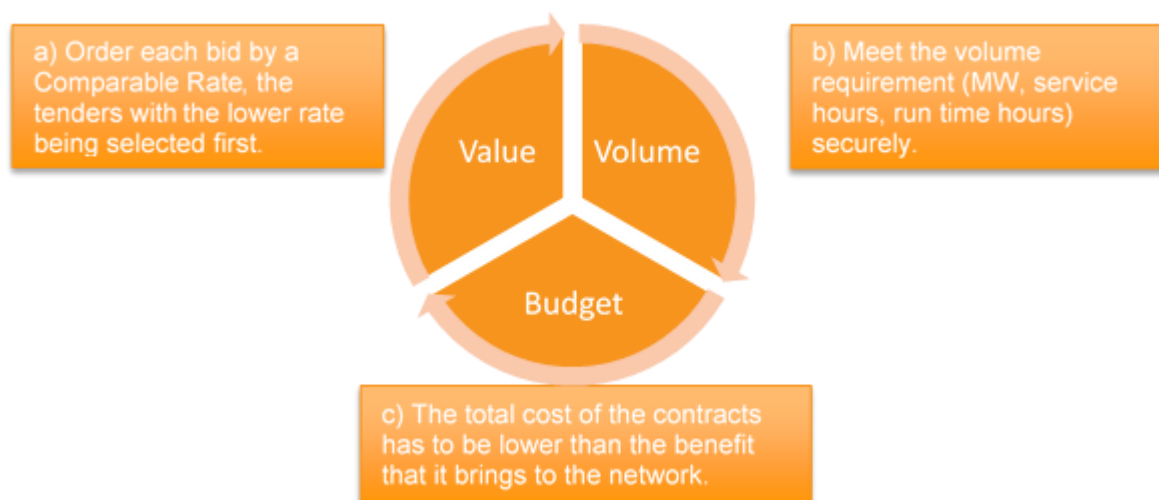


Figure 4: Bid assessment process

The comparable rate (in £/MWh) is derived from the availability fee and utilisation fee as bid in by providers and allows comparison between bids. The detailed formulation can be found in the ITT. As an example to illustrate this methodology we provide a spreadsheet attachment detailing the bid assessment carried out at the Burwell Milton Arbury Histon flexibility zone in Appendix B.

For the Dynamic service, providers set their utilisation price. They can change their price on a daily basis provided that it always remains below the site-specific ceiling price derived through the CBA. This ensures that when we dispatch, the flexibility provision is efficient relative to the reinforcement counterfactual. Where we have more than one Flexible Unit (FU) in a flexibility zone, we will dispatch FUs in price order subject to security of supply and operability considerations (see ). This merit order approach to dispatch encourages providers to compete on utilisation price, thus driving further efficiencies.

For the LV zones, we applied a fixed price based on deferral of typical LV reinforcement costs. This pricing strategy is intended to simplify participation for small-scale flexibility providers due to the small capacities required at an LV level.



## 5. Carbon reporting

Off the back of Action 3.6 of the Smart Systems and Flexibility Plan 2021<sup>19</sup> a working group, which we lead, was developed within the ENA Open Networks project to develop consistent methodologies for carbon reporting across all networks and system operators. We developed the first standardised methodology in 2022 (Product 7)<sup>20</sup> together the networks and ESO with guidance from BEIS and Ofgem and in consultation with the industry. This was based on best practice carbon accounting methodologies.

We have adopted the results from WPD's Pro Low Carbon innovation project which has calculated lifetime emission factors specifically for different DSO flexibility services technologies<sup>21</sup>. The emission factors incorporate operational impacts (direct emissions and consequential offset in grid generation) as well as non-operational impacts (embodied and end-of-life emissions) varying by the technology type.

We calculate the total emissions over the last year by multiplying the energy delivered following a dispatch by the lifetime emissions factor. The calculation does not include the carbon impact of the flexibility counterfactual of network reinforcement. Since reinforcement has been deferred, and potentially avoided, there would be a carbon saving.

The results are presented in Table 1, with equivalent results for 2021/22 in Table 2. This shows that the carbon intensity of our flexibility actions remains largely unchanged (562kgCO<sub>2</sub>e per MWh vs 542 in 2021/22). However, based on our contracted technology type mix we are projecting a reduction in carbon intensity over time as more electric vehicle flexibility comes on-stream in future years and reduces the proportion of gas as a percentage of total operational capacity.

Table 1: Carbon impact of flexibility services actions in 2022/23

LC31E Technology Categorisation Emissions	Technology	Requested energy (MWh)	Delivered energy (MWh) <sup>22</sup>	Direct impact (kgCO <sub>2</sub> e)	Consequential impact (kgCO <sub>2</sub> e)
Fossil - Gas	Gas - Recip	1,074	536	305,494	- 139,058
Stored Energy (all stored energy irrespective of the original energy source)	EV	17	15	- 3,956	3,956
Demand	Demand	1	1	- 215	46
<b>TOTAL</b>		<b>1,092</b>	<b>552</b>	<b>310,324</b>	<b>- 135,056</b>

Table 2: Carbon impact of flexibility services actions in 2021/22

LC31 Technology Categorisation Emissions	Technology	Delivered energy (MWh)	Direct impact kgCO <sub>2</sub> e	Consequential impact kgCO <sub>2</sub> e
Fossil - Gas	Gas - Recip	297	169,279	- 77,054
Stored Energy (all stored energy irrespective of the original energy source)	Domestic battery and solar	2		- 614
	EV	2	- 472	472
Demand	Demand	7	- 1,744	373
<b>TOTAL</b>		<b>308</b>	<b>167,063</b>	<b>- 76,824</b>

<sup>19</sup> Smart System and Flexibility Plan - <https://www.gov.uk/government/publications/transitioning-to-a-net-zero-energy-system-smart-systems-and-flexibility-plan-2021>

<sup>20</sup> ON22-WS1A-P7 Carbon Reporting Methodology (01 Aug 2022) ([energynetworks.org](https://energynetworks.org))

<sup>21</sup> Pro Low Carbon project derived lifetime emission factors for DSO flexibility services - <https://www.westernpower.co.uk/downloads-view/206428>

<sup>22</sup> The significant difference between requested and delivered energy can be attributed primarily to adjustments for the baseline operation of gas fired generators, which reflects that these DER would often be running anyway at times of flexibility dispatch

## 6. Key documents and references

We have compiled this Procurement Report as part of reporting requirements under SLC31E. We welcome any questions the reader may have on its contents. Please send these to [flexibility@ukpowernetworks.co.uk](mailto:flexibility@ukpowernetworks.co.uk).

### Key documents

RIIO-ED2 Business Plan	<a href="https://ed2.ukpowernetworks.co.uk/#business-plan#">https://ed2.ukpowernetworks.co.uk/#business-plan#</a>
Long-Term Development Statement and Network Development Plan	<a href="https://ukpowernetworks.opendatasoft.com/pages/ltlds_ndp_landingpage/">https://ukpowernetworks.opendatasoft.com/pages/ltlds_ndp_landingpage/</a>

### Key websites

Flexibility Hub	<a href="https://smartgrid.ukpowernetworks.co.uk/flexibility-hub/">https://smartgrid.ukpowernetworks.co.uk/flexibility-hub/</a>
Open Data Portal	<a href="https://ukpowernetworks.opendatasoft.com/pages/home/">https://ukpowernetworks.opendatasoft.com/pages/home/</a>
Piclo Flex	<a href="https://picloflex.com/">https://picloflex.com/</a>

### Engagement

Flexibility Forum	<a href="https://smartgrid.ukpowernetworks.co.uk/flexibility-hub/">https://smartgrid.ukpowernetworks.co.uk/flexibility-hub/</a> (within Events in the Document Library)
DER and Customer Forum	<a href="https://www.ukpowernetworks.co.uk/engaging-with-our-connections-customers">https://www.ukpowernetworks.co.uk/engaging-with-our-connections-customers</a>
Piclo Webinars	<a href="https://support.picloflex.com/article/36-piclo-flex-webinars">https://support.picloflex.com/article/36-piclo-flex-webinars</a>

### Market Information

Live tenders	<a href="https://picloflex.com/">https://picloflex.com/</a>
General market information	<a href="https://smartgrid.ukpowernetworks.co.uk/flexibility-hub/">https://smartgrid.ukpowernetworks.co.uk/flexibility-hub/</a> (within the Document Library)
Standard contract	<a href="https://smartgrid.ukpowernetworks.co.uk/wp-content/uploads/2023/02/Appendix-1-Flexibility-Services-Agreement-PE1-0079-2022_v1_2.docx">https://smartgrid.ukpowernetworks.co.uk/wp-content/uploads/2023/02/Appendix-1-Flexibility-Services-Agreement-PE1-0079-2022_v1_2.docx</a>
Revenue guidance	<a href="https://smartgrid.ukpowernetworks.co.uk/wp-content/uploads/2023/03/Appendix-3-Flexibility-Zones-Revenue-Ranges-v5-1.xlsx">https://smartgrid.ukpowernetworks.co.uk/wp-content/uploads/2023/03/Appendix-3-Flexibility-Zones-Revenue-Ranges-v5-1.xlsx</a>
Revenue calculator	<a href="https://smartgrid.ukpowernetworks.co.uk/wp-content/uploads/2023/01/Revenues_Calculator_UKPN_23_1.xlsx">https://smartgrid.ukpowernetworks.co.uk/wp-content/uploads/2023/01/Revenues_Calculator_UKPN_23_1.xlsx</a>
Post-tender reports	<a href="https://smartgrid.ukpowernetworks.co.uk/flexibility-hub/">https://smartgrid.ukpowernetworks.co.uk/flexibility-hub/</a> (within Previous Tenders in the Document Library)
Embedded Capacity Register (ECR)	<a href="https://www.ukpowernetworks.co.uk/electricity/distribution-energy-resources/the-embedded-capacity-register">https://www.ukpowernetworks.co.uk/electricity/distribution-energy-resources/the-embedded-capacity-register</a>

## Appendix A:

We attach detailed procurement and dispatch information for the reporting year 2022/23 in spreadsheet format as required by Ofgem for the LC31 Procurement Report.

## Appendix B:

We attach a worked example of the bid assessment we carried out for the Secure product tender at the flexibility zone Medway Grid.