

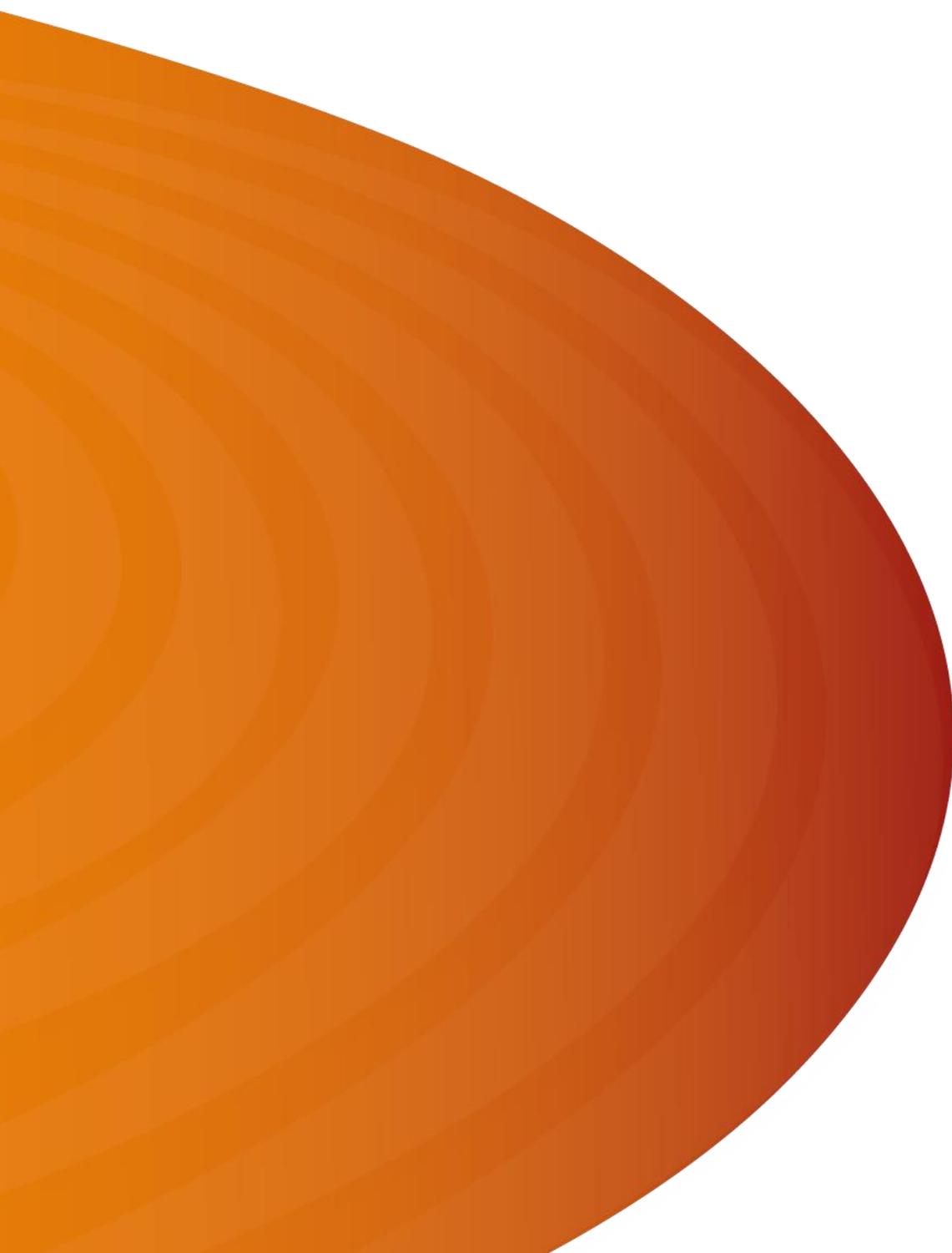
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# Flexibility Services Procurement Report

Standard Licence Condition 31E Reporting Requirement  
29 April 2022



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## 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.

We set out in our Future Smart consultation<sup>1</sup> in 2017 our strategy to introduce customer flexibility as an alternative option to network upgrades. In 2018, we were the first DNO to publish a Flexibility Roadmap<sup>2</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>3</sup>, subsequently we were also the first DNO to tender for LV needs.

Flexibility is a critical tool in enabling net zero at lowest cost for the customers we serve.

This Procurement Report document describes the types of flexibility we procured and dispatched in the 2021/22 regulatory year.

Key highlights contained in this document:

- **Flexibility procurement and use summary:** Section 2 summarises the volumes we have procured in previous tenders for use in 2021/22 and compares these against dispatch volumes in the same period. While we have observed some significant volume attrition in moving from the contracting phase to dispatch, we are pleased to report that we achieved our first full year of dispatching flexibility. Furthermore, we describe the results of our most successful tender to date, which delivered over 300MW of flexibility contracts. 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 describes how we have engaged with flexibility providers to improve the market design and processes and increase participation. We engaged with Electric Vehicle (EV) flexibility providers to design and implement an EV-specific baselining methodology using findings from our Shift innovation project. We will review this methodology in the next regulatory year to ensure that we are inclusive of this important Net Zero technology. We coordinated with the National Grid Electricity System Operator (ESO) through the Regional Development Programme (RDP) which has to date enabled c. 1GW of DER capacity to connect to our network. We expanded the scope to cover East Anglia where we are co-designing new approaches to accommodate the connection of high volumes of electricity storage. We began discovery work for our enduring market platform requirements, engaging one-to-one with flexibility service providers to understand their challenges and how we can increase participation in local markets. Key themes included alignment with ESO and wholesale opportunities, building confidence in the longevity of requirements and transparent performance rules.
- **Economic viability:** Section 4 describes key assessments we undertook as part of the 2021 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>4</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 provides an estimate of carbon emissions from our dispatch activities in the 2021/22 period. We have based our methodology on best available literature on the carbon impact of DSO

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<sup>1</sup> <http://futuresmart.ukpowernetworks.co.uk/>

<sup>2</sup> <http://futuresmart.ukpowernetworks.co.uk/wp-content/themes/ukpnfuturesmart/assets/pdf/futuresmart-flexibility-roadmap.pdf>

<sup>3</sup> Please see p. 5 of our Flexibility Roadmap.

<sup>4</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](#).

# Flexibility Services Procurement Report

29 April 2022



flexibility services, and are leading on the development of an industry-wide, standard methodology for calculating carbon impacts through the Open Networks project, Product 7, for next year's report.

## 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 as rare and short as possible;
- 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 consumers 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.

Our DSO strategy represents an ambitious programme to facilitate the delivery of Net Zero at lowest cost. A key role of the DSO will be the development of flexibility markets. In our RIIO-ED2 Business Plan<sup>5</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>6</sup> and will allow us to manage planning, network development and operations in a more economic and efficient way. DSO ancillary services sit at the core of the DSO evolution as specified in the Ofgem RIIO-ED2 Sector Specific Methodology Consultation:

*"DNOs must actively develop markets to enable and appropriately reward DER to provide services, including distribution non-frequency ancillary services (DSO ancillary services), to efficiently manage their network."*

### Our flexibility procurement principles

Our approach to flexibility procurement is rooted in the following core principles:

- Transparency: we have led the way with the publication of key tender information since 2019. This has included making our tender documentation openly accessible on our website and publishing granular competition results<sup>7</sup>.

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<sup>5</sup> <https://ed2.ukpowernetworks.co.uk/#business-plan>

<sup>6</sup> Future Smart Consultation - <https://smartgrid.ukpowernetworks.co.uk/>

<sup>7</sup> Post Tender Report - <https://smartgrid.ukpowernetworks.co.uk/wp-content/uploads/2021/06/Flexibility-Post-Tender-Report-Bids-Feb-2021.xlsx>

- Co-design: we are committed to working with the market to develop flexibility services which deliver on the priorities of flexibility providers.
- Enabling the market: in these early stages of market development, we understand the importance of removing unnecessary barriers to participation and the benefits of adopting a pragmatic approach with flexibility providers.
- Cooperation: we coordinate with other DNOs and the ESO to promote standardisation and consistency across UK and Ireland flexibility markets and work towards future markets which deliver efficient whole system outcomes.

## Purpose of this document

This document is one of three key reporting tools required under SLC31E of the electricity distribution licence for the 'Procurement and use of Distribution Flexibility Services'. SLC31E was implemented in December 2020 and transposes in to 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 2021/22 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.

## 2. Flexibility procurement and use summary

In this section, we provide a high-level summary of our procurement and dispatch activities in 2021/22 along with supporting commentary. More granular information can be found in Appendix A, Supporting Data spreadsheet.

### Comparison of procured MW for use and dispatched MWh in 2021/22

Figure 1 illustrates flexibility volumes we procured for use in 2021/22, primarily through our most recent 2021 tender and 2020 tender. We show the evolution of volumes through different stages of procurement: bidding, award and operation. Furthermore, we show the energy volumes we dispatched in 2021/22 under each product. Note that Figure 1 presents all MW capacity bid in or contracted to deliver in 2021/22 across all our tenders to date, to facilitate comparison with MWh volumes dispatched in 2021/22. This contrasts with Appendix A which focuses on procurement activities in the 2021/22 period. As such, MW capacities presented there relate to competitions held within 2021/22 only.

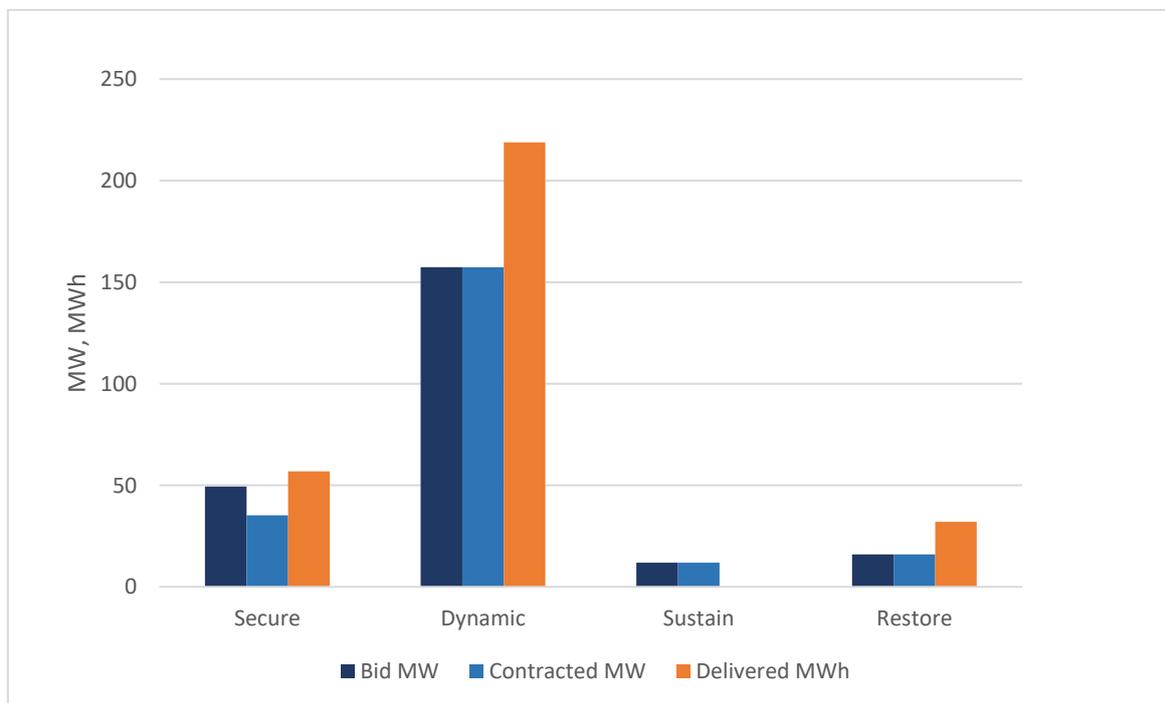


Figure 1: MW procured for use in 2021/22 and MWh dispatched

We are pleased to report that we started dispatching flexibility services in earnest in 2021/22 with a total of 308MWh delivered by flexibility providers from a total of 34MW of operational contracts. This has been driven by the strong 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, particularly during the pandemic. 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. During the delivery phase, we allow both e-mail and API dispatch which ensures that we are inclusive of different types of flexibility provider. We dispatched providers pre-fault during peak periods under the Secure and Dynamic services. We expect to significantly increase dispatch volumes in regulatory year 2022/23 as outlined in our LC31E Procurement Statement.

While market developments have been promising, we face challenges in translating contracted flexibility into operational contracts ready for dispatch. One of the key drivers for this is the locational nature of flexibility

requirements. Where there is insufficient existing flexibility in a flexibility zone, we rely on planned solutions which come with development risks such as financing or customer recruitment risks. These factors are particularly acute for the Sustain product which we are procuring to help manage constraints on LV substations. These substations typically serve limited numbers of customers and therefore have small associated constraint zones and present significant challenges for aggregators trying to recruit flexibility from a limited pool of customers. Another factor is that customer uptake of EVs may have been slower than aggregator forecasts. 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 flexibility volumes pick up in line with EV demand growth in future, helping us to mitigate constraints when they do arise.

We also note that our policy of no penalties other than lost revenues, supportive of delivering high volumes of participation by lowering barriers to entry, could also be reducing the incentive to deliver. Similarly, in particular constraint zones where flexibility budgets are limited, for example due to a relatively inexpensive reinforcement counterfactual, providers may not be sufficiently incentivised to deliver against commitments.

We are taking the following actions to address delay and non-delivery risks:

- We have developed our contract monitoring processes;
- We are reviewing over procurement factors on tendered flexibility volumes based on experience of contract drop-off;
- We are evolving our pre-qualification requirements to filter our high risk flexibility projects;
- We are considering financial penalties for providers who do not deliver against commitments;
- We are developing services and engagement strategies to capture more existing flexibility where it is present, including generation, storage and demand side flexibility;
- Developing our decision making processes as part of establishing the DSO to assess whether to retest the market or proceed with reinforcement where market illiquidity or non-delivery is apparent.

Before implementing any of these measures, we must balance the need for more robust delivery against creating barriers to participation. Noting that we are looking to incentivise new flexibility business models, especially where existing flexibility is limited, we are aware that overly onerous conditions on participation could limit market development.

We had 220MW of flexibility under contract for delivery in 2021/22 which compares with 35MW contracted for 2020/21. This rapid growth has been driven by our recent tenders in 2021 and 2020 where we made concerted efforts to develop the market. Our 2021 tender was our most expansive to date; we tendered 138 sites across all voltage levels of our network, from EHV down to LV, with a total requirement of 387MW. We increased the range of products available to market, tendering Secure, Dynamic and Sustain services to match the range of flexibility business models adopted by the market. We adapted our eligibility criteria to facilitate residential flexibility by reducing the capacity threshold for participation to 10kW. Furthermore, we worked with EV flexibility providers to develop an EV-specific baselining methodology using findings from our Shift innovation project. This is an example of our commitment to facilitating key Net Zero technologies and our inclusive approach which has helped us contract with a wide range of technologies overall.

Overall, we had highest volumes contracted for use and dispatched in 2021/22 under the Dynamic service. This follows from the larger volumes we tendered under the Dynamic product compared to other products, particularly in the 2021 tender to cover our high load growth forecast scenario (see Section 4). Furthermore, we introduced the Dynamic product to our recent tenders in response to market feedback in favour of closer to real-time services. The significant volumes we have procured under this product demonstrates the effectiveness of our collaboration with the market.

The Restore volumes consist of a single 16MW contract with an existing gas-fired generation asset in the Sheerness area. Restore is a post-fault service, as there have not been any faults on that network the dispatch shown is for a proving test.

## Comparison of tendered and contracted MW in our 2021 tender

Figure 2 compares the volumes tendered with the volumes contracted in 2021/22 split between competitions<sup>8</sup> where we met our volume needs and where we did not. The 2021 tender was a multi-year tender; Figure 2 presents peak volumes across the years.

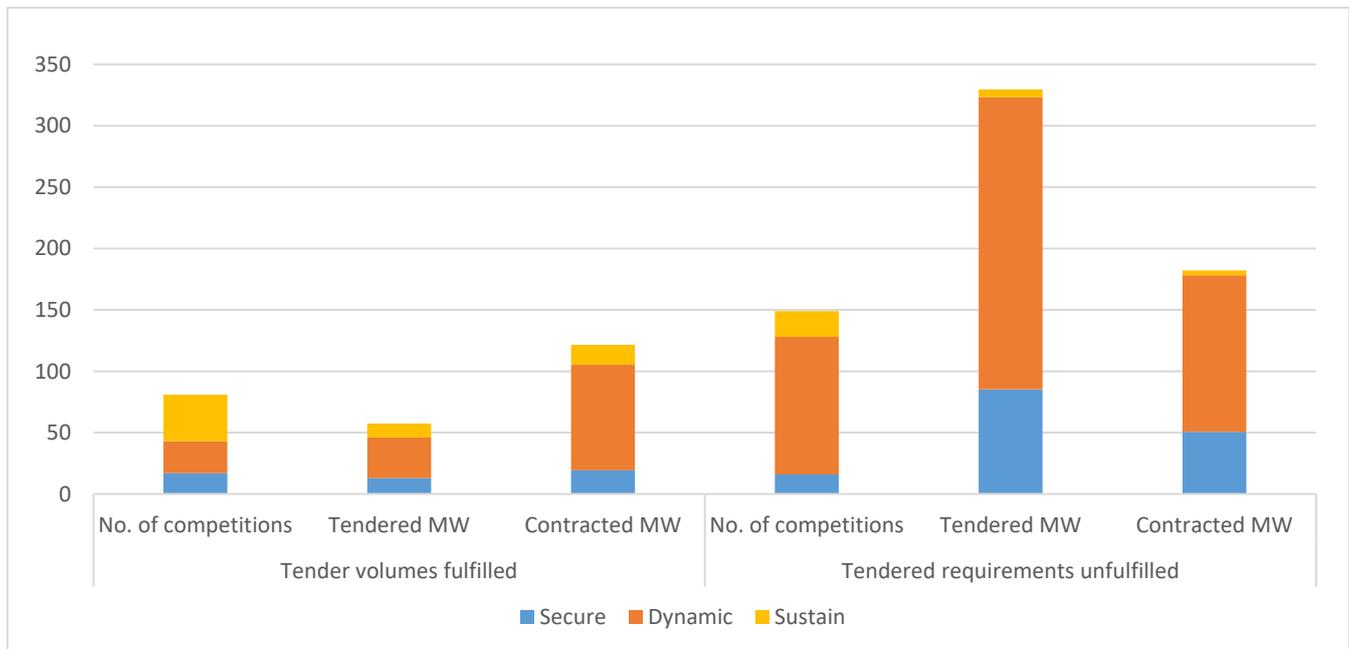


Figure 2: Tendered MW and contracted MW in the 2021 tender

We were able to meet our requirements across 81 out of 230 competitions (35%). This compares favourably with 18 out of 115 competitions (15%) in our April 2020 tender. This was driven by high levels of participation, particularly from EV aggregators. We were able to over procure to some degree at most of these sites. This was made possible by efficiencies delivered by our competitive tender process under the Secure service and the non-firm nature of the Dynamic and Sustain services.

We had unfulfilled needs at the remaining 149 competitions. The majority of unfulfilled needs were under Dynamic competitions. We set requirements for the Dynamic service based on our high load growth forecast scenario. This scenario represents a rapid transition to a Net Zero economy with high rates of electrification. In contrast, we procured Secure/Sustain against the base forecast scenario. The requirements were therefore typically higher under the Dynamic competitions and so requirements were more challenging to meet. With the Secure/Sustain competitions covering a base level of load growth and the uncertainty of high load growth materialising, we were comfortable with unfulfilled volumes under the Dynamic product, especially given the possibility of retendering in future.

Other factors which contributed to unfulfilled volumes include the localised nature of flexibility requirements which can reduce the opportunity to contract with sufficient volumes of flexibility. Furthermore, the overall revenue opportunity may not be sufficiently high to attract planned solutions at all locations. The size of the flexibility budget at a given location, and therefore the available revenue opportunity, is ultimately driven by how expensive the reinforcement counterfactual is. This can vary significantly between different locations.

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

## Locational breakdown of 2021/22 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 published our Post Tender Report 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.

We have also created an interactive map which provides a geographical summary of volumes tendered and contracted in 2021/22 across the Secure, Dynamic and Sustain products<sup>11</sup>. Note that the map presents postcode areas which are either wholly contained within a flexibility zone or partially overlap with one.

## Changes to 2021/22 flexibility procurement plans

In our 2021 Procurement Statement, we described plans to run two tenders in 2021/22 with the second tender largely retendering the same zones from the first tender. Given the success of our first tender, which delivered over 300MW of contracted flexibility, and the assessment of latest network requirements as described earlier, we decided to reprioritise in favour of onboarding contracted flexibility providers as well as long term initiatives critical to our DSO strategy:

- We began discovery work for our enduring market platform requirements. We conducted one-to-one interviews with existing and potential flexibility providers to understand what is working well, their challenges and how we can increase participation in local markets. We believe that a dynamic Distribution Market Platform will be integral to the effective operation of the distribution system during RIIO-ED2, and we intend to channel all of our system needs through such a platform – including forward tenders for flexibility services and running day-ahead and within-day markets.
- We ran three Expressions of Interest for outage needs which resulted in a Restore contract with a 16MW asset in the Sheerness area. We see the development of new applications for flexibility to develop the market and deliver efficient solutions as a key function of the DSO.

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<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)

<sup>11</sup> [https://ukpn-rss.shinyapps.io/2021-22\\_Flexibility\\_Procurement/](https://ukpn-rss.shinyapps.io/2021-22_Flexibility_Procurement/)

# Flexibility Services Procurement Report

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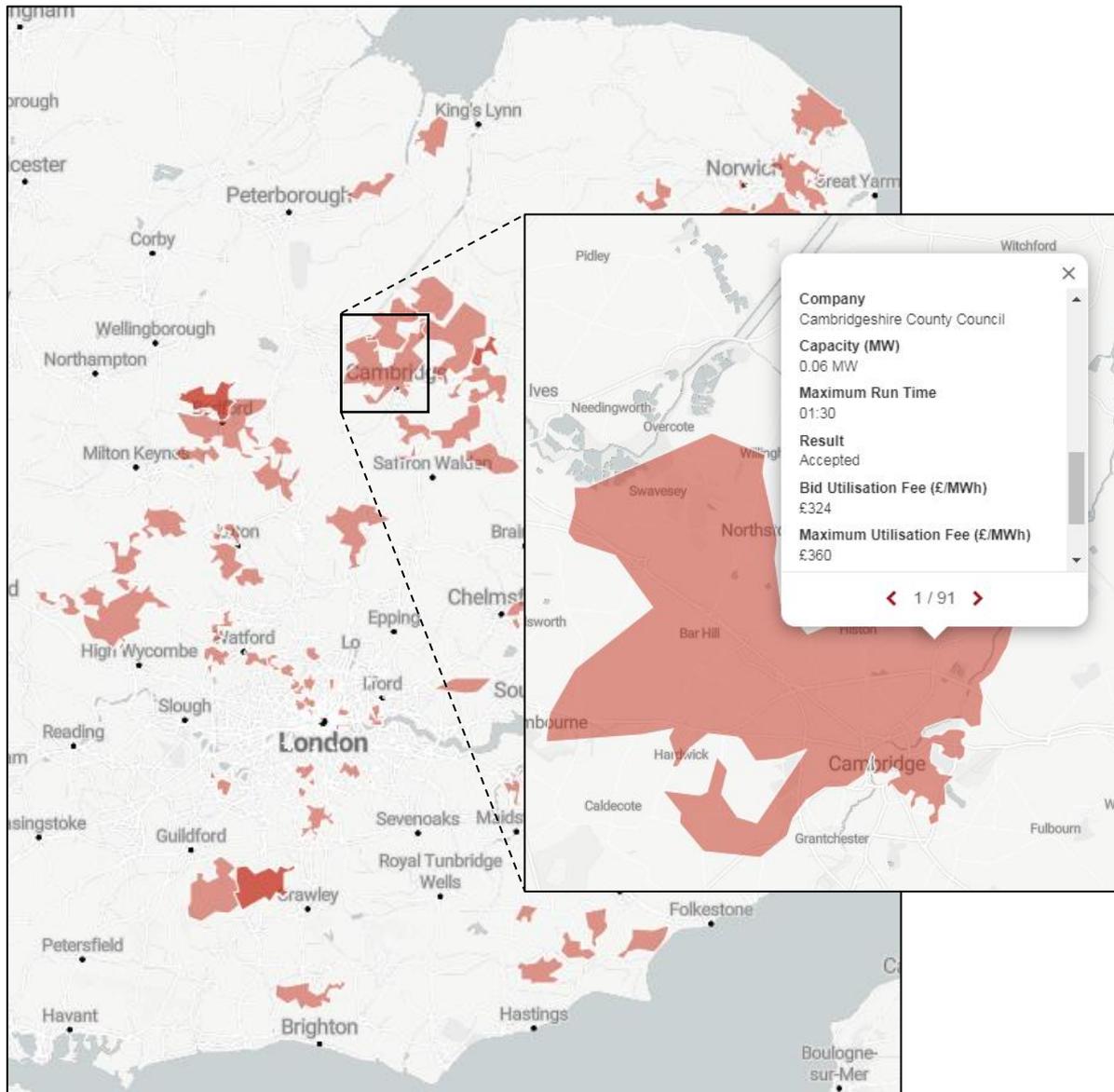


Figure 3: 2021 Post Tender Report on the Open Data Portal

## 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 2021/22, we spoke with a wide and varied audience, including, but not limited to DER developers/owners, electricity heating consumers, a hydro plant operator 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**<sup>12</sup>: Our last summer forum was held online in June 2021 attended by over 70 companies where we announced the results from our February 2021 tender. Webinar attendees were invited to give their feedback, fostering a collaborative approach to flexibility market design. In particular, there was a strong appetite for closer to real-time services<sup>13</sup> which we are addressing through our tenders (see Table 1).
- **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 2021/22, we held 42 surgeries or bilateral meetings with 28 companies and over 40 individuals. These meetings also provide an important opportunity to hear direct feedback on how we can improve flexibility services (see Table 1 for a summary of the feedback we received).
- **Flexibility Mailing list**<sup>14</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 hosted by Chartered Institution Building Services Engineers (CIBSE), The Carbon Trust and Aurora.
- **Biannual Connections and DER Forums**<sup>15</sup>: These forums cater for our connections and DER customers where we cover a wide range of topics including Flexibility Services. We welcomed 40 customers at our most recent Connections and DER Forums in March 2022.
- **Incentive on Connections Engagement (ICE)**<sup>17</sup>: We engaged with the wide and varied range of customers looking to connect to our networks and develop products and services that meet their needs through our ICE initiatives. Our work plan was developed through extensive stakeholder engagement over a 12 month period which included customer forums, scrutiny panels, customer surgeries and one-to-one meetings.
- **Market Platform**: In addition to the regular stakeholder engagement that we do with our market platform partner, Piclo, we began discovery work for our future market platform requirements. We conducted one-to-one interviews with existing and potential flexibility providers to understand what is working well, their challenges and how we can increase participation in local markets. We investigated opportunities to align flexibility services with wholesale and ESO markets, many of which are traded day ahead. There is a clear opportunity for improvement and this aligns with our RIIO-ED2 intent to procure a portion of our requirements closer to real-time. We also heard the importance of continuing to reduce up-front barriers to participation, and of giving flexibility providers confidence that any time and resource they spend to enable participation in our flexibility markets is no-regrets for the future. A number of flexibility providers participating in ESO services raised the importance of clear testing and performance management rules, particularly as stacking services becomes more common. Flexibility provider perspectives are a critical input to the scope and design of our future market platform and we will continue this engagement throughout 2022/23.

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<sup>12</sup> Summer forum slides in the events section - <https://smartgrid.ukpowernetworks.co.uk/flexibility-hub/>

<sup>13</sup> We asked 'If you were to participate in one of our future services, which one would you prefer?' We received 17 responses: Generation constraint management = 4, Close to real time flex services = 10, Restore service = 2, Reactive power (voltage support) = 1

<sup>14</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>15</sup> Connection and DER forum slides - <https://www.ukpowernetworks.co.uk/engaging-with-our-connections-customers>

- **Open Data Portal:** We published our post tender information on our Open Data Portal. This provided a new route for flexibility providers to engage with DSO markets and 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 consumer vulnerability issues. These reports can be found on our website<sup>16</sup>. We always encourage and are receptive to stakeholder feedback.

The more significant changes we have made to our offering based on market feedback in 2021/22 are set out in Table 1.

Table 1: Responding to market feedback

Market feedback	UK Power Networks' response
Closer to real-time services and forward contracts	Tendering a combination of closer to real-time services through the Dynamic product and forward contracts through the Secure product to cater to different business and operational models.
Short and long term contract lengths	Offering a range of contract lengths from one to five years in our 2021 tender and future tenders.
Lowering barriers to participation for low carbon technologies	Using the findings from our Shift innovation project we are offering a new baseline methodology to represent the counterfactual to a dispatch instruction – the Home-based Electric Vehicle Charging Baseline – is a diversified curve representing non-smart charging from a single at-home EV.
Greater variety of products	We identified new outage needs and ran three Expressions of Interest which resulted in our first Restore contract. We have introduced a standard internal template to capture the key requirements of the outage to speed up the time it takes to approach market.
Easier access to information	Launched our Open Data Portal which allows users to overlay flexibility requirements against other UK Power Networks open source data such as the Embedded Capacity Register, stimulating innovation and market development.
Aligning participation criteria	Accommodating half-hourly meter data to align with minimum requirements of other markets.
Improving tendering process	Simplification of tender documentation and improving bidding experience for providers with large numbers of assets.

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

- **Open Networks Project.** The project managed through the ENA brings together all the UK and Ireland local distribution networks and transmission networks to standardise approaches, processes and to improve whole system coordination.

<sup>16</sup> <https://www.ukpowernetworks.co.uk/engagement/engaging-with-our-stakeholders>

- **Regional Development Programmes:** We collaborated with the ESO on the South Coast RDP, which to date has enabled a further c.1GW of DER capacity to connect in the region. We began work on developing the service design and dispatch mechanisms to compliment the control and visibility element of these new customer connections. We also embarked on an accelerated RDP in our East Anglia area, where significant constraints on transmission capacity are driving seven year lead times for new connections. The work to date has initially targeted a new approach to modelling and accommodating high volumes of electricity storage looking to connect in the area, and is working with customers to test different options.

Through the Open Networks project we have worked closely with other DNOs, ESO and other stakeholders to establish common rules for procurement and use of flexibility over the last 12 months, the highlights include:

- **DSO CBA (2021 WS1A P1):** Co-development of the CEM for network investment decisions to incorporate carbon value and identification of methodologies for incorporating option value. This tool is used to decide which intervention to procure to mitigate a reinforcement need, whether that be a flexibility service, an asset reinforcement or an alternative innovative solution.
- **Whole system CBA (2021 WS4 P1):** Co-developing with other network companies a tool to enable the comparison of costs and benefits across different sectors, regulated and non-regulated stakeholders, and a number of scenarios.
- **Procurement processes (2021 WS1A P2):** We investigated with other network companies the potential to create concurrent DNO and ESO procurement timelines.
- **Review of legacy ANM contracts, apportioning curtailment risk and curtailment information (2021 WS1A P3/P8/P9):** Worked with other DNOs to develop exit guidance for customers, assess new methods for ANM curtailment apportionment and improve provision of curtailment information.
- **Standard flex contract (2021 WS1A P4):** We co-developed a new version of the standard flexibility agreement which aligns DNO and ESO procurement.
- **Primacy rules for service conflicts (2021 WS1A P5):** Co-developing primacy principles for network coordination and co-optimisation.
- **Baselining (2021 WS1A P7):** Developing a set of standardised baseline methodologies with other network companies and flexibility provider input. Delivering a baselining tool that can be used by the market and system operators to calculate baselines using the standard methodologies.

## 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 RII0-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>17</sup>. Our DFES is now generated through enhanced modelling and capture four different future load growth scenarios.

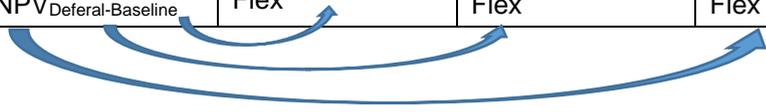
### Ensuring flexibility services were the most economic solution

We undertake the CBA using the CEM and supporting 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 used to evaluate flexibility in 2020/21.

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 below simplified schematic 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>18</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

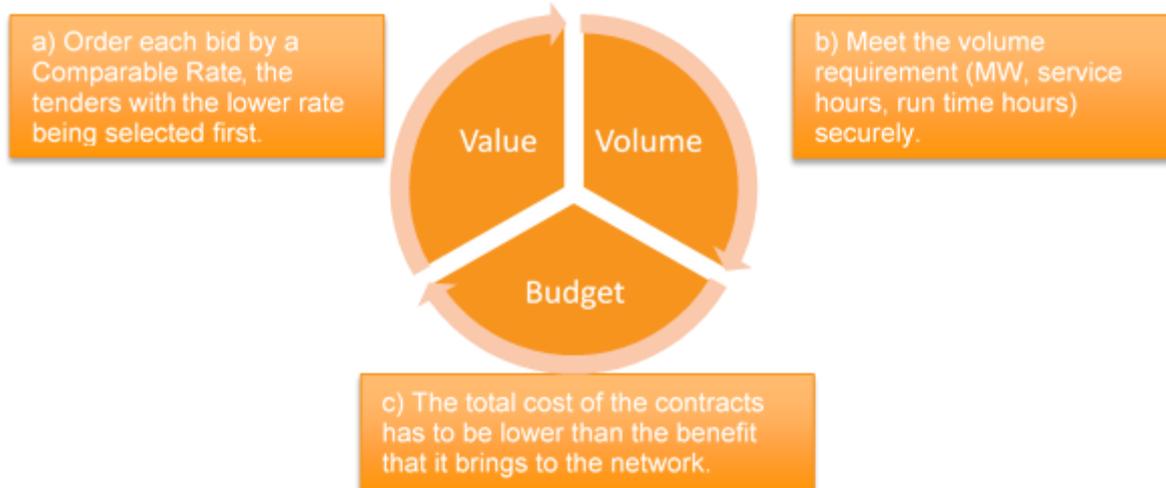
We published our bid assessment methodology for the Secure product within the ITT documentation on the Flexibility Hub<sup>19</sup>. The assessment of bids seeks to meet the volume requirement, at a cost that is within budget and as economically as possible as shown in Figure 4.

<sup>17</sup> <https://www.ukpowernetworks.co.uk/open-data-portal>

<sup>18</sup> Revenue Ranges spreadsheet available on the Flexibility Hub – <https://smartgrid.ukpowernetworks.co.uk/flexibility-hub/>

<sup>19</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 monthly 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)<sup>20</sup> in a flexibility zone, we will dispatch FUs in price order subject to security of supply and operability considerations (see Figure 4). This merit order approach to dispatch encourages providers to compete on utilisation price, thus driving further efficiencies.

For the Sustain product, we applied a fixed price across all competitions based on the typical reinforcement deferral value of an HV/LV substation. This pricing strategy is intended to simplify participation for small-scale flexibility providers.

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<sup>20</sup> A Flexible Unit is a group of DERs within the same flexibility zone that are aggregated together into a single controllable unit.

## 5. Carbon reporting

Action 3.6 of the Smart Systems and Flexibility Plan 2021<sup>21</sup> calls for networks and system operators to develop consistent methodologies for carbon reporting as part of the 2022/23 SLC31E reports. To achieve this aim we are working through the ENA Open Networks project, Product 7, in 2022 which brings together the networks and ESO with guidance from BEIS and Ofgem to review best practice carbon accounting methodologies before developing a standardised approach which will be consulted with industry.

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>22</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. The results are presented in Table 2.

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.

We calculate the total emissions over the last year by multiplying the energy delivered following a dispatch (from dispatchable solutions which generally excludes stand-alone renewables), grouped by technology type, by the lifetime emissions factor.

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

Technology Type	Energy delivered * (MWh)	Emissions factor (gCO <sub>2</sub> e/kWh)		Emissions kgCO <sub>2</sub> e		
		Operational	Non-operational	Operational	Non-operational	Total
Commercial DSR	6.716	68.11	-	457.4	-	457.4
Domestic battery and solar	2.366	109.24	11.19	258.5	26.5	285.0
Electric vehicle chargers	1.817	6.86	-	12.5	-	12.5
Gas-fired generation	296.753	113.78	2.52	33,764.5	747.8	34,512.4
<b>TOTAL</b>	<b>307.652</b>			<b>34,492.9</b>	<b>774.3</b>	<b>35,267.2</b>

\* Energy delivered following dispatch for all flexibility products between Apr21-Mar22 inclusive. For dispatches yet to be settled, 100% delivery is assumed.

The methodology will change in next year's report following the outcome from Open Networks, Product 7. Therefore, the carbon emissions given in this report should be considered as illustrative. In next year's report we will rerun the calculation for 2021/22 using the updated methodology to allow for year-on-year comparison.

Based on our contracted technology type mix we are projecting a reduction in carbon intensity as more electric vehicle flexibility comes on-stream in future years and reducing the proportion of gas as a percentage of total contracted capacity.

<sup>21</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>22</sup> Pro Low Carbon project derived lifetime emission factors for DSO flexibility services - <https://www.westernpower.co.uk/downloads-view/206428>

## 6. Key documents and references

We have compiled this Procurement Statement 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

Future Smart Consultation	<a href="https://smartgrid.ukpowernetworks.co.uk/wp-content/uploads/2019/11/FutureSmart-Consultation-Report.pdf">https://smartgrid.ukpowernetworks.co.uk/wp-content/uploads/2019/11/FutureSmart-Consultation-Report.pdf</a>
Flexibility Roadmap	<a href="https://smartgrid.ukpowernetworks.co.uk/wp-content/uploads/2019/11/futuresmart-flexibility-roadmap.pdf">https://smartgrid.ukpowernetworks.co.uk/wp-content/uploads/2019/11/futuresmart-flexibility-roadmap.pdf</a>

### Key websites

Flexibility Hub	<a href="https://smartgrid.ukpowernetworks.co.uk/flexibility-hub/">https://smartgrid.ukpowernetworks.co.uk/flexibility-hub/</a>
Piclo Flex	<a href="https://picloflex.com/">https://picloflex.com/</a>

### Engagement

Flexibility Forum	Document Library>Events <a href="https://smartgrid.ukpowernetworks.co.uk/flexibility-hub/">https://smartgrid.ukpowernetworks.co.uk/flexibility-hub/</a>
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>
Incentive on Connections Engagement (ICE)	<a href="https://www.ukpowernetworks.co.uk/engaging-with-our-connections-customers">https://www.ukpowernetworks.co.uk/engaging-with-our-connections-customers</a>
Stakeholder Engagement and Consumer Vulnerability (SECV)	<a href="https://www.ukpowernetworks.co.uk/internet/en/have-your-say/events-consultations/reports-presentations/">https://www.ukpowernetworks.co.uk/internet/en/have-your-say/events-consultations/reports-presentations/</a>

### Market Information

Live tenders	Piclo Flex <a href="https://picloflex.com/">https://picloflex.com/</a>
Tender documentation and methodologies	Document Library>Flexibility Services - Procurement February 2021>ITT+Appendices <a href="https://smartgrid.ukpowernetworks.co.uk/flexibility-hub/">https://smartgrid.ukpowernetworks.co.uk/flexibility-hub/</a>
Standard contract	Document Library>Flexibility Services - Procurement February 2021>Appendix 1 <a href="https://smartgrid.ukpowernetworks.co.uk/wp-content/uploads/2020/12/Appendix-1-ENA-Standard-Flexibility-Services-Agreement-PE1-0056-2020-rev-1.1.pdf">https://smartgrid.ukpowernetworks.co.uk/wp-content/uploads/2020/12/Appendix-1-ENA-Standard-Flexibility-Services-Agreement-PE1-0056-2020-rev-1.1.pdf</a>
Revenue Range	Document Library>Flexibility Services - Procurement February 2021>ITT Appendix 6 - revenue ranges <a href="https://smartgrid.ukpowernetworks.co.uk/wp-content/uploads/2020/11/Appendix-6-Revenue-Ranges_v1.0.xlsx">https://smartgrid.ukpowernetworks.co.uk/wp-content/uploads/2020/11/Appendix-6-Revenue-Ranges_v1.0.xlsx</a>
Post-tender market reporting	Document Library>Flexibility Services - Procurement April 2020>Post Tender Report and Bids <a href="https://smartgrid.ukpowernetworks.co.uk/wp-content/uploads/2020/06/Flexibility-Services-Post-Tender-Report-17-June-2020.pdf">https://smartgrid.ukpowernetworks.co.uk/wp-content/uploads/2020/06/Flexibility-Services-Post-Tender-Report-17-June-2020.pdf</a> <a href="https://smartgrid.ukpowernetworks.co.uk/wp-content/uploads/2020/07/Flexibility-Post-Tender-Report-Bids-2020.xlsx">https://smartgrid.ukpowernetworks.co.uk/wp-content/uploads/2020/07/Flexibility-Post-Tender-Report-Bids-2020.xlsx</a>
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>

# Flexibility Services Procurement Report

29 April 2022



## Appendix A:

We attach detailed procurement and dispatch information for the reporting year 2021/22 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 Burwell Milton Arbury Histon.