



# DSO Strategy RIIO-ED2

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December 2021

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## How this strategy impacts other areas of our plan

Our focus is to achieve the best possible positive outcomes for our customers, by utilising innovative solutions and smarter working practices to drive efficiency in all we do. This strategy forms part of a suite of wide ranging, ambitious and interconnected strategies that we will be implemented in RIIO-ED2. Each one is designed to contribute towards the delivery of the same four overarching strategic outcomes we will achieve for customers:



### 1. Sustainability

Lead the drive to net zero as early as possible.



### 2. Connectability

Customers can easily connect their electric vehicles, heat pumps and renewable generation.



### 3. Vulnerability

First class vulnerable customer support programme where everyone benefits in a smart future.



### 4. Affordability

Maintain excellent customer service, safety and network performance and transform the energy grid for future generations, while keeping bills broadly flat.

Each of our strategies is embedded across our operations and never delivered in silos. This will lead to joined up delivery, utilise opportunities to share knowledge and expertise across WPD teams, and achieve maximum benefits for customers. By doing so we will ensure each of our strategies has a far reaching impact and identifies opportunities to improve our service, performance and efficiency in every possible area of our business. Our strategies are therefore highly interrelated and co-dependent.

The following table provides a snapshot of some of the extensive impacts of this DSO Strategy, and signposts to other areas of our plan upon which its successful delivery will be dependent.

Strategy	Reference within the strategy:		
Climate Resilience	-	-	-
Customer Vulnerability	✓	Maximising the inclusivity of our services by tailoring our information provision and engagement to reflect the needs of different customers, including those in vulnerable situations	Page 48
Destination Net Zero: Business Innovation and Efficiency	✓	Creating a more efficient and flexible system to meet the future energy demands of our customers	Page 9
Digitalisation Strategy and Action Plan	✓	Delivering key changes to develop our DSO capabilities as effectively as possible through digitalisation wherever possible and learning from data best practice	Page 52
DSO			
Environment & Environmental Action Plan	-	-	-
Innovation	✓	Facilitating greater collaboration with third parties through the Innovation Hub	Page 56
Major Connections	✓	Using flexibility to provide additional capacity for new connections	Page 36
Network Visibility	✓	Promoting operational network visibility and data availability	Page 56
Net Zero Communities	-	-	-
Social Contract	-	-	-
Whole Systems	✓	Facilitating neutral markets for more efficient whole system outcomes	Page 53
Workforce Resilience	-	-	-

# Executive summary

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**The UK's electricity system is undergoing a rapid period of change as distribution network customers invest in generation and alter their consumption behaviours to affect a lower carbon future. Recent publications, such as the Net Zero Strategy, Heat and Buildings Strategy, Ten Point Plan for a Green Industrial Revolution and the Energy White Paper focus on the changes that we will see over the months and years ahead. Decarbonisation of heating and transport to reduce carbon emissions remains a key priority.**

To enable a greater volume of demand, generation and storage to be connected, our networks are becoming smarter and more active. Creating a more efficient and flexible system will benefit all customers and empower them to be at the centre of the energy revolution.

We recognise that change is essential to driving performance and efficiency from our network and to ensure it can meet the future energy demands of all our customers. A more flexible network operation which embraces Distribution System Operator (DSO) requirements is needed. The enhanced capabilities we are developing will develop markets to give our customers the freedom to access other opportunities within the developing energy system.

Our Flexible Power product has been adopted by other Distribution Network Operators (DNOs) and is now a national platform for flexibility. Network Operators requiring flexibility and customers who can offer flexibility are brought together on our platform.

We have developed our plans for data and have aligned them with the expectations of the Energy Data Taskforce Report. In addition to our digitalisation commitments, we have also published a comprehensive Digitalisation Strategy which demonstrates how we make best use of new and existing data to manage our networks.

Our industry leading innovation work, combined with the years of experience of operating a highly reliable and cost effective distribution network, makes us uniquely placed to lead the management of an increasingly smart, flexible and efficient local electricity system as energy becomes more decentralised.

We view the network operation of a more active regional distribution network as a natural extension of our current role. With DSOs managing coordination at a local level to ensure unconflicted services are available at transmission, enabling the Electricity System Operator (ESO) to concentrate on balancing the national network using un-conflicted services competitively made available. This all requires planning and network development which we view as a locally based role, with open data transfer of models and forecasts to the ESO and other market participants.

Through the Open Networks project, we are working to ensure that our approach, as we transition to the future energy system, is coordinated with other network and system operators.

We will continue to review our proposed actions and workplan in line with views received from our customers, other stakeholders, department for Business, Energy and Industrial Strategy (BEIS), Office for Zero Emission Vehicles (OZEV) and Ofgem.

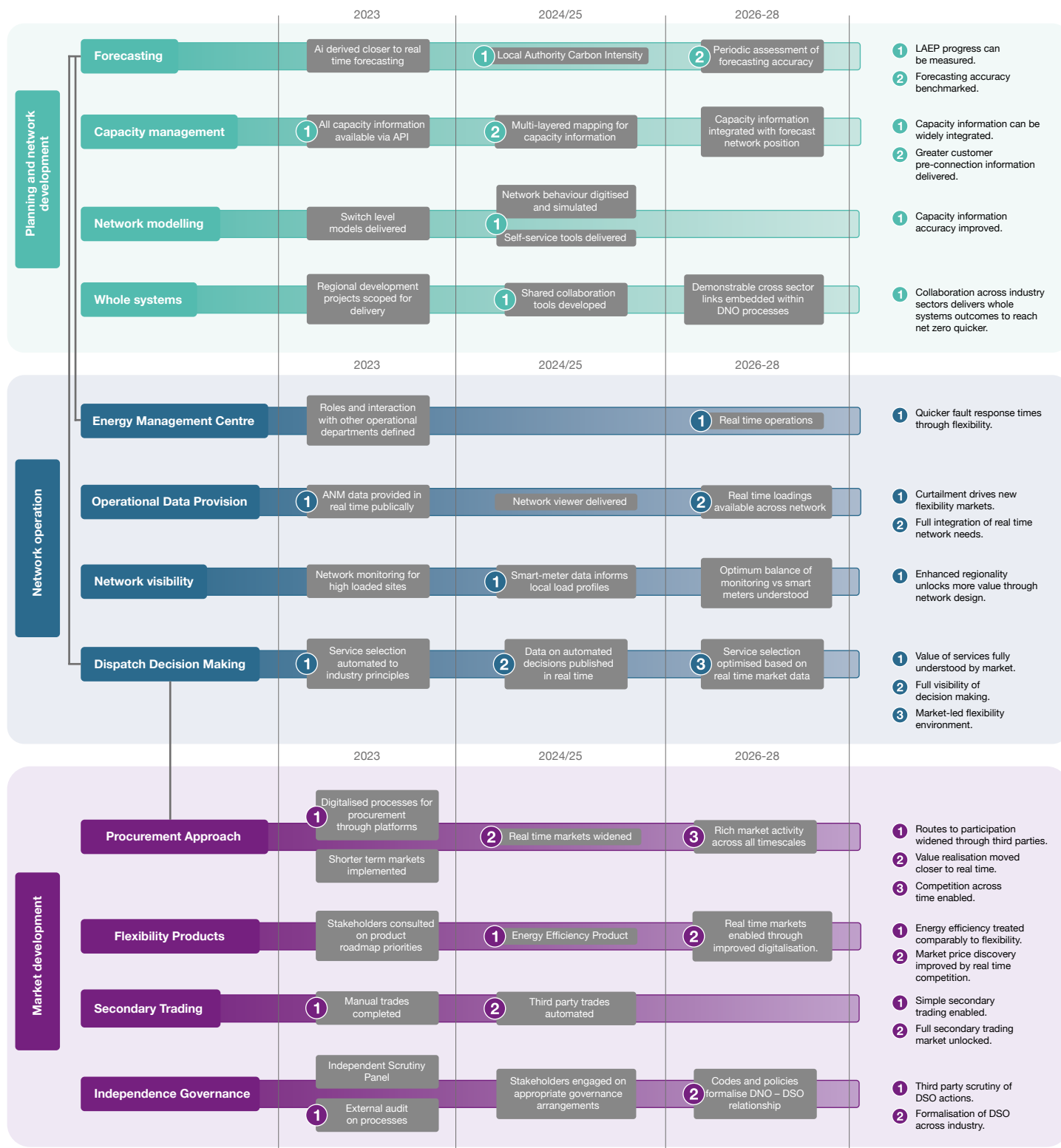
Our document aligns with the Ofgem roles and baseline objectives of planning and network development, network operation and market development.



# DSO roadmap

Through RIIO-ED2 we will deliver a number of enhancements to broaden and deeper our DSO capabilities. In the roadmap below, specific key improvements across the main DSO roles and functions have been identified and delivery has been distributed according to when the output is forecast; early, mid or late RIIO-ED2.

On the right hand side, outcomes have been highlighted which will provide direct benefits to enable decarbonisation.



To meet the challenge of this growth in electricity required for decarbonisation, we are planning to invest £260 million in DSO related costs within the RIIO-ED2 period.

# A network for RIIO-ED2 and beyond

We are designing and building networks which will be used to serve customer needs out to 2050. Our longer term scenarios span out to 2050 and include analysis on maximum peak power by season, annual energy consumption and technology used. The data covers demand, generation and storage, allowing us to ensure the networks we’re investing in now, will be ready for a credible range of futures.

Figure 1 Energy distributed across WPD group under Best View

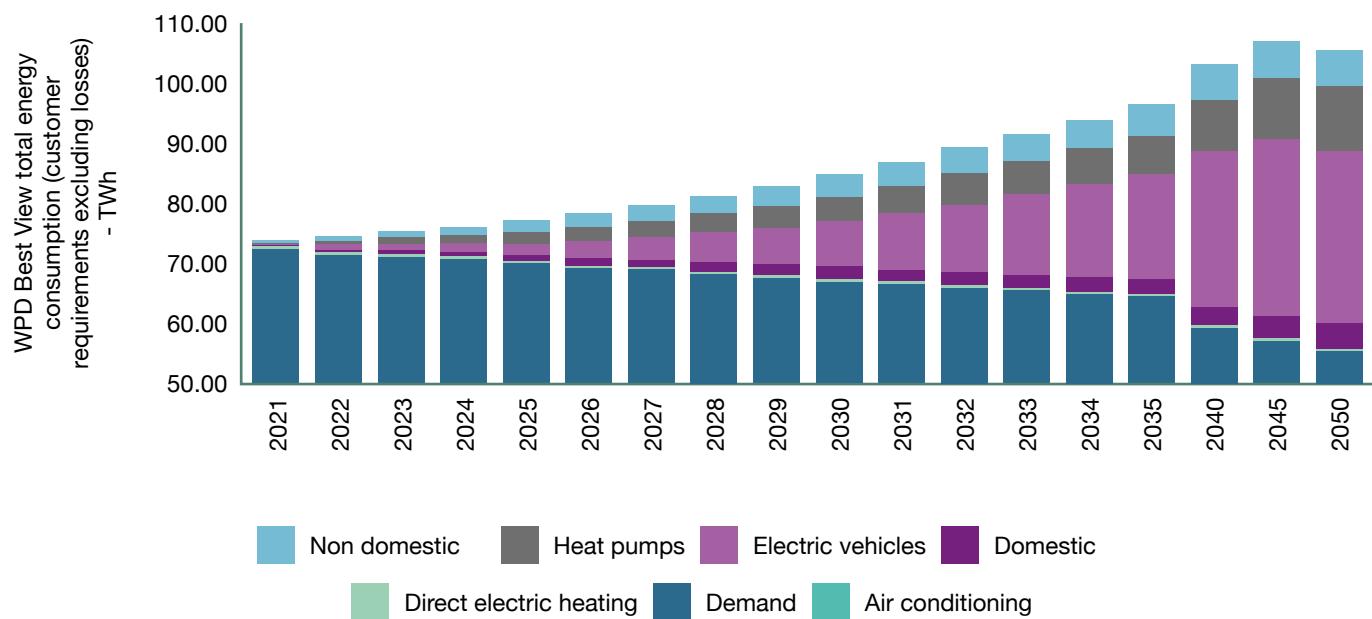
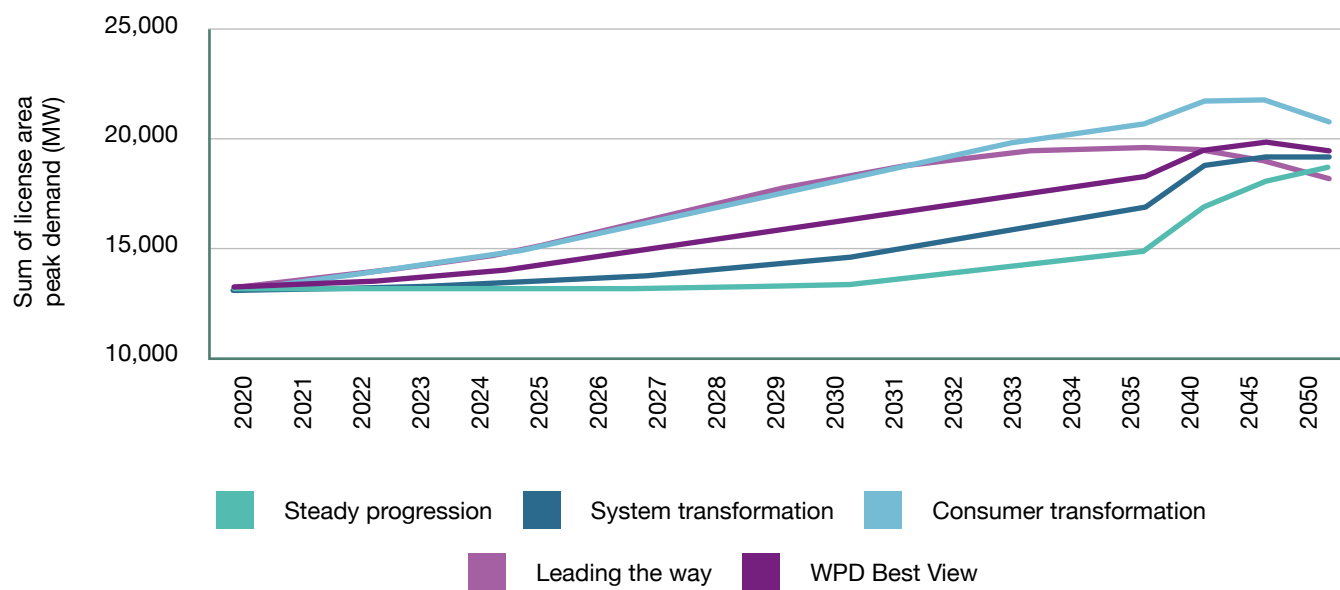


Figure 2 Peak demand across WPD group under DFES scenarios



## RIIO-ED1 firsts

During RIIO-ED1, WPD has gone faster and further in developing DSO capabilities, achieving a number of industry firsts which have directly benefited our customers.

First to publish long term scenario forecasts (2015/16).

First to move to annual update of distribution future energy scenarios (DFES) projections (2020).

First to publish comprehensive report on customer behaviour assumptions for all DFES technologies (2021).

First to publish Distribution Network Options Assessment (DNOA) and use the Common Evaluation Methodology tool to demonstrate the transparent approach to optioneering we are taking (2020).

First to publish Shaping Subtransmission reports outlining the network impact assessment using DFES forecasts (2016).

First to publish a common information model (CIM) model of an entire licence area (2020).

First to publish signposting data for informing flexibility markets through a digital user friendly flexibility map (2018).

First to implement six monthly procurement cycles for flexibility (2019).

First to operate a dynamic procurement system (DPS) to manage tender compliance (2019).

First to tender flexibility using a Utilities Contracts Regulations (UCR) compliant process (2019).

First to dispatch flexibility using an electronic application programming interface (2018).

First to implement a self billing process through an online portal and Flexible Power (2019).

First to publish data on our forecast availability and utilisations actions on a monthly basis (2019).

First to publish an annual summary of flexibility actions, participation and outcomes (2019).

First to provide performance and settlement data through an online portal (2019).

First to implement secure, dynamic and restore flexibility products (2018).

First to design, build and operate a flexibility dispatch platform through Flexible Power (2019).

First to provide full and complete access to flexibility requirement data available via API (2021).

First to provide flexibility markets with potential revenue valuation tool (2019).

First to have a functionally separate Distribution System Operator (2021).

First to publish Distribution System Operability Framework (DSOF) articles to increase awareness of technical issues (2018).

We were the first DNO to publish documents from the Regional Development Programmes in conjunction with the ESO (2018).

First to publish a costed DSO strategy (2017).

First to adopt the ENA Standard Flexibility Agreement Versions (V1, V1.1 and V1.2) to contract with our flexibility providers (2020).

# 1. Introduction

**As WPD adds DSO capabilities to existing Distribution Network Operator roles, it will carry out its existing functions and take on some new ones so as to:**



**Develop and maintain an efficient, coordinated and economical system of electricity distribution.**



**Facilitate competition in electricity supply, electricity generation and flexibility services.**



**Improve the resilience and security of the electricity system at a local level.**



**Facilitate neutral markets for more efficient whole system outcomes.**



**Drive competition and efficiency across all aspects of the system.**



**Promote innovation, flexibility and non-network solutions.**

To facilitate neutral markets we have identified functions and activities which are specifically related to DSO. We have also identified the functions that a DNO would provide to any DSO. These are described as DSO enablers and cover areas where the DNO roles support a more flexible network operation through a DSO provider.

With WPD, as a DSO, managing the coordination of services at a local level, the complexity and risk can be reduced for the ESO, resulting in a more efficient and cost effective whole system.

As a regulated business with no interests in UK generation or supply, WPD views the facilitation of our customers into these neutral markets as a natural extension of our current role in managing the power across our distribution networks.

We are uniquely placed to ensure simple and consistent access to new markets for our active customers through maximising the utilisation of our existing electrical and communication networks. We are also able to use the flexibility inherent in our network to ensure all customers benefit; through both receiving a resilient and secure supply and through cost effective delivery.

Within WPD we have already completed organisational changes which segregate our DSO functions from those of the DNO.

Each area reports separately to our operations director. Within this strategy we have included two specific sections. The first covers elements related to system operator, with the second detailing elements of DSO enablers managed by the DNO.

In Supplementary Annex 3: Appendix A01 we have listed the DSO roles and activities for RIIO-ED2, as listed in the Ofgem Business Plan guidance.

In many of these areas we have made significant progress within RIIO-ED1 and this is noted against each activity.



## 2. Distribution System Operation - the rationale, benefits and functions

**WPD recognises the need to change our role and include a DSO mode of operation to support changing energy uses by customers and a more dynamic operation of networks. We think DNOs are well placed to become DSOs to build the required capabilities, we have undertaken several critical steps.**

The move to DSO highlights areas which are new to us, but also shows areas where the DNO business has a role to play in providing base information and detail to support DSO decision making. We see the Operation Enablers as an area of benefit where the DNO business will support all DSO providers.

This is an essential part of the neutral facilitation of markets as they evolve with system operator providers. We also see a vital role for WPD in establishing a system operator provision. Our role is to stimulate the market in flexibility and create the space in which third party providers can operate. When paired with our operation enablers, these system operator services provide a holistic response to flexibility.

Transitioning from a network based on passive operation enabled inherently through its design, into one in which demand and generation is balanced locally by a mixture of enhanced sensing with active technical and commercial mechanisms. It will require significant change in our current role, but will facilitate a smarter energy system which can flexibly meet the needs of our users for the long term.

WPD has a large research and innovation programme, which we have harnessed to test new solutions before deploying them across the wider business. Our Future Networks Programme has continually developed better ways of delivering network capacity and providing an improved service to customers.

We have developed significant competence in a number of key areas which fall under the umbrella of operation enablers. They have focused on assessing network capacity in innovative ways and creating the data management and telecommunications systems to operate the network closer to real time.

The way we have integrated telecoms, data, ratings and connections is best demonstrated in our work on flexible connections. Our flexible connections suite has developed options in two areas for customers seeking to connect to the grid. A timed connection offers a very simple way of acting flexibly, without the need for communications or monitoring.

Load managed connections make use of ANM technology to control generation or demand behind single or more complex constraints. These are particularly useful in areas of constraint as an alternative to network reinforcement. The load managed connections suite combines both contractual and technical approaches. These methods of connection vary in cost and complexity and enable the solution to be tailored to the individual requirements of the customer. We have been able to develop these solutions within WPD to enable our internal systems to manage transmission level constraints and provide efficient, economic and timely access for customers.

Further innovative work has given us an insight into how system operator tasks can be completed. Our FALCON, SYNC and ENTIRE projects have demonstrated our ability to forecast, manage and dispatch both demand and generation turn up/turn down services and have been designed to do so in conjunction with National Grid, allowing customers full access to a number of markets providing revenue streams, whilst also minimising any risk of operating conflicting services.

Several innovation projects have developed the new remote control, monitoring and telecommunications equipment we need to have a more detailed view of how assets are used. This ensures we get the best value from them, whilst avoiding a potential for them to become overloaded or unreliable.

### What a smart and flexible network means for our customers

We will offer easy, low cost access for our customers to use electricity as their path to decarbonise. We're placing our customers at the heart of the energy revolution.



#### Low carbon

Making it quick and easy for customers to adapt to change and connect Electric Vehicles (EVs) and heat pumps when they want to.



#### Smart and flexible

Keeping costs to customers low by only reinforcing the network where there is no alternative; while enabling customers to access financial savings in return for managing their energy needs more flexibly.



#### Local

Driving the expansion of community led renewable energy connecting to the network and participating in flexibility and demand reduction schemes to benefit local communities.



#### Open

Offering easier and automatic access to extensive network data, with the ability to tailor data requests to the customer's specific requirements and in a format of their choosing to drive innovative new services and enhanced local area energy planning.

## 2. Distribution System Operation - the rationale, benefits and functions

**We continue to test and deploy innovative equipment to be used on the electricity infrastructure itself. These include devices such as battery storage and power electronic based equipment (for example Flexible Power links, flexible AC transmission systems and fault current limiters).**

Through implementation of our DSO strategy, WPD will ensure that our network, and our business, is embedded with the capability to deliver all the emerging system requirements our customers have, both now and in the future.

By taking strategic decisions now, we can incrementally deliver this capability whilst maintaining enough flexibility that will equally enable a number of uptake scenarios without the risk of leaving assets stranded.

The building blocks of our strategy are grouped into five workstreams which relate back to the Ofgem roles and baseline objectives of planning and network development, network operation and market development.

### **A. Planning and network development**

As customers adopt low carbon technologies (LCTs) or generate power more locally, the range of connection types for homes, businesses and generators is set to increase to meet customer needs. A DSO will also facilitate flexibility markets and make use of flexibility as an alternative to conventional network construction.

### **B. Network operation – network visibility and data**

A DSO required accurate and granular information on asset capability (design ratings and health/condition), how they are connected (or could be) and their actual operation (both real time and historic). A new generation of monitoring equipment and telecommunications will be used to support market integration and the new customer propositions.

### **C. Network operation – efficient and economic distribution system**

A DSO will look at energy in a different way to a conventional DNO. Energy flows and volumes will be more important than absolute maximums. Our systems will need to operate more autonomously and react to signals from other parts of the network. How we dispatch DERs will become a key element of efficient system operation.

### **D. Market development – comprehensive market information**

A DSO acts as a platform facilitator for customers, suppliers, aggregators and other participants to offer or receive services. Sharing information on network capability in multiple timeframes will enable businesses to offer customers innovative energy services. Data sharing between transmission and distribution is critical to ensuring the whole system is optimised in the interests of customers. Our use of the Common Information Model (CIM) will help data flow smoothly.

### **E. Market development – fair and transparent procurement**

We must ensure our costings, requirements and active system details are published in advance to allow customers to participate. Alignment of conditions, terminology and products will allow customers to lever multiple markets.

### 3. Putting the customer at the heart of DSO

**Developing and operating a flexible and smarter energy system will open up more opportunities for consumers to interact and benefit from the transition to net zero. These opportunities must be centred around the customer and their influence in the directions of our activities and timing of implementation is crucial to success.**

Distribution System Operation can be a technically complex area, but this must not present a barrier for customers to understand, nor participate.

In our DSO Strategy we are setting out, simply, what we will be doing to develop and operate a smarter and more flexible network and how these benefits will be delivered back to customers.

To inform the outcomes we are seeking to deliver and ensure we are progressing outputs in the right priority, we have engaged with a wide range of stakeholders through an incremental process.

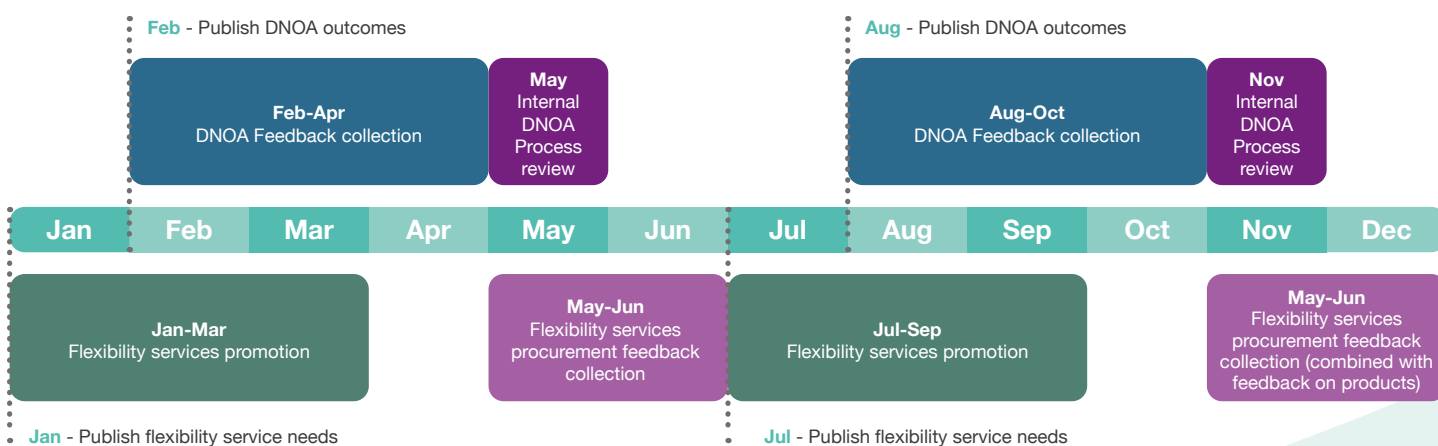
#### Engagement around flexibility requirements

WPD operates two procurement cycles a year. These are surrounded by a mix of promotional activities to maximise participation, as well as feedback processes to allow us to continually improve our processes.

The publication of our requirements are accompanied by promotion to increase market awareness and drive participation. This includes webinars and surgeries, one to one engagement and the attendance of relevant events. This targets a wide range of stakeholders to ensure all relevant parties are aware of the opportunity.

Once procurement has been completed, we then focus on collecting feedback on how we could improve how we publish requirements and the Distribution Network Options Assessment (DNOA) process. The associated timings are covered below.

**Figure 3** Timeline for our engagement around flexibility requirements



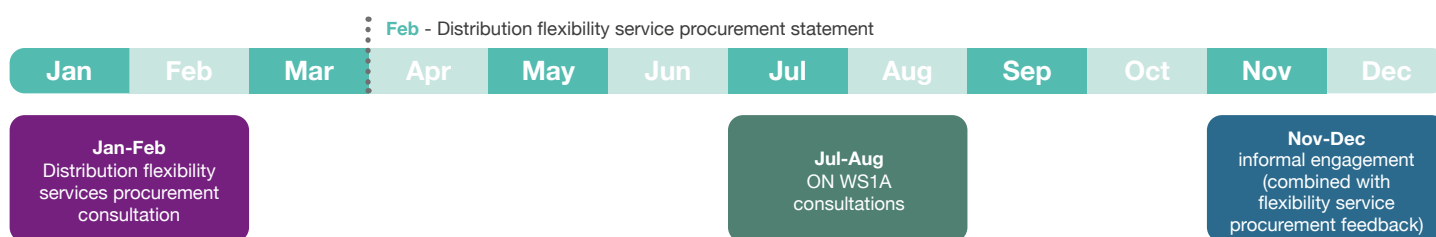
### 3. Putting the customer at the heart of DSO

#### 4.2 Engagement about products and process

In addition to what we procure, we also seek stakeholder feedback on how we procure services. We aim to target key stakeholders including those who have been involved in various elements of the process as well as wider industry stakeholders, including the ESO and other DNOs. As well as ad hoc feedback we see two key processes;

- Our work as part of the Open Networks project we collaborate with the other DNOs to deliver more standardised processes for procurement. As part of the WS1A process, a formal consultation is conducted in July. We used this feedback to inform ON work as well as WPD internal process.
- As part of the development of future Distribution Flexibility Statements, we will create a formal process to feedback on WPD process. Informal discussions will be carried out alongside the collection of feedback following the 2nd yearly procurement. This will be used to help us assess changes needed to the statement. These will feed into a formal consultation we aim to run in January and February.

**Figure 4** Timeline for engagement around products and processes



#### Engagement with ESOs, DNOs and iDNOs

We recognise that WPD is one actor amongst many in an ever more complex energy marketplace. As such, in addition to our wider engagement, we endeavour to engage heavily with the other network licensees.

A key part of this is through our active involvement at the Energy Network Association, especially the Open Networks project, where we work with the other licensees to develop and adopt common approaches across a range of DSO related activities. Workstream 1A is focussed on the development of flexibility services. Its key objectives include:

- Bringing more transparency in how DNOs facilitate local markets for flexibility and make decisions to provide more confidence in independent decision making.
- Simplifying participation in local flexibility markets through standardisation of approaches across DNOs and between DNOs and the ESO.
- Addressing barriers to participation in flexibility markets and facilitate stacking of revenues across multiple markets.

In addition we engage actively with other licensees directly when needed. Examples of this include:

- Our collaboration with the ESO and other relevant DNOs, on the Regional Development Programmes (RDPs). The RDPs look across the whole system landscape to identify key areas of development to unlock additional network capacity, reduce constraints and open up new revenue streams for market FSPs. Building on the work of Open Networks we are developing flexibility markets to manage distribution and transmission system needs.
- By opening up our Flexible Power brand and processes to other DNOs we have looked to increase alignment and collaboration within the industry. The collaboration will help streamline the process for flexibility providers and make interfacing with DNOs simpler and easier by avoiding the complexities and resource intensity associated with liaising with numerous network operators. We intend to work in partnership to further develop the Flexible Power brand and develop the portal functionality to enable interface capability with other flexibility platforms so wider market participation options can increasingly be made available to providers.

# 3. Putting the consumer at the heart of DSO

## Engagement with stakeholders as part of RIIO-ED2 planning

Within our RIIO-ED2 Business Planning process, we have engaged with a full spectrum of stakeholders including major energy users. Research has been completed with bill paying users to understanding the willingness to pay for developments.

Our engagement process has started with a a blank piece of paper, fluidly allowing co-creation of outcomes, which we have then checked back with those stakeholders to ensure we've heard correctly and interpreted the right outcomes.

The process has allowed us to calibrate the level of ambition and scope and enabled us to refine commitments – which we have taken forward within our RIIO-ED2 plans.

WPD's Customer Engagement Group (CEG) has critically reviewed and challenged our plans and strategies as part of the RIIO-ED2 process. DSO related commitments and the supporting activities as set out in this DSO strategy have been developed with the CEG.

This is fully detailed within SA-05 - Giving customers a stronger voice: Enhanced Engagement our Business Plan.

Figure 5 RIIO-ED2 customer engagement process

Stage	Objective
Stage 1: Preliminary engagement	Identify the high level outcomes WPD should commit to deliver.  Identify initial stakeholder priorities (areas where outputs and performance improvements are expected); to ensure all stakeholder interest areas have been recognised.
Stage 2: High level social value research	Identify specific improvement levels within each priority area and their value to customers.
Stage 3: Business Plan development	Co-create early commitments with stakeholders.  Develop initial costing for each commitment.
Stage 4: Business Plan refinement (detailed social value research)	Negotiate output levels and refine commitments.
Stage 5: Business Plan acceptance testing	Present the final plan to stakeholders for review (and voting) before submission to Ofgem.





## 4. Your feedback has driven our plans

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A wide range of feedback was received and has been mapped to the DSO roles. Prominent examples are detailed below.

### Planning and network development

The increasing penetration of variable renewable generators leads to a network with more variable demand and generation curves. Stakeholders highlighted the need to accurately predict these fluctuations as WPD transitions to a DSO.

Future network capacity was mentioned in multiple events as a concern in light of new renewable generation as well as new housing developments. For community energy groups, enabling electric vehicle uptake and issues relating to the environment were their top two priorities.

Stakeholders want more investment now, to reduce the cost of net zero significantly in the future. However, this has to be balanced with affordability for customers, ensuring we do not disadvantage the vulnerable or fuel poor. WPD must therefore strike a balance and invest wisely to match likely uptake, using accurate forecasting, modelling the effect of different uptake scenarios. WPD's Future Energy Scenarios (FES) are therefore crucial.

### Network operation

Referring to WPD acting as a neutral market facilitator to enable accessibility to multiple markets, business customers noted that WPD has no choice because WPD has to provide non discriminatory access so it has to choose the cheapest flexibility option, so to choose low carbon over anything else would require a change in legislation.

WPD must allocate grid capacity fairly, but there must be some social value calculation involved, not just financial.

### Market development

Flexibility services were seen as crucial and it was noted that a smarter, more flexible network would reduce the need for traditional reinforcement. Customers felt that investment in technology would benefit WPD in the long term and educating consumers about ways to reduce their emissions was important.

Handling increasing volumes of renewable generation and transitioning to a DSO requires WPD to substantially increase the amount of flexibility on its network. We must cater for the needs of domestic and commercial customers, with both requiring clear, simple steps to allow them to participate. WPD should provide clarity and long term certainty of its flexibility requirements and offer well established propositions to encourage participation.

Stakeholders mentioned that a lot of the DNOs are using online auction type platforms to procure flexibility services, but there needs to be a more joined up approach to the flexibility market. More can be done to open up flexibility services for domestic consumers, with a role for WPD in the societal education process needed.

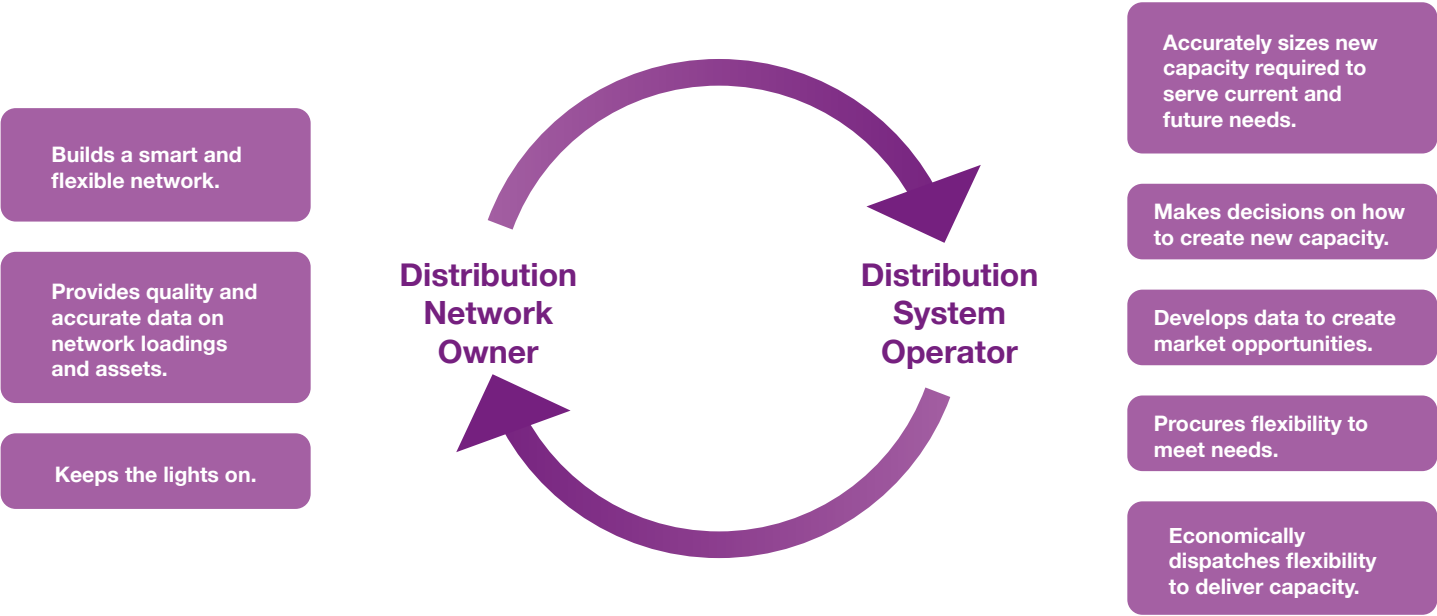
It was suggested that WPD should start looking at giving dates for when flexibility is rolled out across WPD's areas, providing longer term certainty over our requirements, which is important for the local authorities and communities trying to achieve net zero.

We have used this stakeholder feedback to inform our DSO Strategy and will continue to develop our thinking, direction and implementation during RIIO-ED2.

# 5. Distribution System Operations and the Distribution System Operator

Distribution System Operations is all about developing and operating a smarter and more flexible electricity system. To deliver benefits from this smarter approach requires not only investment in data, systems and processes to enable this capability, but also for this capability to be exploited. This is the role of the Distribution System Operator.

The Distribution System Operator is responsible for accurately sizing the investment in new capacity required to serve current and future needs. It is responsible for doing this efficiently through the use of flexibility, which may be provided by third parties or the DNOs own smart grid network. It will also direct traditional reinforcement where this is most efficient.



The Distribution System Operator’s key focus is to make decisions which enable capacity to be provided efficiently and economically, through creating competition in how that capacity is provided.

The DNO is responsible for providing accurate data and information on its asset capability and current or historical network loading. The DNO’s key focus is to invest in the data and smart grid technology which can be used by the Distribution System Operator.

Data and its exchange will be a significant enabler in the relationship between DNO and DSO and during RIIO-ED2 this needs to be codified. WPD will take a lead in this development.

To enable many of these functions, both the DNO and DSO will need to improve skills and expand resourcing levels, as new roles and activities are taken on. To do this, existing staff will be trained as these competencies need developing and new skills will be brought into the business where immediate experience is needed. Professionals from adjacent industries and sectors with transferable skills be sought. Further information can be found in our Workforce Resilience Strategy.

## Ensuring independence and dealing with perceived conflict

Within distribution businesses, there may be perceived conflict between the roles of network owner and system operator. The potential for any conflict to occur can be minimised and the impact diminished by ensuring appropriate steps are taken with respect to independence and governance.

There may a future role for new bodies, such as the future system operator to support the independence and scrutiny on decision making, reducing further any perceptions of conflict.

During RIIO-ED1, we have structured our Distribution System Operator function to be independent by implementing a number of steps:

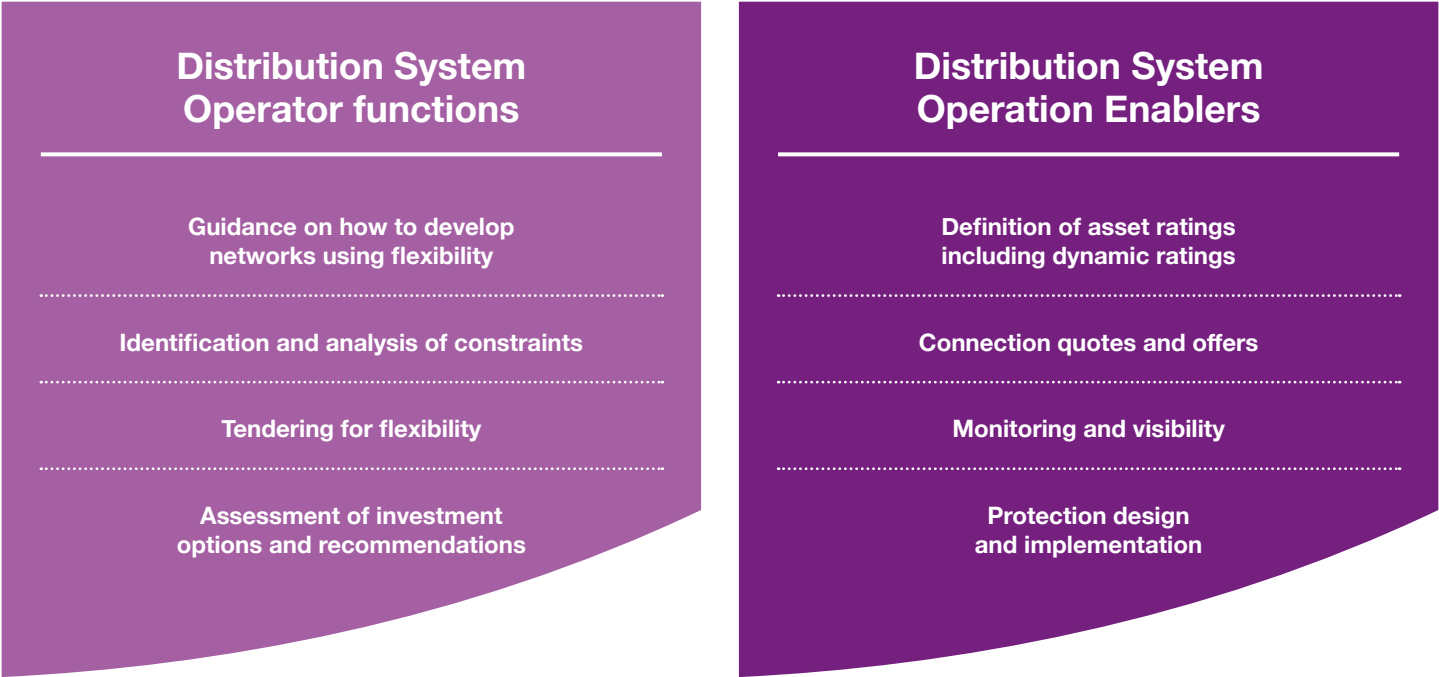
<b>Standardised forecasting frameworks</b>	Forecast volumes of demand, generation and storage are undertaken in our Distribution Future Energy Scenarios using a common Future Energy Scenario framework that is in alignment with the ESO's. Our DFES publications are aligned 6 months after publication of the ESO FES. Our DFES technology summaries publish comparisons of our regionalisations to the national ESO equivalents out to 2050.
<b>Use of industry datasets</b>	To inform consumer behaviour for the volumes of new technologies connecting to our network, we use data collected from within WPD and other electricity sector companies across the industry. This includes smart meter information and innovation projects to inform consumer behaviour.
<b>Use of industry power system tools</b>	To determine the electrical impact of the volumes of technologies connecting to the network, we use the same engineering processes, policies and digital tools as used by the network owner. This results in the network owner having confidence in the potential scenario impacts.
<b>Open competition</b>	Market information is publicly available to inform the market of potential requirements. Tender information is open to all participants registered on our dynamic purchasing system to drive competition between flexibility providers and across other network solutions.
<b>Common evaluation methodology</b>	Industry standard cost benefit analysis tools are used to determine most economic investment decisions Independence of decision making.
<b>Transparency in decision making</b>	Our Distribution Network Options Assessment (DNOA) document is published every six months to coincide with the tendering process, transparently showing the decisions behind the investment decision being proposed.
<b>Independence of decision making</b>	Investment decisions across flexibility and traditional reinforcement options are recommended by the Distribution System Operator directly to WPD directors. The Distribution System Operator is a functionally separate department, with executive level accountability and board level visibility.
<b>Assurance of decision making</b>	Internal audit and documented data assurance processes ensure that consistency is applied to the decision making process.

During RIIO-ED2, we will be going further in placing appropriate governance and transparency to ensure the independence remains:

<b>Run an independent Distribution System Operator Scrutiny Panel.</b>	For the start of RIIO-ED2 we will establish a new independent scrutiny panel for the Distribution System Operator. Chaired by an independent party, this Board will provide sufficient challenge and review of actions and outcomes of WPD's Distribution System Operator. Terms of reference for the membership and the roles and responsibilities will be developed as part of this governance activity, but will include horizon scanning and ensuring stakeholder views are supported by actions and outcomes.
<b>Appointment of Scrutiny Board members for DSO</b>	To ensure the independent Scrutiny Board represents a wide range of stakeholders and has relevant expertise and authority to provide oversight, three independent members will be appointed in substantive positions.
<b>External audit of DSO</b>	Through RIIO-ED2, processes will continue to be formalised and an externally led assurance process will be implemented for wider assurance on the general ability of the DSO to discharge its obligations against the core DSO functions.
<b>Operate a DSO control room</b>	Flexibility service dispatch must be free from conflict from the network owner function and commercial data from the markets should be held separate to only inform the DSO decision making process. An independent energy management centre responsible for service conflict management, optimisation and merit order selection will be operated during the RIIO-ED2 period.
<b>Provide a longer lens for investment decisions</b>	Following on from WPD's Distribution Network Options Assessment publication, the expected investment decisions for interventions anticipated to be needed will be published for a ten year window within the Network Development Plan (NDP).
<b>Publication of DSO metrics</b>	Metrics on DSO and enablers will be published for regulatory visibility, benchmarking and comparison. Progress against planned milestones and activity metrics demonstrating market development can be regularly updated to show DSO competence.
<b>Competition across DSOs</b>	Competition across DSOs in the UK will drive best outcomes for consumers and promote stretching innovation. Metrics and performance across different licence areas can be compared and contrasted to identify good practice and highlight effectiveness of approaches.
<b>Formalise the DNO - DSO relationship</b>	Establish the missing data exchanges, policies, publications and processes between DSO, DNO and whole system participants. We will work with wider industry to ensure these can be fed into formal industry codes where appropriate.
<b>Review effectiveness of existing governance arrangements</b>	Throughout RIIO-ED2 we will regularly consult on the effectiveness of governance arrangements, identifying areas of improvement in conjunction with our stakeholders and putting forward options for further measures if required.

# 5. Distribution System Operations and the Distribution System Operator

WPD have already completed organisational changes which segregate our Distribution System Operations from those of the DNO. Each area reports separately to our operations director.



In this DSO Strategy we have included two specific sections. The first covers elements related to system operator, with the second detailing elements of DSO enablers managed by the DNO.

# 6. System operator functions

## Scope

More intermittent and less predictable use of the electricity distribution system is inevitable as customers substitute carbon based fuel sources with cleaner electricity. Traditional DNO operations would require substantial investments in passive grid infrastructure, which would be underutilised much of the time. Continued construction, maintenance and operation of passive distribution networks is no longer going to deliver the best outcomes for UK electricity bill payers.

DNOs therefore need to change and provide DSO systems and solutions in order to operate and maintain efficient, economic and coordinated networks. WPD plans to be at the forefront of this transformation.

We will roll out DSO competences using a top down approach, ensuring the 132kV, 66kV and 33kV networks are targeted first, prioritising those areas which will benefit most. This enables the rest of the network to be incrementally upgraded as the customer need dictates. We aim to develop wider flexibility for the use of import/export capping as an alternative to conventional solutions only reinforcing the networks when these solutions cannot deliver what is required.

## Meeting baseline requirements

Planning and network development		Promote operational network visibility and data availability		Facilitate efficient dispatch of distribution flexibility services		Provide accurate user friendly and comprehensive market information		Embed simple, fair, and transparent rules and processes for procuring distribution	
Role	Progress to date	Role	Progress to date	Role	Progress to date	Role	Progress to date	Role	Progress to date
1.1.1	<div><div></div><div></div><div></div><div></div><div></div></div>	2.1.1	<div><div></div><div></div><div></div><div></div><div></div></div>	2.2.1	<div><div></div><div></div><div></div><div></div><div></div></div>	3.1.1	<div><div></div><div></div><div></div><div></div><div></div></div>	3.2.1	<div><div></div><div></div><div></div><div></div><div></div></div>
1.1.3	<div><div></div><div></div><div></div><div></div><div></div></div>	2.1.3	<div><div></div><div></div><div></div><div></div><div></div></div>	2.2.2	<div><div></div><div></div><div></div><div></div><div></div></div>	3.1.2	<div><div></div><div></div><div></div><div></div><div></div></div>	3.2.2	<div><div></div><div></div><div></div><div></div><div></div></div>
1.1.4	<div><div></div><div></div><div></div><div></div><div></div></div>			2.2.3	<div><div></div><div></div><div></div><div></div><div></div></div>	3.1.3	<div><div></div><div></div><div></div><div></div><div></div></div>	3.2.3	<div><div></div><div></div><div></div><div></div><div></div></div>
				2.2.4	<div><div></div><div></div><div></div><div></div><div></div></div>	3.1.4	<div><div></div><div></div><div></div><div></div><div></div></div>	3.2.4	<div><div></div><div></div><div></div><div></div><div></div></div>
								3.2.5	<div><div></div><div></div><div></div><div></div><div></div></div>

In RIIO-ED1     In RIIO-ED2

Note numbers relate to the baseline requirement detail as shown in Appendix A01



## 6. System operator functions

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### Workplan

#### Planning and network development

**Through forecasting using internal data sets, WPD will be able to provide instantaneous and predicted constraint levels for Distributed Energy Resources (DER) within operational timescales.**

This will allow the levels of constraint to be used when dispatching flexibility services and ensure the network is managed to maximise capacity, minimising constraints. We will develop enhanced forecasting, simulation and network modelling capabilities, with processes in place to drive continual improvement to meet network and user needs.

During RIIO-ED1 will have finished conversion of WPD network models to enable switch level analysis and develop the systems to record and simulate network asset behaviour.

Through RIIO-ED2, we will improve our understanding of customer behaviour, enabling the impact of consumer led smart technologies to be modelled alongside smart grid mitigations, to better understand true network capacity needs. A core forecasting and capacity management team developed within the DSO business will drive improvement in understanding electricity system impacts on customer assets and behaviour. A system modelling team within the DSO business will develop the systems, techniques and data required to understand the electricity system impacts on network assets and behaviour.

Enhanced visibility will give us the data, not only for us to manage our network to the highest levels, but also to enable us to give the best information to customers, providing leading indicators on where distribution network capacity is plentiful and where further support from flexibility services is required. By making this information available, WPD will contribute to the neutral facilitation of regional markets for the deployment of third party owned flexibility services.

The space between the LTDS timescales and the DFES forecasts will be filled with a Network Development Plan. We will use this to provide information across current and next Business Plan periods. We will ensure that our models and outputs are consistently available in all our forecasts.

The DSO is not recommending any investment in CLASS style services at the moment, but would review that decision should the services become mandated or become commercially permitted and their application result in a positive cost benefit analysis.

Distribution network options assessment will be a six monthly publication providing transparency in decision making on the use of flexibility and other competitively tendered innovative network mitigations. It will include CBAs of options and provide the long term view to ensure our solutions are timely and appropriate. An industry standard tool, CEM, will be used to compare the investment options around a number of industry standard scenarios and the DSO's own Best View.

WPD will develop a front-loaded payment mechanism to catalyse investment in energy efficiency measures, building on the revenue potential of flexibility. Network areas which would benefit from flexibility may also benefit from energy efficiency measures which reduce network loadings at cardinal points assessed by the DSO.

A specific energy efficiency proposition should deliver low risk, longterm network utilisation reductions at an economic level. Research from the 'Smart and Fair?' initiative, set out in our Customer Vulnerability Strategy will directly inform the development of our energy efficiency product. Utilising insights from this research programme we will identify potential technical and contractual barriers to uptake so that these can be reduced to ensure we provide targeted, accessible information and our product can maximise opportunities to support vulnerable customers.

We will use our social indicator data and findings from 'Smart and Fair?' to support the identification of areas where flexibility and/or energy efficiency measures would generate the greatest social value and create a methodology to capture this in our cost benefit analysis, in order to target customers when developing flexibility tenders.

By engaging with aggregators, suppliers and other industry participants who will be enabling participation in domestic flexibility we can identify opportunities to target vulnerable customers and build flexibility advice into the support our Priority Service Register and fuel poverty support partners provide, leveraging our existing energy efficiency and tariff switching interventions to unlock further value for customers.

Stakeholder engagement and whole system optioneering will be a crucial part of the DNOA process. The DNOA framework set out by WPD will solidify robust and transparent processes to ensure independence of decision.

## 6. System operator functions

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### Workplan

#### Promote operational network visibility and data availability

**By viewing energy flows on a temporal basis, we can forecast requirements and ensure the network is proactively managed in an optimum way. Complex data analytical tools will be deployed to allow us to visualise and interrogate the data. We will share the results of this enhance visibility with customers, their energy suppliers and the ESO.**

WPD publish its network flexibility data for a five year window across four future energy scenarios and also publish the procurement data for a two year window under WPD's Best View.

These datasets provide information to the market, as well as support the planning process. Month ahead forecasts are published on the Flexible Power website to outline the expected windows of availability and utilisation needed for DSO operations.

The timescales of this forecast will be updated as forecasting methods improve, with multiple iterations expected all the way up to real time. Forecasting and real time data can be accessed via API on our Connected Data Portal.

Through the RDPs in South West and Midlands, WPD is working on providing real time network headroom, footroom and underlying DER, ESS and Flexibility data to the ESO. This is expected to be made live in 2022.

System utilisation, demand, generation and storage power information is published online in real time at a licence area level. This will be brought down to a more granular level during 2022.





## 6. System operator functions

### Workplan

#### Facilitate efficient dispatch of distribution flexibility services

**The real time requirement for decision making drives this activity to be completed in our Network Control Centres which have a 24/7 presence. This is already being completed as a look ahead task with the ESO but the network is managed in real time at arm's length from the National Grid network, with interactions based on forecasts predictions or unplanned events.**

This interaction will become faster and detailed, with more DER instructions offering solutions to both. Automated systems and interfaces will help manage the efficient dispatch. Working across the industry through the ENA we will establish base rules for the industry in conjunction with other DNO. Innovation projects such as the UKPN KASM project will provide a useful basis for solutions. We already have our own acceptance and dispatch principles published on the Flexible Power website, they were developed in 2019 and will be reviewed as industry level work continues. Through RIIO-ED2 we will improve the visibility of operational decisions and the decision making to promote transparency of actions.

As systems become more detailed and interactive, rules will be set to ensure DERs can operate efficiently. It is important that the rules set are equitable to all network participants. These will be created transparently with stakeholder engagement through the WPD DER Owner Operator forum. Through the Midlands RDP, WPD is already working with the ESO to develop these primacy rules. Once developed they will feed into Open Networks.

We will support the secondary trading of distribution flexibility services and curtailment obligations by providing relevant data. We recognise it is important that our data is presented in the same format, described in the same way and provides the same level of detail as that of other network operators.

This allows customers and stakeholders to have a consistent view of the data across the industry to support existing, new and developing markets.

During RIIO-ED2 WPD will develop a process for facilitating, analysing, approving and verifying secondary trading of flexibility services. WPD's flexibility contracts are aligned to the Open Networks common contract and these allow for the substitution or exchange of flexibility services, subject to WPD approval. As well as allowing for bilateral trades of these contracts, WPD will publish the data which will enable peer to peer markets to further facilitate this trading activity.

The Distribution Network Options Assessment (DNOA) framework set out by WPD will solidify robust and transparent processes to ensure independence of decision. WPD compares the viability of the various options by using the Common Evaluation Methodology (CEM) process, which has been developed under open networks. This process considers multiple factors including financial, society, losses, safety and carbon benefits to determine the right investment pathway. Through RIIO-ED2 we will develop the DNOA process in line with stakeholder engagement and feedback so that the inputs, processes and decision disseminations fully represent the needs of our customers.

As our use of flexibility services increases we will expand and grow our dispatch infrastructure to meet the requirements. Scalability is a key feature of our solutions. During the RIIO-ED2 period we will replace and scale our platforms as required, with work starting in 2026.

WPD has operated and scaled up Flexible Power since its early inception in 2016 as an innovation project, through to the current day, where it regularly instructs 100s of MWhs of flexibility services and has been adopted by three other DNOs. Flexible Power dispatch instructions are electronic initiated through open APIs, which require no proprietary hardware onsite.

Our Flexible Power systems are able to work with other systems, such as the interface to Kiwi Power. We remain open to other providers taking signals and data from systems and inputting back into them.

Our Flexible Power systems are able to work with other systems, such as the interface to Kiwi Power. We remain open to other providers taking signals and data from systems and inputting back into them. Although our ANM systems do not provide a DSR response, we have followed the same ethos and openness. Our PowerOn system already interfaces with ANM systems from two providers and is able to interact with other platforms.

## 6. System operator functions

### Workplan

#### Facilitate efficient dispatch of distribution flexibility services

The definitions of different types of dispatch instruction for distribution flexibility services and transparent rules about when and in which markets they should be used are a key consideration. We have developed acceptance and dispatch principles which have been published since early 2019. Our procurement strategy document clearly sets out what products we procure and how we approach the procurement. WPD has implemented the industry standard flexibility products developed under Open Networks and was the first DSO to procure the products 'Secure', 'Dynamic' and 'Restore'.

WPD does not implement hard dispatch controls for flexibility services, all flexibility instructions are through electronic APIs and not direct hardware control. Hard dispatch controls are used solely for disconnection under fault, outage or system emergency conditions.

WPD does not have a hard coded system for flexibility. The flexibility service platform does not run off any DNO infrastructure. Data exchange to and from DNO control systems is limited to monitoring and real time control and is implemented through industry standard communications protocols.

#### Embed simple, fair, and transparent rules and processes for procuring distribution flexibility services

As our Flexible Power products have become more embedded, we have worked to standardise them. As other DNOs have now joined the Flexible Power platform we have taken the opportunity to collaborate and standardise. Customers have asked us for simpler ways to engage in the distribution flexibility services market and, in response, we have streamlined the process for flexibility providers. Providers can now view locations, procurement and documentation for four DNOs on a single platform.

WPD uses industry standard products to ensure consistency and standardisation within the market. These have been developed through Open Networks using WPD products for three of the four main products. In addition to this WPD is developing innovative pathways to improving participation and engagement in the marketplace. FutureFlex and IntraFlex are being run to support 'Business as Usual' flexibility services and, as with any innovation projects, the successful parts will be integrated into the main business.

WPD provided flexibility system need data to the market multiple years in advance. WPD procures twice a year using a six month procurement cycle. Dates and timelines are provided two years in advance. Contracts within Constraint Management Zones are awarded on one to four year contracts according to the flexibility provider's preference on contract length.

Clear, comprehensive and transparent mechanisms and associated commercial structures for coordinating distribution flexibility services and ESO flexibility services procurement will help customers participate in markets. Through the Midlands Regional Development Programme (RDP), WPD is working with the ESO to develop co-optimisation, coordination and primacy rules for operating flexibility services for both transmission and distribution network needs. This will feed into open networks.

We do not want to become the commercial route for access to wider ESO services. It should be noted that WPD contracts for flexibility are purely procured for distribution needs. Joint procurement is being explored within the RDPs.

Customers who provide flexibility will require the freedom to work across multiple markets and services to fully realise the benefits that their DER response can offer. WPD flexibility service contracts have no exclusivity clauses. It is expected joint procurement between WPD and the ESO will be enabled via a common contract with joint terms to facilitate DER servicing both transmission and distribution needs via a single procurement exercise.

WPD want market support services, such as pre-qualification, credit checking and settlement to be simple and enable cost efficient participation in markets. We will set out the processes involved with procurement, as well as the resources and costs associated with the activity to enable third parties to compete on a like for like basis. Where the market can do so more efficiently, WPD will enable this.

Throughout all of our work to support DSO services we must show neutrality and ensure that actual and perceived conflicts can be addressed. We have ringfenced the DSO team away from a wider electricity business systems team, responsible for providing the DSO enablers (such as data, monitoring etc) and the wider DNO business. Each team has separate and equal direct reporting lines into the operations director.

## Our Distribution System Operator projects

We are developing a range of projects to take our DSO operations forward. Details of each of the projects are included in Section six.

The suite of projects help develop our analysis tools and the provision of data in a user friendly form for flexibility participants. The current projects include:

- Network analysis for DSO.
- Planning state estimation.
- Stability analysis.
- DFES data architecture and systems.





# 7. Distribution system operation enablers

## Scope

The DSO enablers provided by a DNO are the activities and functions which support the neutral facilitation of markets and flexibility. They relate to areas where the DNO provides data for a market, and where the DNO is involved in the connection of low carbon technologies (LCTs) such as electric vehicles (EVs) and heat pumps.

A DNO will also need to be able to reflect the flexibility responses of a DSO within its own systems for real time operational decision making. The network management tools must be open to input from proprietary systems used in flexibility markets.

Understanding how the network is performing is key to its efficient use of the network, so data from monitoring devices is required at more places on our network. Existing maximum demand sensors need to be augmented to offer power flow direction and other metrics. We will protect the integrity and safety of lower voltage networks through a combination of advanced modelling, additional visibility and conventional reinforcement. Smart meter data will be used to enhance models which are applied to our low voltage networks.

## Meeting baseline requirements

Planning and network development		Promote operational network visibility and data availability		Provide accurate user friendly and comprehensive market information		Embed simple, fair, and transparent rules and processes for procuring distribution flexibility services	
Note	Timescale	Note	Timescale	Note	Timescale	Note	Timescale
1.1.1	<div><div></div><div></div><div></div><div></div></div>	2.1.2	<div><div></div><div></div><div></div><div></div></div>	3.1.5	<div><div></div><div></div><div></div><div></div></div>	3.2.2	<div><div></div><div></div><div></div><div></div></div>
1.1.2	<div><div></div><div></div><div></div><div></div></div>	2.1.4	<div><div></div><div></div><div></div><div></div></div>			3.2.5	<div><div></div><div></div><div></div><div></div></div>
		2.1.5	<div><div></div><div></div><div></div><div></div></div>				

In RIIO-ED1    In RIIO-ED2

Note numbers relate to the baseline requirement detail as shown in Appendix A01

## 7. Distribution system operation enablers

### Workplan

#### Planning and network development

**The effective application of both flexible connections and DSR Services is contingent on the availability of network data such as real and reactive directional power flows and voltages.**

On the High Voltage (HV) (11kV and higher) networks, full network visibility down to primary substation level will allow WPD's Active Network Management systems to minimise the amount of curtailment customers are subject to while maximising asset utilisation and maintaining network security. On Low Voltage (LV) networks, monitoring of distribution substations will ensure that network reinforcements are carried out when and where they are needed and provide the necessary data to enable 'smart' solutions to be deployed where required to further optimise asset utilisation.

Data sharing in a fast and efficient way becomes key as more data sets interact. We will ensure that our planning data is made available in a standard format to increase the efficiency of data sharing. We will use the Open Networks project to ensure that our approach is coordinated with other network and system operators.

We continue to collaborate with all other network licences through ENA to establish common data descriptions, metadata standards and approaches to sharing data to ensure that a standardised and interoperable process is taken forwards. We have demonstrated leadership in this area as the first GB DNO to share its complete asset and connectivity data, above LV, in Common Information Model (CIM) format.

Visualisation of data is key to ensure that it is used and gains maximum leverage in the transition to net zero. We hold heat maps and information on our website, with forecast DFES data being made available both in 'WPD specific' geographical areas and in specific local authority boundaries.

An example of where we have made different formats of data available is associated with our network capacity and Future Energy Scenarios Interactive Maps, where the maps provide users with an easy to navigate geographic view, but we also make available the more detailed source data for more technical users to build their own analysis.

Customers can independently access this data using our interactive maps and download features. The base data is also available to download for use in third party models and systems. Improving and increasing data management acts as the backbone to drive insight both internally and externally to meet current and future system needs.

Developing data into a more consistent format has meant that we can now share openly our data via the internationally recognised CIM standard for the transfer and provision of electricity network data, to allow direct access to a complete asset and connectivity model to support investment and operational planning for customers and stakeholders.

We are not planning any investment on CLASS style services in this price control.

#### Promote operational network visibility and data availability

**We have already established the ability to share our network information through the standard CIM format. This allows other operators and stakeholders to run their own modelling and simulations against our base network.**

This requires more development to encompass all of the examples of data sharing included in the Ofgem baseline requirement and, as an example, we do not share working network configuration in real time. We do share an as planned network configuration. We plan to address the areas required during the RIIO-ED2 period, developing them as data becomes available and system changes are made for us to offer useful outputs. Some outputs, such as losses recorded at substation level, will rely on third party projects such as the roll out of smart meters so we will develop solutions to make use of these projects as they complete.

WPD publishes the network flexibility data for a five year window across four future energy scenarios and also publish the procurement data for a two year window under WPD's Best View. These datasets provide information to the market, as well as support the planning process. A month ahead forecast is published on the Flexible Power website to outline the expected windows of availability and utilisation needed for DSO operations. The timescales of this forecast will be updated as forecasting methods improve, with multiple iterations expected all the way up to real time.

We use a common data triage process to assess the openness of data. This is applied to assess data classification and determine whether anonymisation or redaction is required to enable the data to be shared. This results in either open, public, shared or closed classification. A summary assessment is published along with the dataset to provide stakeholders an explanation of the data classification.

During the RIIO-ED1 period we established the DER owner/operator forum. That gave operators a route to discuss all matters related to DER ownership, such as grid constraint, outage management and forecasting. Details of DERs connected to the WPD network and the respective owners is well established. At future owner/operator forums we will work to collaboratively develop the specification of detail that is required to help secure DERs. We plan to develop this specification into a solution for all DERs.

## 7. Distribution system operation enablers

### Workplan

#### Provide accurate user friendly and comprehensive market information

Our digitalisation activity has already and will continue to, deliver change in how we plan, manage, and operate our network and interact with and provide data to customers and third party system participants.

We are committed to continuing to build on our significant work to date digitalising our business to ensure that we remain an efficient and effective operator of our network and deliver data and solutions in the right format, at the right time to customers and stakeholders to meet their needs and ambitions.

Our core principles are and will remain improving data management, increasing network insight and operation and ensuring data is presumed open. These principles ensure value is driven to all parts of the energy industry and wider, supporting the net zero transition.

Improving and increasing data management acts as the backbone to drive insight both internally and externally to meet current and future system needs. Standard processes for creating, managing and handling data through a robust data governance process has been implemented and will continue to be developed; investing in solutions to improve our data quality; and ensuring we have a 'single source of the truth'.

#### Embed simple, fair, and transparent rules and processes for procuring distribution flexibility services

We will investigate the additional arrangements that are required to support DERs and the ESO in a more real time automated basis.

Presuming our data to be open goes beyond making it available through our systems and services. Our role is to enable data to be harvested, housed and utilised irrespective of specific access point.

Our implementation of APIs and client URLs will ensure that this is available and appropriate. Our ENA wide work on the creation of an Energy Digital System Map for GB has demonstrated our commitment to and the availability of our data to serve this purpose.

### Our Distribution System Operation Enabler projects

We are developing a range of projects to take our DSO enabler work forward.

Details of each of the projects are included in Section 7 which explores Distribution System Operation enablers in more detail. The suite of projects help develop our data and monitoring functions to offer more granular and real time data to DSO operation providers.

The current projects include:

- Improved network monitoring and power flow sensing.
- Automated data mastering solution.
- Time series historian analysis system.
- Open cloud data platform.
- Internal data platform.



## 8. System Operator in detail – our work to develop DSO functions

### Planning and network data

**WPD uses numerous sources of data to establish an accurate forecast of future network loads and constraints. Established processes take national forecasts and combine them with local information to generate local forecasts.**

A range of common scenarios used across the industry have been cross referenced to our stakeholder-led bottom up Best View driven by our DFES process, ensuring it is net zero compliant. This Best View has been used to identify future network constraints and inform the future work programme that forms the RIIO-ED2 network reinforcement requirements.

Through forecasting using internal data sets, WPD will be able to provide instantaneous and predicted constraint levels for Distributed Energy Resources (DER) within operational timescales. This will allow the levels of constraint to be used when dispatching flexibility services and ensure the network is managed to maximise capacity and minimise constraints. We will develop enhanced forecasting, simulation and network modelling capabilities, with processes in place to drive continual improvement to meet network and user needs.

By the end of RIIO-ED1 we will have implemented switch level models for the WPD EHV network, allowing automated analysis of capacity forecasting and system security. This will include the digitisation of network operational behaviour, allowing the simulation of post-fault activity. Through RIIO-ED2, we will

improve our understanding of customer behaviour, enabling the impact of consumer led smart technologies to be modelled alongside smart grid mitigations, to better understand true network capacity needs. Our existing assumptions have been published in our DFES Customer Behaviour Assumptions Reports: [www.westernpower.co.uk/downloads/303103](http://www.westernpower.co.uk/downloads/303103).

Within the Distribution System Operator, a team specialising in forecasting and capacity management has been created to drive improvements in understanding electricity system impacts on customer assets and behaviour. A separate system modelling and whole system team will develop the systems, techniques and data required to understand the electricity system impacts on network assets and behaviour, including how these interact with and provide benefits to the whole energy system.

A core forecasting and capacity management team developed within the DSO business will drive improvement in understanding electricity system impacts on customer assets and behaviour. A system modelling team within the DSO business will develop the systems, techniques and data required to understand the electricity system impacts on network assets and behaviour.

### WPD's track record and processes

**Since 2015, WPD has been undertaking scenario planning work through Distribution Future Energy Scenario (DFES) reports, updating them on a two yearly cycle to provide a forward looking ten year window of potential LCT uptakes. The DFES projections have been aligned to the latest National Electricity Transmission System Operator (ESO) scenario forecasts that are available when the DFES process is carried out.**

A separate process called Shaping Subtransmission determines the impact of the scenarios on the network. This process uses data from the DFES analysis to determine whether the change in use of the network leads to constraints. The information about constraints is used to inform future requirements for investment.

The forecast network requirements are used to provide information for potential flexibility providers. Signposting gives a multiple scenario five year forward view of requirements and forecasting provides a single two year Best View of requirements. This information informs the flexibility procurement process which operates on multiple cycles up to the point when investment is required.

The options for investment are considered in the DNOA process (formerly the strategic investment options process) which determines whether flexibility, conventional

reinforcement or alternative innovate approaches provide the most economical solution. This leads on to either implementing the operation of flexibility or proceeding with conventional reinforcement, where flexibility is unavailable.

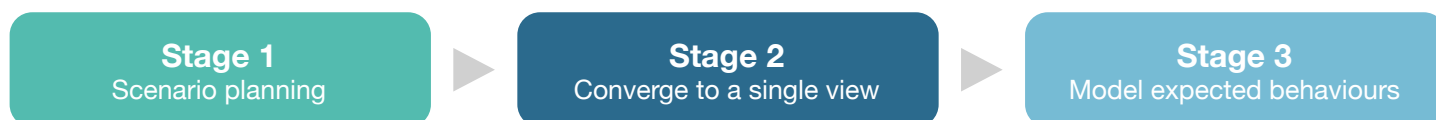
The use of future energy scenarios and the associated processes are embedded as 'Business as Usual' within WPD and therefore activities in RIIO-ED2 will be focused on expanding, enhancing and evolving these processes.

Enhanced visibility will give us the data, not only for us to manage our network to the highest levels, but also to enable us to give the best information to customers. It will provide leading indicators on where distribution network capacity is plentiful and where further support from flexibility services is required. By making this information available, WPD will contribute to the neutral facilitation of regional markets for the deployment of third party owned flexibility services.

## 8. System Operator in detail – our work to develop DSO functions

### Strategic network planning process

There are three main stages involved in our strategic network planning process:



### Stage 1: Scenario planning – production of Distribution Future Energy Scenarios (DFES)

The first stage of the strategic network planning process is creating the Distribution Future Energy Scenarios (DFES).

The (DFES) use national Future Energy Scenarios (FES) forecasts produced by the Electricity System Operator (ESO) and local information to provide a distribution view of the technology volume changes across DNO licence areas.

WPD starting developing DFES studies in 2015 and was the first DNO group to develop DFES analysis and documentation.

Since the publication of the first DFES report for the South West, WPD has continued to work with Regen to carry out the analysis which has been captured and published in license specific DFES documents for all WPD licence areas.



WPD has committed, that from 2020, a full suite of DFES documents will be produced annually. This means that by January each year there will be an updated suite of DFES documents for all WPD licence areas following release of an updated ESO FES in the preceding July.

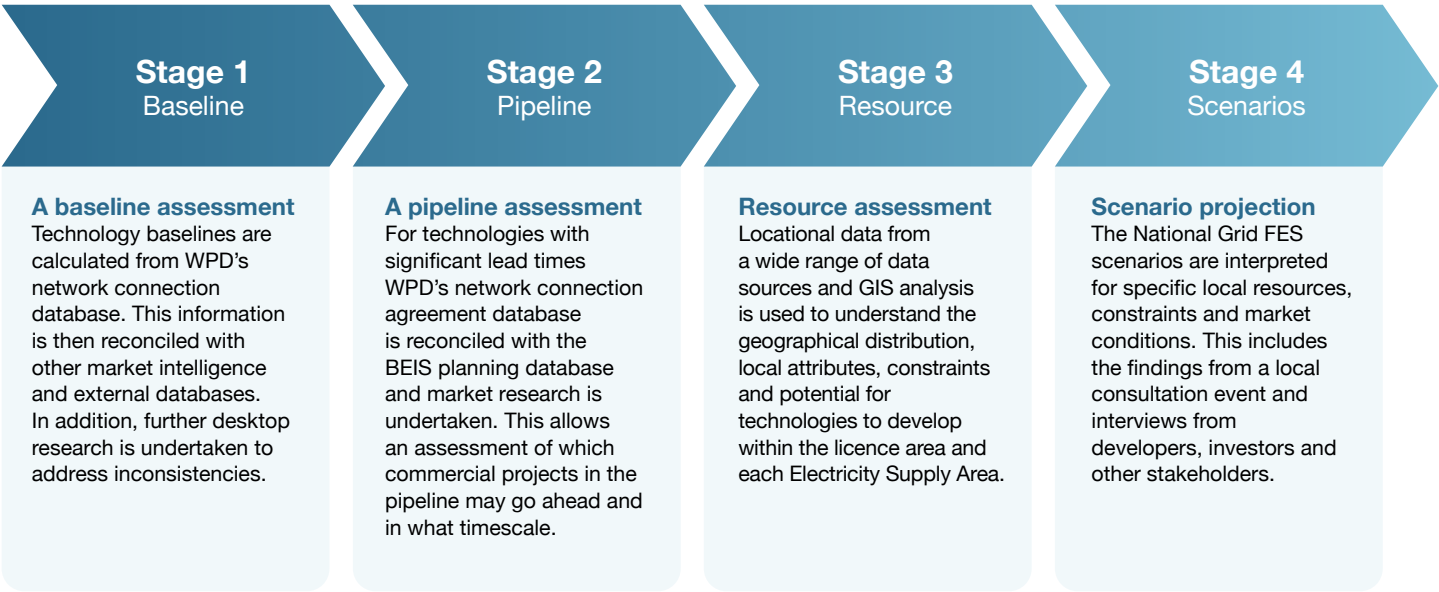


# 8. System Operator in detail

## – our work to develop DSO functions

### Considerations in DFES analysis

The DFES investigates MORE THAN 50 different technology types and assesses the potential for growth under each of the four ESO FES scenarios. It follows a four stage process as shown in the diagram below.



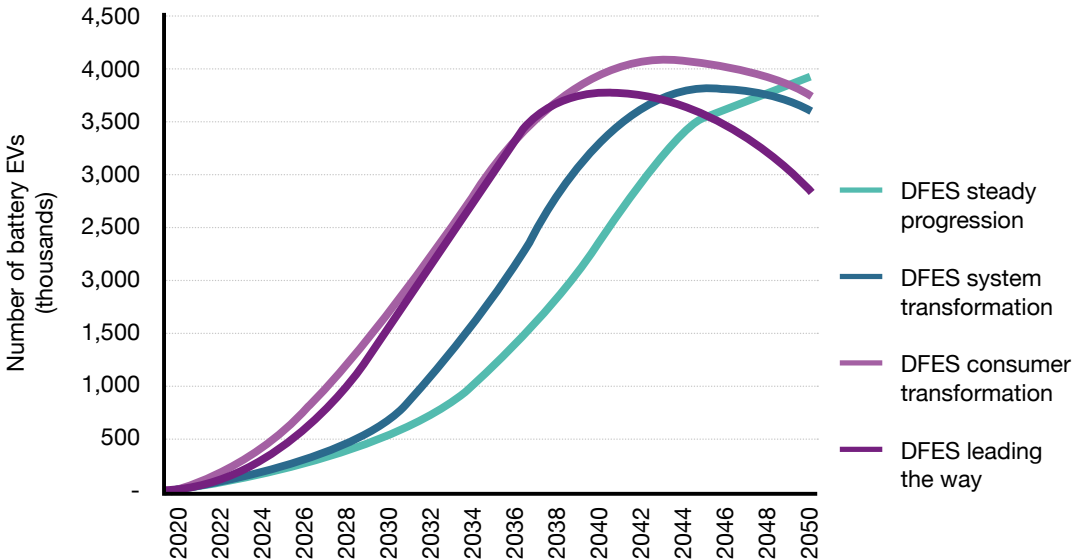
The analysis for the DFES considers the impact of each ESO FES scenario on a range of demand and generation technologies resulting in a projection of the volumes of such technologies.

This is illustrated by the West Midlands battery EV volume projections shown below. Similar projects are available for the full range of demand and generation technologies across all four WPD areas.

Figure 6 Battery electric vehicles by scenario

The DFES uses the concept of Electricity Supply Areas (ESA) to define the level of granularity of the analysis. These are aligned to primary substations, resulting in around 1,150 ESAs across WPD.

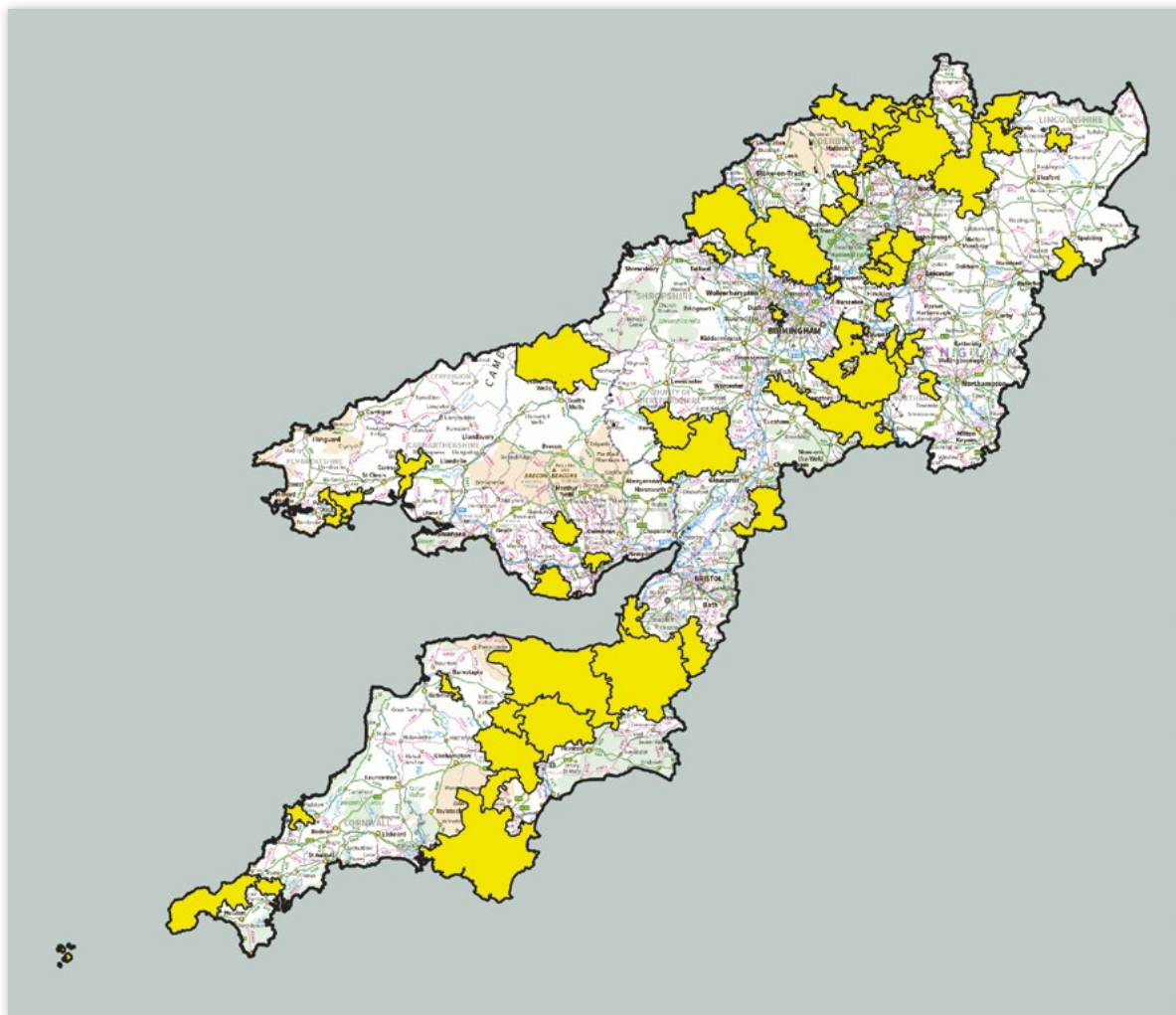
The growth of each of technology is considered for each individual ESA informed by information on local circumstances.



## 8. System Operator in detail – our work to develop DSO functions

The image below shows the expected growth of non-hybrid heat pumps under the Leading the Way scenario in the West Midlands. All this data for any technology and any scenario is available via our DFES Maps.

**Figure 7** Heat pump growth - West Midlands



The analysis for results in a report and an associated dataset of scenario projections for each unique combination of technology, scenario, year and electricity supply area.

This data is available on the WPD website at:



[www.westernpower.co.uk/  
distribution-future-energy-scenarios-map](http://www.westernpower.co.uk/distribution-future-energy-scenarios-map)

The scenario projections for each technology are given in quantifiable units – i.e. a value that can be counted. Examples of this are MW of installed capacity (for generation and storage) and number of heat pumps and EVs. Electrical behaviour assumptions are not included at this stage.

The DFES is a key input to our continual assessment of the distribution network. The outputs from the DFES inform multiple business operations, including informing the electrical analysis underpinning our Shaping Subtransmission series of reports.

## 8. System Operator in detail

### – our work to develop DSO functions

#### Development of Local Area (LA) DFES

**As part of our extensive stakeholder engagement programme, WPD invited all 130 local authority (LA) stakeholders covered by the WPD area to work with WPD to build a joined up energy plan.**

As part of the interactions, WPD shared DFES projections which had the electricity supply area data in the WPD DFES analysis recut into each local authority area. WPD distribution managers from depots in the local areas held meetings with local authority energy representatives to review the assumptions and projections.

This resulted in a range of responses, with some local authorities being more ambitious than the LA DFES and other local authorities finding the interaction helpful to assist them in formulating their LAEPs.

The chart below shows the progress that local authorities are making in developing their LAEPs, with one third having established a LAEP, around half still developing their plans and a fifth with no plans yet under development.

This is an evolving area and therefore it will be important to revisit this interaction to gain further knowledge about LAEPs.

The feedback from local authorities has been used to refine the allocation of growth projections across the WPD licence areas, which makes them more representative of local requirements and more certain that they will be required.

It is proposed to continue the interaction with the local authorities on an annual basis to feed into the annual review of WPD DFES scenarios and also use this data to feedback regional information into the ESO FES process.

#### WPD sought the following data from the local authorities:



General data based around a local energy strategy, declaration of a climate emergency and setting a target date to reach net zero.

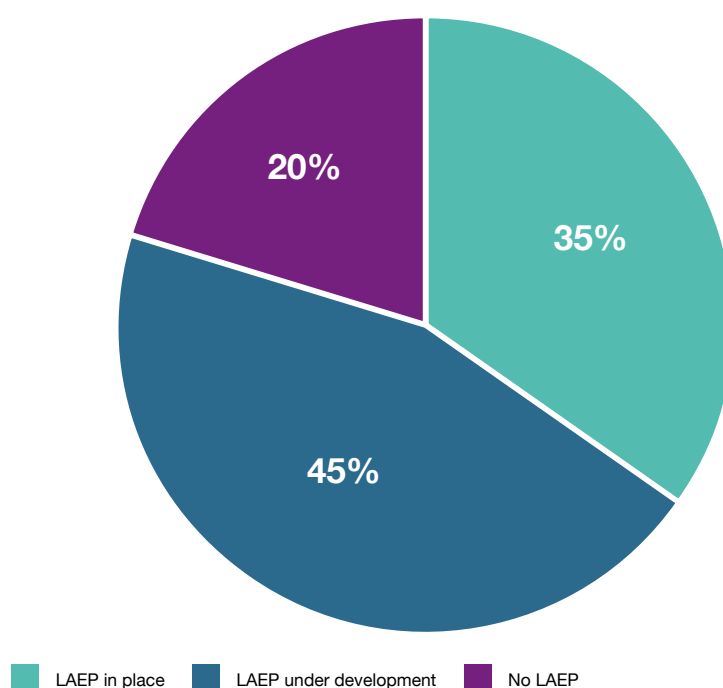


Availability and comparison of data sets.



Technology projections for electric vehicles, heat pumps, new industrial, commercial and domestic developments, generation including solar, wind and battery storage.

**Figure 8** LAEP status



## 8. System Operator in detail – our work to develop DSO functions

### Stage 2: Defining a single WPD Best View

Having created a series of scenario projections, the next stage is to converge these into a single WPD 'Best View'.

#### Determining a WPD Best View scenario

To derive the WPD Best View, WPD uses an iterative process. DFES data and previous Best View is used to support stakeholder and Local Area engagement, which then allows the quality of Local Area Energy Plans to be assessed using criteria derived from Ofgem guidance to gauge the ambition, engagement and deliverability.

The assessment is carried out by WPD's senior regional managers, scoring against the criteria matrix and a local area specific DFES scenario is selected.

The DFES scenario is chosen by closely comparing the ambition of the planned volumes across all technology types within the area, and then further ranked on how close this ambition is likely to be to the needs of stakeholders (engagement completed), how accurate the modelling is and the capability of the area to deliver.

A single DFES scenario is currently chosen to approximately represent all technologies, but there is scope in the future for differentiation between expected uptakes of technologies to also be simultaneously assessed.

This process enables these scenarios volumes to be summated up to a licence area level, checked against WPD strategic views of development and a new WPD Best View can then be provided.

Before the WPD Best View is finalised, the licence area totals are checked against national ambition to ensure WPD targets are aligned to deliver governmental policy. Scenario boundaries across the rankings may be moved to more closely aligned, assuming incentives and policy is directed at achieving national net zero ambitions.

Each primary substation also receives a disaggregation of this 'WPD Best View' and this is used to inform the growth rates required for investment across the network.





## 8. System Operator in detail – our work to develop DSO functions

### Stage 3: Modelling expected behaviours

#### Shaping subtransmission reports

The process considers the MW impact, the timing of the impact and diversity of the impact to identify where the growth will result in specific network constraints.

The output is published in Shaping Subtransmission reports for each of the four WPD licence areas. The constraints identified feed into WPD's longer term signposting process for identifying long term flexibility requirements. Different strategic investment options are considered to alleviate potential network constraints, which incorporates both flexibility service provision and conventional reinforcement.

All of our electrical assumptions are detailed in the accompanying DFES Customer Behaviour Assumptions Report - [www.westernpower.co.uk/downloads/303103](http://www.westernpower.co.uk/downloads/303103)

The following tables summarise some of the high level figures for WPD from the calculation of the WPD Best View for each licence area at the start (2023) and the end (2028) of RIIO-ED2.



#### WPD Best View 2023

Technology	Units	WMID	EMID	SWALES	SWEST	WPD
Solar generation	GW (installed capacity)	0.971	1.922	0.772	1.676	5.342
Onshore wind generation		0.050	0.409	0.548	0.354	1.362
Other distribution connected generation		1.445	2.208	0.893	0.954	5.500
Battery storage	GW (installed capacity)	0.251	0.357	0.027	0.155	0.789
Electric vehicles	Number of vehicles	255,510	184,320	34,863	73,734	548,427
Heat pumps	Number of heat pumps	72,205	95,738	30,839	66,068	264,850

#### WPD Best View 2028

Technology	Units	WMID	EMID	SWALES	SWEST	WPD
Solar generation	GW (installed capacity)	1.290	2.784	1.090	2.036	7.200
Onshore wind generation		0.050	0.414	0.587	0.407	1.458
Other distribution connected generation		1.505	2.353	0.944	1.074	5.876
Battery storage	GW (installed capacity)	0.347	0.430	0.065	0.223	1.065
Electric vehicles	Number of vehicles	859,665	739,693	168,661	318,053	2,078,872
Heat pumps	Number of heat pumps	248,492	352,980	109,712	181,870	893,054

For RIIO-ED2, the data shows that there will be a significant growth in EVs, increasing from 550,000 to 2.1 million, while the number of heat pumps is set to grow from 265,000 to 893,000.

# 8. System Operator in detail

## – our work to develop DSO functions

### Network planning

During RIIO-ED1, WPD has established flexibility markets that provide an alternative means of addressing network constraints. These make use of new technology and the ability for some network users to provide flexibility in their own consumption either by increasing, reducing or shifting their net import or export.

This flexibility can be commercially controlled by WPD to offset the need for reinforcement, provide more capacity to other connections, improve network security or increase system operability. When considering how to address a network constraint, WPD will consider whether flexibility provides a more economical solution. Adopting a ‘flexibility first’ approach will enable the network to developed efficiently and economically.

### Timing of investment and use of flexibility

Ideally the capacity of the network is increased once the network approaches its capacity limits, with work being started just ahead of need so that it is completed as the new capacity is required.

Conventional reinforcement, using larger capacity assets releases large blocks of capacity due to the discrete sizing of network upgrades. These large steps in additional capacity generally do not require further investment for a number of years resulting in longer term capacity availability. However, these large steps in capacity increases may be excessive for the anticipated future network requirements.

Since conventional reinforcement can take a long time to deliver, this can cause problems and delays for customers that want to connect to heavily loaded parts of the network. They may have to wait until the network is reinforced until they can connect or accept a lower capacity connection.

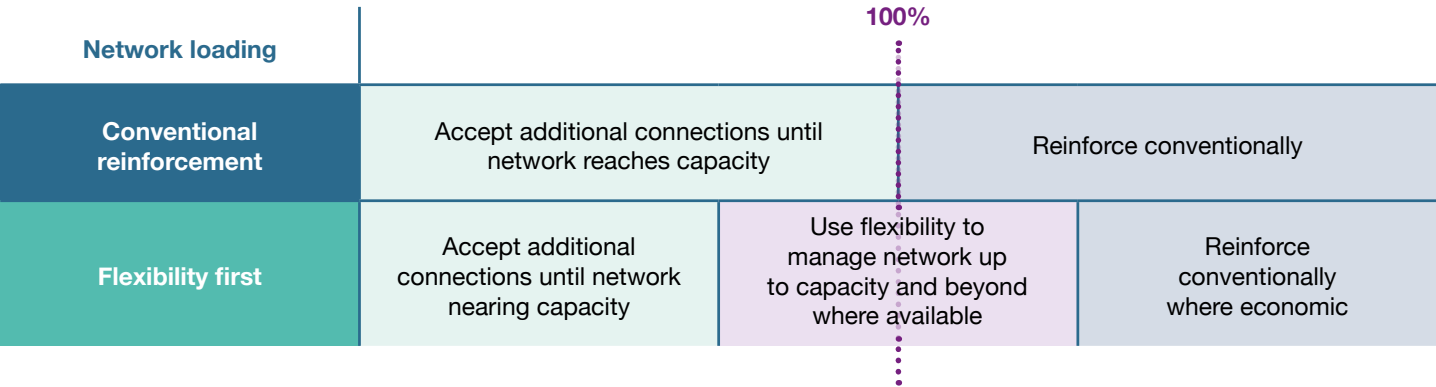
Flexibility can provide more granular network capacity increases, better matching the in year requirements of network users.

Flexibility has the potential to manage capacity short falls economically and responsively until the need for conventional reinforcement is more certain. In some circumstances, particularly where uncertainty is high, a greater period of operation of flexibility may allow for more optimal longer term investment plans to be implemented. Flexibility can also be used to allow new customers to connect to heavily loaded parts of the network without the need for reinforcement.

While we will be making greater use of flexibility, we anticipate that there will be situations where it is necessary to carry out conventional network reinforcement. This will be where there is insufficient flexibility provision for the scale of network constraint.

The following diagram illustrates the different approaches that may arise.

Figure 9 Approaches to using flexibility to improve network utilisation.



## 8. System Operator in detail – our work to develop DSO functions

### Timing of investment and use of flexibility

Until distribution flexibility is sufficiently developed and ubiquitous enough to be relied on, the identification of flexibility provision needs to be carried out at an earlier stage compared to when conventional reinforcement work would start. This is to allow sufficient time for the assessment of whether there is sufficient flexibility available and (in circumstances where it is not available) still have sufficient time to carry out the conventional reinforcement.

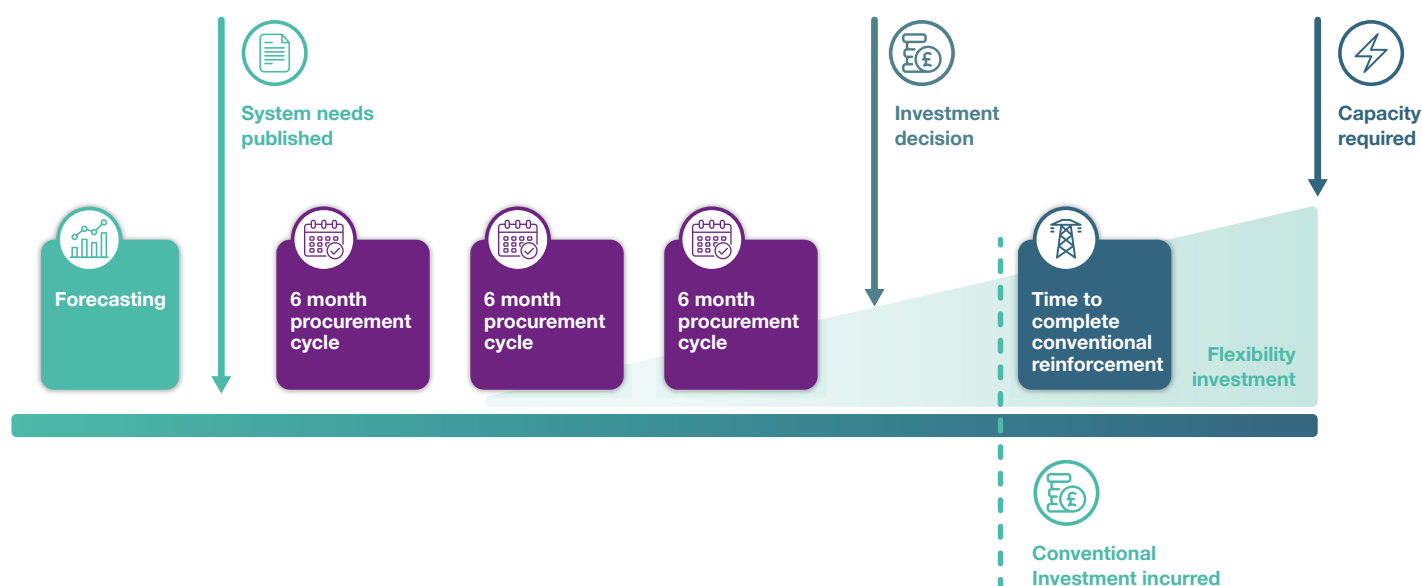
WPD has an investment trigger for flexibility ahead of when conventional reinforcement would be undertaken.

This ensures that the flexibility market is fully explored in advance of when conventional reinforcement needs to start. Generally, this will involve publishing flexibility requirements and investing in flexibility 12 months ahead of when a conventional investment decision would be made.

At the time of reaching the decision for conventional reinforcement, further flexibility can be sought to determine whether the conventional reinforcement can be deferred or replaced completely by flexibility solutions.

Cost benefit analysis will underpin any decision making;

**Figure 10** Timetable for developing networks using flexibility and/or conventional reinforcement



Within our RIIO-ED2 Business Plan we have included £94 million of avoided cost across both primary and secondary networks due to flexibility, which provides immediate benefits to customers. We have removed these costs from our funding allowances up front due to our confidence in delivery, including only the £11 million we expect to spend on flexibility services.

We have designed uncertainty mechanisms to allow us to go further with flexibility and have committed to fully refund the capital expenditure associated with the conventional reinforcement where we deliver the capacity through flexibility. More information can be found in SA-07 Managing Uncertainty.

## 8. System Operator in detail

### – our work to develop DSO functions

#### Using flexibility to provide capacity for new connections

As well as using flexibility to provide additional capacity to manage load related constraints, WPD has developed and trialled processes to use flexibility to provide additional capacity for new connections coming onto the network

In constraint management zones, any flexibility that is provided from the market in excess of requirements to meet existing network constraints can be used to offer capacity for new connections. New connections that trigger the need for reinforcement will be offered the option of having a flexibility solution as an alternative to conventional reinforcement. Depending on the scale of requirement, this may allow more time for the construction of the conventional reinforcement, defer the conventional reinforcement or remove the need for conventional reinforcement. This will allow the connection to proceed more quickly and may reduce the costs for the connecting customer.

Similar to conventional reinforcement, WPD will take on the liability and costs associated with providing the network capacity by contracting with the flexibility provider. This will provide confidence for the connecting customers that the network will be managed in a way that provides them with the power they require.

Within the DNOA process, as well as considering conventional reinforcement and flexibility, other whole system solutions or innovative solutions are also assessed. Our whole systems approach will actively seek these new opportunities out.

Connecting customers will be offered two methods of paying for these costs; one option will be to pay the costs for flexibility and assets retrospectively on an annual basis, the other option will be to settle the costs upfront, based on WPD's Best View of the blend of flexibility and asset costs that will be required. The first option will be settled against actual costs incurred and will be subject to variations due to external factors such as the market cost of flexibility and deviations from assumed network loadings. The second option will be a fixed cost and benefit from a reduction due to NPV applied for future costs.

Both of these options will allow the connection to be made without using Active Network Management and without any risk of curtailment and both will still have costs apportioned based on the network capacity. WPD will manage the constraints using flexibility and take on the risk and responsibility for doing so.

These arrangements were piloted as part of WPD ICE plan in 2019 and the pilots have allowed the development of the commercial details

#### Distribution Network Options Assessment (DNOA)

WPD's DNOA process (formerly the System Investment Assessment process) provides a systematic methodology to recommend a single investment option.

Conventional network reinforcement typically requires a large upfront capital expenditure and for larger investments, which take a longer time to construct, the costs might be incurred across a number of years.

Deferment of reinforcement by flexibility requires ongoing payments to flexibility providers to turn down turn up the flow of power to allow other customers in the CMZ to have the power for their needs.

Initially flexibility costs may be small, however as network requirements grow more flexibility will need to be procured, resulting in flexibility costs rising year-on-year. Should changes in demand or generation reduce the network requirements, these flexibility costs may reduce.

WPD compares the viability of the various options by using the Common Evaluation Methodology (CEM) process, which has been developed under open networks. This process considers multiple factors including financial, society, losses, safety and carbon benefits to determine the right investment pathway.

By outlining our analysis process stakeholders and customers can be assured that WPD is giving them the best possible value for money while maintaining a secure and sustainable network. The DNOA also works in tandem with Flexible Power in helping inform flexibility providers of the potential for future opportunities to provide flexibility services with signposting data for the next five years.

The analysis conducted within the DNOA is based on data from WPD's Distribution Future Energy Scenarios (DFES). WPD published the first DNOA in March 2021 and will be publishing future DNOAs every six months to continue to inform stakeholders, customers and flexibility providers.

[www.westernpower.co.uk/DNOA](http://www.westernpower.co.uk/DNOA)



## 8. System Operator in detail – our work to develop DSO functions

### Network operations

#### Independence of decisions and openness of data

Within planning timescales, independence of decision making is ensured with the Distribution System Operator reviewing emerging constraints and assessing whether it is more efficient and economical to utilise flexibility or a new asset to manage the constraint through the use of industry tools such as the CEM and publications such as DNOA.

Where the decision is made to address the issue via the use of flexibility services, there will also then be a need to choose which service provider(s) should provide the required services.

In order to avoid the potential for conflicts of interest to occur it is proposed that, following the precedent set at the design phase, the decision as to how to manage the constraint should sit with the Distribution System Operator side of the business. To do this, we will establish an Energy Management Centre (EMC) function.

This approach will also mean that the decisions of which service providers to choose where multiple options are available is always managed by the DSO, this will make it easier to develop a single, justifiable method for selection of service provider.

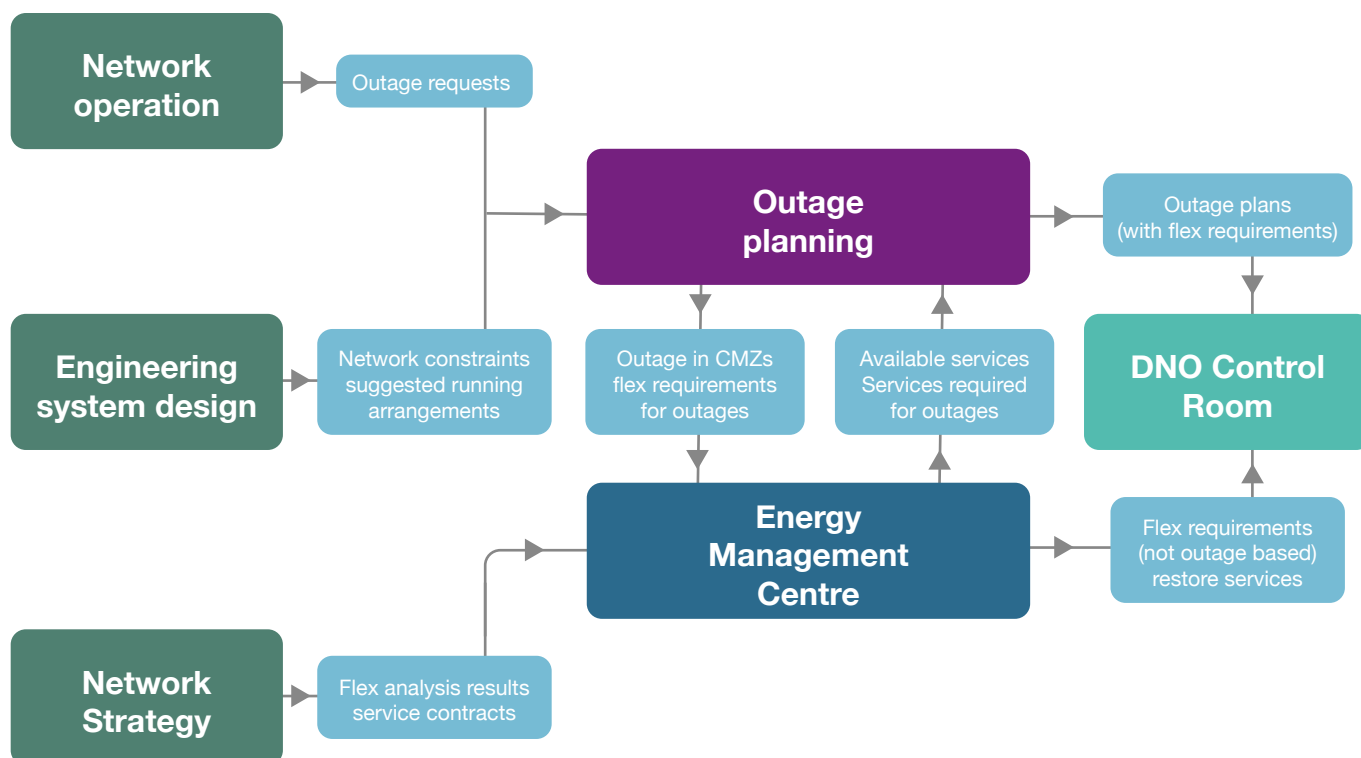
The EMC will be responsible for running these processes aligned to dispatch principles. WPD has already published dispatch principles on its Flexible Power site and through RIIO-ED2, will be developing the data systems and processes to undertake automated real time decisions for operational purposes.

This approach should neatly build on the existing operational processes currently in use in DNO control rooms and will minimise the additional training and workload required. The DNO Control Engineer's focus remains on the technical requirements of operating the network, in a safe and secure manner, without the need to take on commercial decision making as well.

This will prove particularly useful during periods of high network activity, such as a storm, where existing Control Engineer focus must remain on safety and customer restoration.

Separation of the responsibility for selection of services will streamline the processes so that during high levels of activity on the network, opportunities to use new flexibility services are able to be integrated without impacting on restoration times. The diagram below shows how the proposed EMC will fit into the existing processes for network operations:

**Figure 11** Energy Management Centre



## 8. System Operator in detail – our work to develop DSO functions

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### Network operations

#### Changes to network operations

Traditionally the operation of the distribution networks has been relatively passive. Power flows have been one directional from the transmission system to consumers. Network operation has mainly focused on responding to network faults and alarms, outage planning and coordinating access to the network for work activities. These functions will continue into the future.

However, the growth in intermittent distributed generation and decarbonisation of transport and heat has led to reverse power flows, increase loads and greater need to redirect power flows away from heavily loaded parts of the network. This has resulted in implementation of Active Network Management (ANM) for constraining new connections and evolution of flexibility markets, where capacity is provided by flexibility providers adjusting their demand or generation output.

In addition, there are other drivers of optimising the operation of the network including managing voltages, losses and power factor that need increasingly sophisticated and smart ways of network operation.

This is requiring new data and processes for analysing what is happening on the network and more active ways of managing constraints such as processes for dispatching flexibility and greater coordination with the Electricity System Operator.

The volumes of data will significantly increase and systems will need to be enhanced or developed to enable efficient and effective operation of the networks. The primary objectives of operating the network safely and maintaining network reliability will remain unchanged.

As flexibility becomes more critical to the running of the network it will become necessary to better integrate flexibility with existing operations teams. In order to deliver this efficiently while also minimising perceived conflicts of interest it is proposed that this is best undertaken by the Energy Management Centre (EMC).

The EMC's primary responsibilities will be to:

- Review predicted network loading within operational timescales and identify whether these can be accommodated by the existing network passively or if there is a requirement for flexibility (services or other smart grid solutions).
- Where there is a need for flexibility, review what is the most efficient and economical solution, following a clear and transparent decision making process.
- Acquire and schedule the required services/smart grid solutions for planned network running arrangements and prepare appropriate contingency options for network control to dispatch if required.

## 8. System Operator in detail – our work to develop DSO functions

### Flexible Power

WPD's flexibility programme is run under the Flexible Power brand, which was created by WPD through an early innovation project and has been brought into 'Business as Usual' to manage capacity on the network through the use of customer provided flexibility services.

Flexibility is used as a lower cost alternative to reinforcement when identified as part of our DNOA process.

WPD has been pioneering the use of flexibility solutions during RIIO-ED1, but they will be used increasingly as more demand connects to the network.

To allow flexibility to provide any real network benefits, the full end to end process for flexibility delivery needs to be implemented.

Through Flexible Power, we have created a full suite of tools and processes to enable flexibility within the DSO. To date, 11 of the 14 DNO licence areas have adopted Flexible Power and a collaborative venture has been set up to continue its development. This will focus on scaling up processes and systems for wider roll out, standardisation and improved integration with other market platforms.

Four flexibility services are used within the industry, with WPD taking an early lead in developing and implementing three of these:

**Secure** – used to proactively manage peak demand.

**Dynamic** – used to support the network in case of a coincident fault during network maintenance.

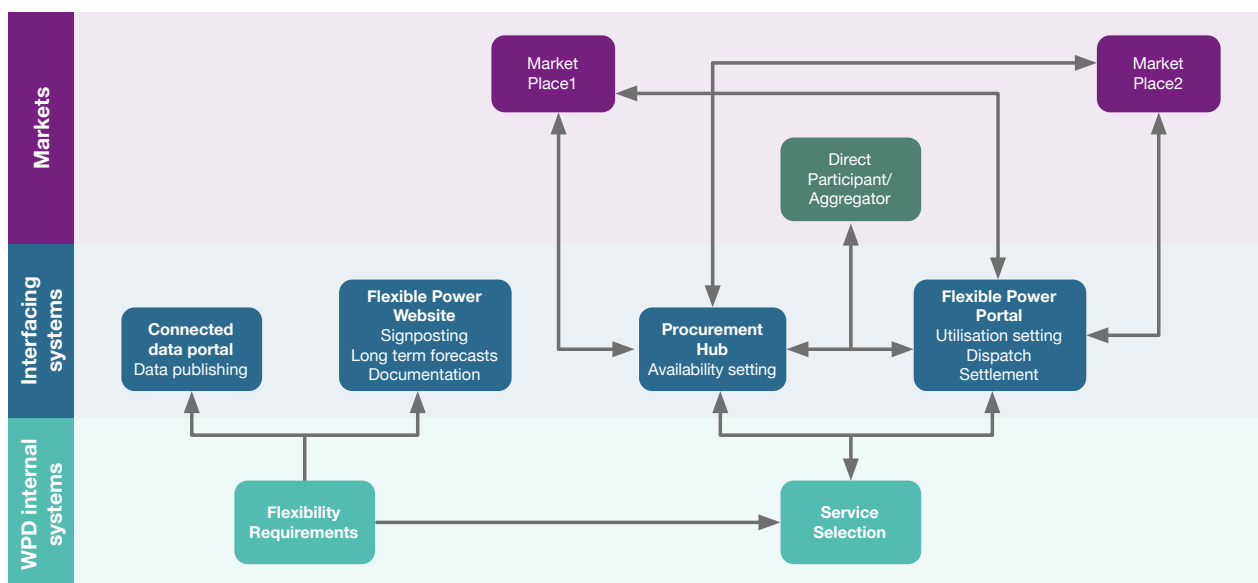
**Restore** – used to reduce the stress on the network during fault situations, with flexibility providers responding instantaneously.

A fourth product, **Sustain**, is also used within industry as a simpler, scheduled product. Within our latest product evolution consultation paper we are engaging with customers and stakeholders to propose adoption of Sustain for better enabling domestic flexibility.

Our products will continue to evolve and we will manage this process in conjunction with stakeholders through our C31E process and also with wider industry through Open Networks. During ED2 we have committed to develop increased support for energy efficiency through development of a front-loaded flexibility commercial mechanism. More information on our C31E process can be found here: [www.westernpower.co.uk/distribution-flexibility-services-reporting](http://www.westernpower.co.uk/distribution-flexibility-services-reporting)

In our latest "evolution of distribution flexibility services procurement" paper, we have put forward how we are planning to digitalise our processes and expand our flexibility product offerings to simultaneously operate long term, short term and real time flexibility markets. This paper also sets out how we expect to leverage third party platforms, aggregators and marketplaces to provide multiple routes to participation. Our new proposals for better alignment of products will enable secondary trading opportunities and widen access for all potential flexibility service providers.

Figure 12 Flexibility systems



## 8. System Operator in detail – our work to develop DSO functions

### Market development

#### Providing market information for flexibility services

WPD recognises that across the distribution network there are many electricity customers that have the potential to shift their demand, by amending when they use power, or adjusting their export from onsite generation.

The flexibility market allows these customers to earn a financial payment for the provision of specified flexibility services. The type and amount of service required is dependent upon the nature and scale of a constraint on the network, which could be as a result of increased loads at certain points in time or increased generation. During RIIO-ED1, we have gone further and faster in enabling markets within our region, resulting in a mature approach to signalling our intent, procuring services and contracting with flexibility providers. This has resulted in WPD operating the largest distribution flexibility market in the UK.

**Figure 13** Procurement results

Procurement cycle	Primaries covered	MW for procurement	MW operational without additional procurement	Flexibility contracted* (MW total) *excluding restore
2018	18	63	0	35.3
2019 H1	80	93	0	56.8
2019 H2	120	184	0	123.1
2020 H1	175	334	0	217.7
2020 H2	256	304	73	439.8
2021 H1	305	239	211	456.5
2021 H2	320	258	211	708.99

Our total procured flexibility currently stands at 709MW, the largest DNO portfolio in the UK. Within reporting year 2020/21 we have deferred or avoided £39.4 million of reinforcement as reported in E6 table of the RRP. This is the highest of any DNO in the UK and is directly benefiting customers.



## 8. System Operator in detail – our work to develop DSO functions

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### Forecasting

Forecasting is a more accurate single scenario view of the constraint on the network across a two year window. It explicitly states WPD's flexibility requirements and is used to advise what flexibility is being sought during procurement cycles.

Like signposting, forecasting also describes the amount of flexibility required and specifies the availability window (i.e. when the flexibility is required), but over a shorter, more defined timescale. Forecasting data enables flexibility providers to respond to flexibility tenders and as it is openly available allows different providers to have the same opportunity to participate in the market.

We are currently consulting with stakeholders on our approach to how we develop future markets and how we will integrate with third party platform providers. Our consultation paper on "Evolution of Distribution Flexibility Services Procurement" outlines how we are developing our approach to operate longer term, shorter term and real time markets together.

### Accessibility to markets

WPD expects that flexibility services will be provided by many different market participants including: demand response aggregators, electricity suppliers, generation operators, battery operators, industrial and commercial customers, local authorities, community groups and EV charging operators.

Recognising that each of these participants may wish to provide services to WPD through a variety of routes, we have established access through a number of channels.



The Flexible Power brand has been created by WPD to deliver the procurement of demand response services. It acts as our customer facing brand when seeking flexibility services and is implemented consistently across all four of our licence areas. As well as providing visibility and enabling routes to participation, Flexible Power also encompasses our flexibility participant portal and electronic dispatch, monitoring and settlement services.



Piclo has developed and trialled the UK's first GB wide flexibility marketplace, supported by funding from BEIS Energy Entrepreneurs Fund. WPD has displayed its flexibility requirements on the Piclo platform since November 2018. Flexibility providers with matching assets in WPD Constraint Management Zones are directed to WPD's Flexible Power site to enter procurement.

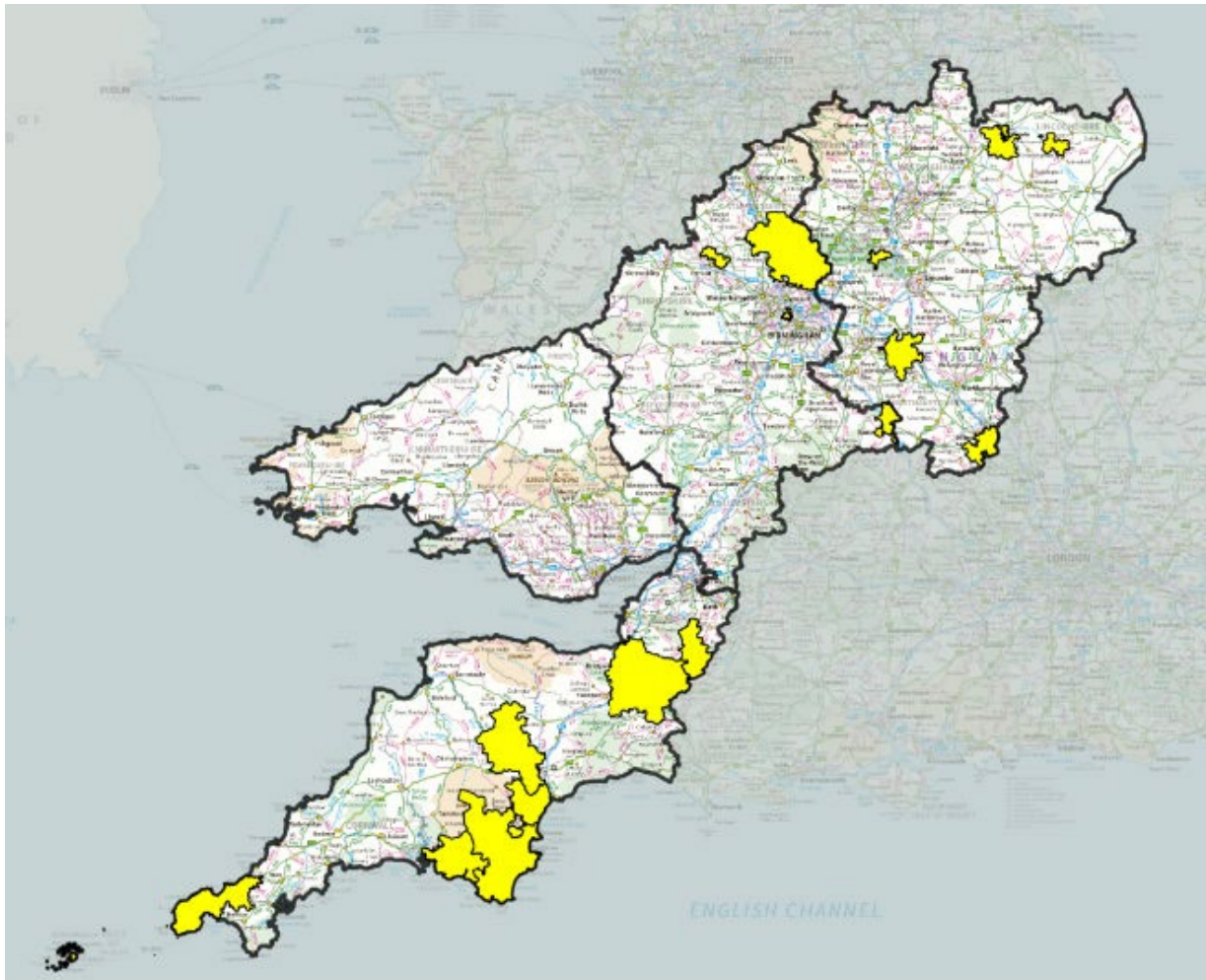


At a more local level, since July 2017, WPD has partnered on Centrica's Cornwall Local Energy Market (LEM) project, which is developing a virtual marketplace for flexibility services across the Cornwall region. The Cornwall LEM project is targeting both business and residential customers and is providing new technology solutions to enable flexibility and help unlock new revenue streams for customers.

## 8. System Operator in detail – our work to develop DSO functions

### Market development

WPD's Flexible Power website provides a map of the CMZs location, a postcode finder to allow potential suppliers to confirm their site is within the CMZ and the operational window the demand response will be required in.



The operational window details; the time of day, day of week and month of year, MW change required and a forecast of the total MWhs. Operational windows will generally be seasonal to support the constraints within the summer and winter demand peaks.

To ensure that WPD is able to stimulate market participation through multiple routes, we are enhancing Flexible Power to provide better market integration.

[www.westernpower.co.uk/network-flexibility-map](http://www.westernpower.co.uk/network-flexibility-map)

These actions are going to be completed during RIIO-ED1 and include:

- **Availability of geographic and postcode information for platforms to pre-qualify and validate flexibility assets (completed 2021 on our Connected Data Portal - <https://connecteddata.westernpower.co.uk>).**
- **Standardisation of visibility and forecasting data for hosting on flexibility platforms (implemented).**
- **Automated, machine to machine processes for qualification of assets through third party platforms (Q3 2022).**



## 8. System Operator in detail – our work to develop DSO functions

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### Our system operator projects

#### Network analysis for DSO

This project implements a set of new applications that support the increasingly complex analysis of network requirements and optioneering of solutions.

Traditionally, DNOs have analysed and planned the network against set of relatively certain external parameters such as future load growth. However, the range of scenarios for future growth of EVs, heat pumps and distributed energy resources means that there is a requirement to carry out multiple sets of network analysis against the range of future energy scenarios. In addition, there are more network solutions available; WPD has a suite of smarter or flexibility based solutions which could be used instead, or in conjunction with, conventional network infrastructure upgrades.

We will need to increasingly carry out more technically complex studies. Such analysis, optioneering and optimisation will be supported in RIIO-ED2 by a new set of applications.

The applications will bring together time series data for measured points on the network, DER and DSR metering data and ANM/Intertrip/Protection schemes data and provide the capability to assess all the requirements together to understand where there are network constraints that require additional capacity.

#### Stability analysis

Traditionally, there was a large amount of inertia within the power systems, with large turbines at large power stations spinning at high speeds.

This stored energy is particularly valuable when a generator fails as the spinning reserve can make up the power lost thus maintaining the stability of the network. However, the closure of numerous coal fired and large power stations and move to more intermittent distributed energy resources with an inherent low inertia operation. This impacts the dynamic behaviour of the grid as the amount and characteristics of the inertia is changing with more of it being connected to the distribution networks.

DNOs have traditionally not had to model for stability conditions on the system, but as the energy system changes, a lower inertia power system may place additional constraints on distribution network operation.

When generation meets demands and all necessary conditions such as voltage and frequency are maintained, the system is stable and balanced. However, any mismatch or excursions outside required parameters can cause generators or circuits to trip, which can then cause other issues and further trips.

The project will understand and model sub-second voltage collapse conditions and how these may drive requirements on how distribution network operation can support the voltage stability of the system.





## 8. System Operator in detail – our work to develop DSO functions

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### Our system operator projects

#### Planning state estimation

State estimation is used to provide a view of the network configuration and operational status, informed by a set of measurements and data. Within a planning context it is used to determine representative characteristics of the network to allow network planning and development decisions to be made.

Increased network monitoring and new sources of data mean that there is greater scope to improve state estimation for planning purposes and also the various data sources can be used to cross check each other and identify data anomalies.

This project will seek to merge the data streams from more accurate real time monitoring, current/historical network configuration topologies and alternative sources of network data to improve state estimation being used in network planning.

Inconsistencies, errors and inaccuracies can be identified through the state estimation modelling and these issues can be fed back for resolution in the core systems to improve data quality and reliability.

#### DFES data architecture and systems

Distribution Future Energy Scenario (DFES) work completed within WPD uses data from local authority and other key local stakeholders, supplements it with market information on technology roll out and allows national energy system predictions to be regionalised, informing WPD investment plans and requirements for additional network capacity.

As the importance of this data increases in identifying network needs, driving flexibility markets and having more of the data shared for third party use, a productionised data architecture needs to be adopted to ensure the DFES process is more efficient, consistent and repeatable providing information that is accurate and accessible.

DFES data architectures will need to be designed around third party access to the datasets. To enable this, there may be a requirement for performance aggregation, anonymisation or other reporting functions on this data before making it available publicly.

This project will also develop the systems to facilitate this.





## 9. Distribution system operation enablers in detail – our work within the DNO to support DSO

### Planning and network development

**On the HV (11kV and higher) networks, full network visibility down to primary substation level will allow WPD's ANM systems to minimise the amount of curtailment customers are subject to, while maximising asset utilisation and maintaining network security.**

On LV networks, monitoring of Distribution Substations will ensure that network reinforcements are carried out when and where they are needed. It will also provide the necessary data to enable 'smart' solutions to be deployed where required to further optimise asset utilisation.

In addition to providing WPD with the necessary real time data to actively manage its network, the installed monitoring will also provide shareable data to support emerging Flexibility markets. This data can be further augmented with smart meter data to provide network information where monitoring is not available. We have estimated that a feeder requires 80% of customers to have smart meters fitted for it to provide a reasonable representation of the whole feeder.

To check that this estimation is correct we are comparing the smart meter data to data for the whole feeder from monitoring equipment installed at the substation. We are testing a range of densities from 60% to 100% to identify the appropriate level of density that provides a reliable indication. This will help us to refine the generic assumption used for planning and open up the opportunity for bespoke analysis for each feeder based upon its own profile.

In addition to monitoring load flows and voltages, WPD will increase its monitoring of power quality. This additional information will further facilitate the connection low carbon technologies (LCTs) while ensuring the network outages resulting from excessive harmonic distortion, for example, are avoided. Full details, including costs and benefits, of WPD's approach have been published in our Network Visibility Strategy.

Data sharing in a fast and efficient way becomes key as more data sets interact. We will ensure that our planning data is made available in a standard format to increase the efficiency of data sharing. We will use the Open Networks project to ensure that our approach is coordinated with other network and system operators.

There are a range of changes that are required to improve our data management we view this as a journey where we need to track and measure our progress to ensure we continue to focus in the right areas. We have already demonstrated improvements in our data management processes through targeted project activity to understand our data sets, lineage, and business and third party use. We recognise the need for a consistent approach to data management, delivering standardised and effective processes to share data with other network licences and wider customers and stakeholders.

We continue to collaborate with all other network licensees through ENA to establish common data descriptions, metadata standards and approaches to sharing data to ensure that a standardised and interoperable process is taken forwards. We have demonstrated leadership in this area as the first GB DNO to share its complete asset and connectivity data, above LV, in Common Information Model (CIM) format.



## 9. Distribution system operation enablers in detail – our work within the DNO to support DSO

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**Historical information can help customers and participants forecast future demands, and our historical data will be made available in a proprietary form, such as PI Historian or other time based data store. Visualisation of data is key to ensure that it is used and gains maximum leverage in the transition to net zero.**

We have already undertaken a number of digitalisation and data enhancements aligned to these principles including adoption of the Dublin Core metadata standard. Dublin Core means that data is presented in a discoverable and accessible form (e.g. information maps, guiding users to key network and supporting information); establishing data governance roles and implementing a data triage process.

Our external engagement recognises that different users have different needs and expectations of the same data. That means that ensuring the right data is available in the right format at the right time will lead to different formats at different times to serve different users.

Customers can self-serve this data using our interactive maps and download features. The base data is also available to download for use in third party models and systems. Improving and increasing data management acts as the backbone to drive insight both internally and externally to meet current and future system needs. Standard processes for creating, managing and handling data through a robust data

governance process has been implemented and will continue to be developed; investing in solutions to improve our data quality; and ensuring we have a 'single source of the truth'.

Our online data hub is already home to many sets of network data and information. We recognise the needs of different data user types vary and therefore for each relevant dataset we commit to sharing data in three principle formats to deliver usable and valuable data to as wide an audience as possible.

Easy to use and visual data representations, such as interactive heat maps of network capacity data, provide the direct route to answers for non technical data users. Downloadable, standardised and interpretable data provide opportunities for data users to interrogate data and drive their own insight and value, different to that presented in visualised representations. At the most interactive level data automatically presented to technical data users through application programming interfaces (API), focused on regular and repeatable data to, for instance, inform real time dispatch detail for aggregators and flexibility providers.

### Promote operational network visibility and data availability

**We have already established the ability to share our network information through the standard CIM format.**

This allows other operators and stakeholders to run their own modelling and simulations against our base network.

Some outputs, such as losses recorded at substation level, will rely on third party projects such as the roll out of smart meters so we will develop solutions to make use of these projects as they complete. This visibility will cover real and reactive power, for both import (demand) and export (generation) connections. As well as ensuring the power flows on the network are monitored with high granularity, our systems will allow the energy distribution patterns to be recorded and traced.

By viewing energy flows on a temporal basis, we can forecast requirements and ensure the network is proactively managed in an optimum way. Complex data analytical tools will be deployed to allow us to visualise and interrogate the data. We will share the results of this enhanced visibility with customers, their energy suppliers and the ESO.

Our implementation and continuing management of a data catalogue will provide regular and reliable single point access to trusted data in a timely and effective manner.

This will also facilitate a single self-service environment to its users that help them to find, understand, trust and manage data. Further, it will be clear to all data users within the organisation what each piece of data means, how it is collected, and how to use it effectively.

We use a common data triage process to assess the openness of data. This is applied to assess data classification and determine whether anonymisation or redaction is required to enable the data to be shared.

This results in either open, public, shared or closed classification. A summary assessment is published along with the dataset to provide stakeholders an explanation of the data classification.

## 9. Distribution system operation enablers in detail – our work within the DNO to support DSO

### Promote operational network visibility and data availability

Traditional approaches to providing connections require customers to fund a proportion of the network reinforcement costs where additional network capacity is required. At higher voltages this work may also take a number of years to deliver. For new connections this poses delays and costs.

WPD has developed a suite of flexible connections that offer the opportunity for the connection to be made at lower costs and with quicker timescales recognising some form of curtailment may be required at times of high network loads. Our flexible connections suite has developed options in two areas for customers seeking to connect to the grid. A timed connection offers a very simple way of acting flexibly, without the need for communications or monitoring. Timed connection customers schedule their load to avoid specific times.

Load managed connections make use of ANM technology to control generation or demand behind single or more complex constraints. These are particularly useful in areas of constraint as an alternative to network reinforcement. Flexible connections control network access and are administered by the DNO. They are not used to provide more capacity by the DSO.

#### Enhanced network visibility and monitoring

using...

Understanding how the network is performing is key to the efficient use of the network, so data from sensors and measurement devices is required at more places in our network. Existing maximum demand sensors will need to be augmented to offer power flow direction and other metrics. At LV 15,500 of the highest priority substations, based on likely installed capacities will have monitors installed. At HV in order to facilitate the connection and active management of renewable power generators and energy storage installations, WPD will ensure that it has 100% visibility of the power flow on it's network at all 1,800 of its primary substations, as well as monitoring power quality at key locations.

#### Smart meter data

to enable...

This data will be further augmented with smart meter data to provide network information where monitoring is not available. We will utilise smart meters at every opportunity to:

- Enhance and refine our network planning models (particularly on low voltage networks).
- Improve power cut response services.
- Prevent faults by analysing smart meter data to proactively identify potential network issues.

#### Smarter, more flexible networks

We will oversee a network wide deployment of flexibility, avoiding £94 million of conventional reinforcement by maximising the utilisation of the existing grid. We will offer a suite of flexibility products to ensure that we can maximise the utilisation of the existing grid by funding customers to provide import/export capping at key times of network constraint as an alternative to conventional solutions. We will only reinforce the networks when these solutions cannot deliver what is required

## 9. Distribution system operation enablers in detail – our work within the DNO to support DSO

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### Facilitate efficient dispatch of distribution flexibility services

**Whilst interoperability of systems is important, it is also worth noting that the WPD network management tool is established, so proprietary systems are inevitable in network management.**

It is important, however, that these systems can manage interfaces with generic systems. We will ensure that our instruction infrastructure can communicate with third party systems.

Although our ANM systems do not provide a DSR response, we have followed the same ethos and openness. Our PowerOn system already interfaces with ANM systems from two providers and is able to interact with other platforms.

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### Provide accurate user friendly and comprehensive market information

**We are committed to continuing to build on our significant work to date digitalising our business to ensure that we remain an efficient and effective operator of our network and deliver data and solutions in the right format, at the right time to customers and stakeholders to meet their needs and ambitions.**

Our core principles are and will remain improving data management, increasing network insight and operation and ensuring data is presumed open.

Data provision in a useful format is essential and we will develop systems that can integrate through API links and machine readable formats. The information must be easily accessible and navigable. We will tailor both their information provision and

engagement approaches to reflect different needs of potential market participants, including groups in vulnerable situations.

Our core principles are and will remain improving data management, increasing network insight and operation and ensuring data is presumed open. These principles ensure value is driven to all parts of the energy industry and wider, supporting the net zero transition.

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### Embed simple, fair, and transparent rules and processes for procuring distribution flexibility services

We will investigate the additional arrangements that are required to support DERs and the ESO in a more real time automated basis.

We are committed to making sure that our data is both discoverable and searchable. This means that we will continue to collaborate with wider industry to ensure that data, irrespective of organisation, has the same meaning, format and description (metadata and data dictionaries). We continue to collaborate with all other network licensees through ENA to establish common data descriptions, metadata standards and approaches to sharing data to ensure that a standardised and interoperable process is taken forwards.

We have demonstrated leadership in this area as the first GB DNO to share its complete asset and connectivity data, above LV, in Common Information Model (CIM) format.

Presuming our data to be open goes beyond making it available through our systems and services. Our role is to enable data to be harvested, housed and utilised irrespective of specific access point. Our implementation of APIs and Client URLs will ensure that this is available and appropriate. Our ENA wide work on the creation of an energy digital system map for GB has demonstrated our commitment to and the availability of our data to serve this purpose.



## 9. Distribution system operation enablers in detail – our work within the DNO to support DSO

### Our distribution system operation projects

#### Project – improved network monitoring and power flow sensing

Over the last decade, we have seen a significant change in the nature of connections to the distribution network. Historically, generation was dominated by large, mostly fossil fuel powered thermal power stations connected to the transmission system at 275 and 400kV.

Power was transferred from the transmission system to consumers via distribution system Grid Supply Points (GSPs) at 132kV and down, ultimately, to 415V (LV).

Building a network to cope passively with new potential peaks and possible reverse power flows would be very costly and inefficient. However, many of the new LCTs being installed offer their own opportunities to mitigate their impact – for example battery storage systems and electric vehicles can be used to ‘soak up’ excess generation in order to reduce levels of reverse power flow, while incentives in the form of price signals can encourage customers to modify their consumption patterns in order to reduce peak levels of demand.

Such adoption of ‘smart’ technologies to actively manage load will have significant benefit to costs, reliability, and security of supply.

WPD will aim for 100% visibility of its 11kV and higher voltage networks by ensuring that directional power flow measurements are available at all of its primary substations. All new substations now require the necessary instrument transformers and transducers.

In total, approximately £35 million will be spent by the end of the RIIO-ED2 price control period, with substations prioritised according to need – those within active ANM zones and/or with significant alternative connections as well as areas of the network being supported by DSR (flexibility) contracts.

While also beneficial to WPD in optimising its network design and reinforcement activities, the largest benefit is likely to be to the industry (and society) as a whole. The value of generation that will benefit from new connection agreements estimated at £123 million across the WPD network.

#### Project – automated data mastering solution

Throughout the business a level of automated data mastering, which is the central storing of data in a single location and sharing it, routinely, with other related systems. Into RIIO-ED2 and beyond there is a need to further increase this level of data mastering and implement increased automation, supporting our transition to a single source of data.

This will deliver operational, flexibility and performance improvement through the provision of improved quality, completeness and volume of relevant data internally and externally to enable optimised and new connection and flexibility services.

Given the evolving needs of customers and stakeholders, robust and validated data sets are required to deliver operational, planning and maintenance efficiency for customers and internal stakeholders alike. It also enables our human, processes and technological systems to operate effectively by delivery our business objectives.

Master Data Management (MDM) is a technology enabled discipline in which business and IT work together to ensure the uniformity, accuracy, stewardship, semantic consistency and accountability of the enterprise's official shared master data assets. Master data is the consistent and uniform set of identifiers and extended attributes that describes the core entities of the enterprise including customers, prospects, citizens, suppliers, sites, hierarchies and chart of accounts.

Using modern approaches to ensure this consistency between systems is crucial in achieving our business goals and ensuring that data can be easily accessed, shared and utilised throughout the organisation and externally, enabling the effective operation of DSO services.

This project will facilitate multiple outcomes with a number included below:

- **CIM available internally and externally to drive consistent understanding over assets and connectivity to improve operations.**
- **Enabling single source of truth data to enable LV to EHV self-serve design functionality improving connections and flexibility service provision.**
- **Automated data sharing, such as in ICCP format to National Grid and other DNOs.**

## 9. Distribution system operation enablers in detail – our work within the DNO to support DSO

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### Our distribution system operation projects

#### Project – time series historian analysis system

During RIIO-ED1, much effort has been spent on increasing the reliability, quality and dependability of our time series data within our systems and we have shared a significant element of this in real time.

RIIO-ED2 is the right time to ensure the same is true of time series data between systems, such as our Advanced Distribution Management System (ADMS), smart metering and LV monitoring data; this will ensure that we can both maximising the value of our time series data internally to further optimise short and long term planning and operational decision making as well as providing increased granularity of real time data to customers and stakeholders to support improvements in their planning, operational and flexibility decisions.

We recognise that customer and stakeholder needs are dynamic, and always changing. We also recognise that to deliver excellent customer service, societal, environmental and system reliability we must create value for money throughout our decision making processes. Using high quality, high resolution and confident data sets.

As we increase the amount of data regarding customers, assets and operations this future capability, namely to make timely decisions with high levels of confidence becomes ever more important and providing that to customers to do the same. As does our ability to contextualise and govern high volume data sets, ensuring that high quality data is informing our decisions processes. In order to facilitate the next step change in our journey to make more informed, more confident and more assured operational decisions we are looking to develop the capture, collation and utilisation of time series data from across our various systems.

This project will facilitate multiple outcomes with a number included below:

- **Real time and historic time series data available openly to at least primary substation level and LV where appropriate.**
- **Enabling real time flexibility data for scheduling and settlement purposes.**
- **Facilitating a fully enabled flexibility management system.**
- **Optimisation of integrated DNO and DSO operational systems.**

#### Project – open cloud data platform

Our work to date enabled us to be the first DNO to make an online data catalogue available, providing access to our datasets in a common location, with standardised definitions and descriptions to ensure the data is usable and interoperable.

Our current network operations and future operation plans are reliant on robust, reliable and transparent data to continue delivering exceptional services. Sharing this data through a secure, interactive Open Cloud Data Platform will provide benefit to customers and stakeholders to be make more informed decisions.

Delivering on the net zero overarching governance, changes are required to both energy usage and delivery, as well as, more imperatively, to ensure that the data that drives these changes is effectively utilised.

Building on our initial data portal, the implementation of an Open Cloud Data Platform will enable the ability to share datasets quicker, reduce the risk of data errors through the reduction in the requirement for human interaction and developing and implementing a framework embedded in a cloud architecture.

This improved method of providing data to the customers will unlock opportunities for new processes to be developed, resulting in there being an expansion in the services and network activities that are facilitated.

This project will facilitate multiple outcomes with a number included below:

- **All data centrally accessible and described consistently ensuring it is standardised and interoperable from asset information to operational data to ensure open and fair flexibility services.**
- **Historic and database level data accessible to meet the needs of a wide range of user types.**

## 9. Distribution system operation enablers in detail – our work within the DNO to support DSO

### Project – Internal Data Platform

Implementation of an Internal Data Platform to provide a centralised process for data systems to transfer data, which staff can trust and utilise across different systems and environments to continue to move away from a decentralised, historic knowledge based culture and ensure that we deliver a data centric approach as an organisation.

Linked to automated data, mastering the central storage and utilisation of data will be a critical step in meeting future DSO requirements and accessing benefits.

At the same time, it will enable a move to probabilistic based asset and network operation. It will ensue that the business is set for the future, enabling more effective decision making, and overall trust within the business regarding the accuracy and validity of data used in these decisions.

This solution is fundamental to delivering multiple outputs as described above, as well as outcomes, such as:

- **Developing DFES data architecture and systems.**
- **Planning state estimation solution implemented.**
- **Network analysis for DNO and DSO functionality.**
- **Enabling real time flexibility data for scheduling and settlement purposes.**
- **Facilitating a fully enabled flexibility management system.**
- **Optimisation of integrated DNO and DSO operational systems.**



# 10. Digitalisation Strategy: digitalisation chapter

## Digitalisation and data at the core of DSO

Operating a smart and flexible network for our customers and stakeholders requires a DSO function powered by digitalisation and data. Our DSO capability is a neutral facilitator of markets, one that enables the net zero transition whilst maintaining a resilient and affordable system. Ultimately, the purpose of developing our DSO function is to enable our customers to actively participate in, and benefit from the energy transition.

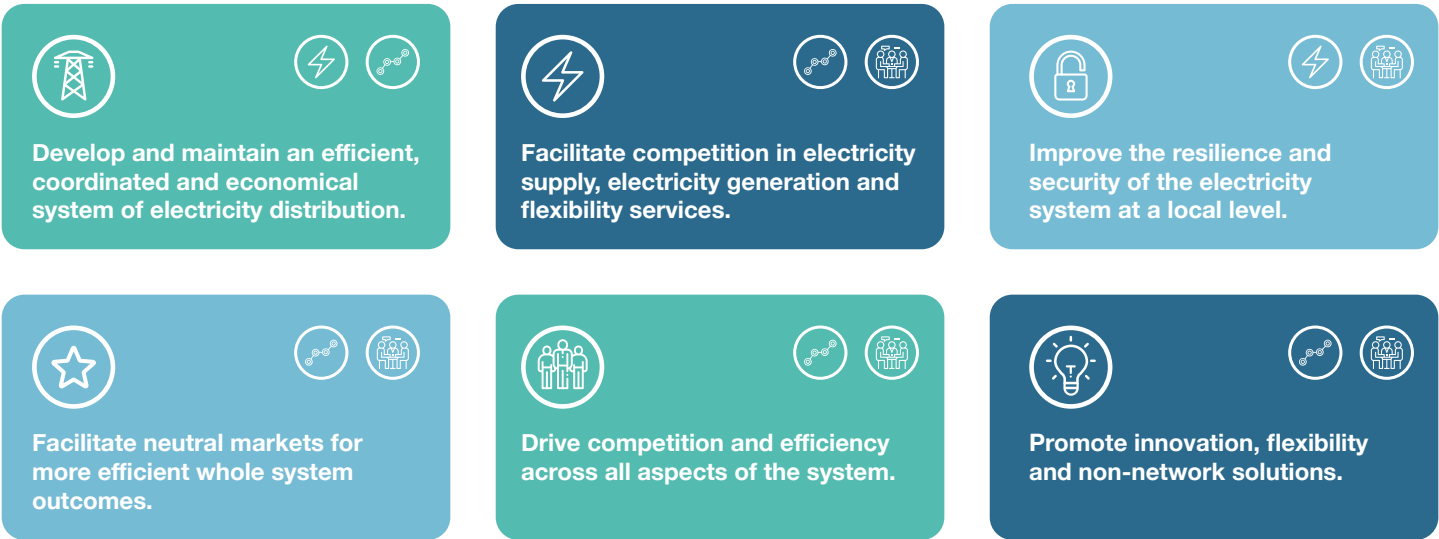
The most effective way of delivering the transformation needed for DSO is to embrace digitalisation and data best practice principles, as this delivers better outcomes for customers and stakeholders. There are several examples of digitalisation and data delivering better outcomes for customers and stakeholders in other industries:

- Optimised travel plans and better view of journey options through mobile applications built on open rail data.
- Saving money by sharing financial data with third parties who can offer better credit card options or personal loans, enabled by open banking data.
- Single identity and sign in process for accessing government services from different departments (For example, the NHS, DVLA, local council, passport) through open government data sharing.
- Quicker Covid-19 vaccination roll out by sharing of patient data between the NHS, vaccination taskforce, local authorities, and GP records.

We have meaningful investment to facilitate DSO in our Digitalisation Strategy and action plan, which reflects our ambition to be the leading DSO in the UK going significantly beyond Ofgem’s baseline expectations. Our Digitalisation Strategy and action plan is fully integrated with our DSO strategy to deliver the transformation needed for a smart and flexible network for our customers and stakeholders.

Each of the pillars from the Digitalisation Strategy (‘Improving data management’, ‘Increasing network insight and operation’ and ‘Delivering for stakeholders’) enable the DSO roles set out earlier in this document as follows:

Figure 14 Digitalisation strategy pillars



### Key

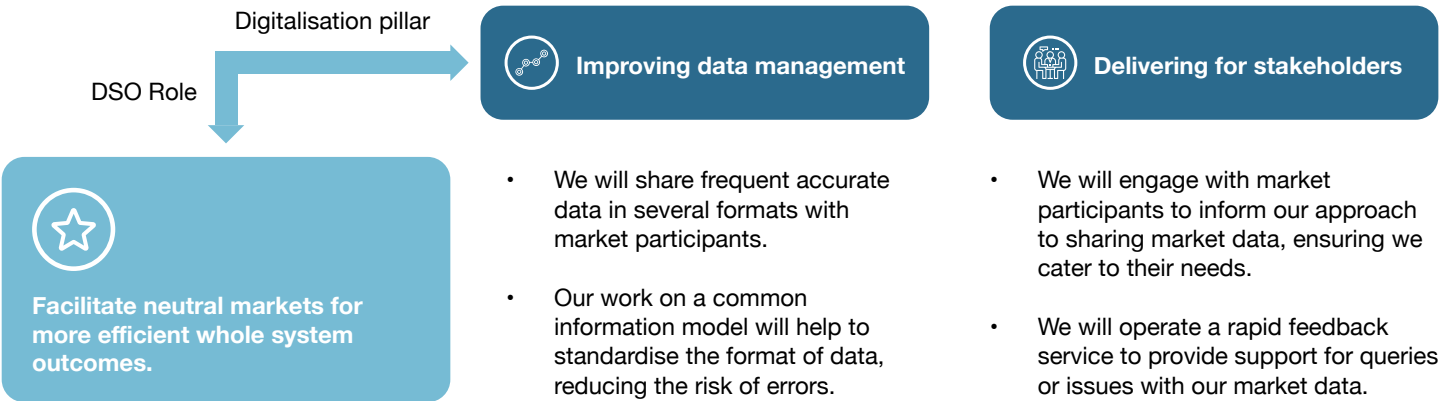




# 10. Digitalisation Strategy: digitalisation chapter

By integrating our strategies in this way, we are ensuring that our investments in digitalisation and data deliver business transformation and unlocks tangible outcomes for our customers and stakeholders. For example, the DSO role ‘facilitate neutral markets for more efficient whole system outcomes’ is enabled by the Improving data management and delivering for our stakeholders.

Figure 15 Digitalisation pillar - role of the DSO





# 10. Digitalisation Strategy: digitalisation chapter

## How our customer and stakeholder engagement has shaped our approach

Our Digitalisation and Data Strategy for enabling the DSO transformation has been shaped by our engagement with our customers and stakeholders.

We believe that this is critical for DSO, as many of the new roles and capabilities for DSO will involve us working even more closely with our customers and stakeholders as we enable them to participate in the energy transition. It will also mean working with new customers and stakeholders, such as flexibility aggregators.

Our customers and stakeholders have provided the following key feedback on our digitalisation and data strategy to enable DSO. We have carefully considered this feedback, and used it to shape our digitalisation and data approach for DSO as follows:

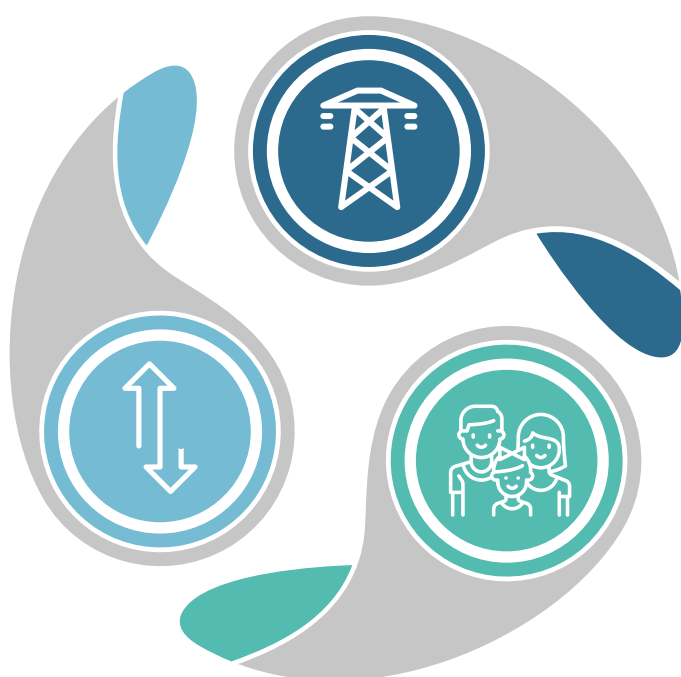
Customer/stakeholder feedback	How this has shaped our approach
A common data language across the industry would help customers make better decisions with their data	<ul style="list-style-type: none"> <li>We will continue to progress our work on a 'common information model' for the industry, which will provide a standard data language for all participants.</li> </ul>
Introduction of a customer satisfaction measure for open data	<ul style="list-style-type: none"> <li>Our connected data portal already has functionality to enable our customers and stakeholders to provide feedback on the quality of our open datasets.</li> <li>In RIIO-ED2 we will proactively survey customers and stakeholders to understand their satisfaction with our open data provision.</li> </ul>
Increasing customers 'Energy IQ' by making data more readily available	<ul style="list-style-type: none"> <li>We have introduced a Business Plan commitment 'Improve the accessibility and usefulness of data, tailored to individual customer needs and in the format of their choosing by making 60% of WPD's network data available via an application programming interface.</li> </ul>
Value of data beyond energy and industry collaboration	<ul style="list-style-type: none"> <li>We have an ambitious vision for our data to be used to deliver whole systems outcomes across sectors.</li> <li>We will collaborate on several whole systems projects over RIIO-ED2, and are currently part of the 'West Midlands Regional System Operator' project, exploring ways that better collaboration can help to decarbonise Coventry.</li> </ul>
Focus on self-serve design	<ul style="list-style-type: none"> <li>We will be delivering several new digital self-serve options, including for customer service enquiries, connections, and open data.</li> <li>We have introduced a Business Plan commitment: 'Provide a same day response for customers by introducing online self assessment tools for individual domestic low carbon technology applications'.</li> </ul>
Not leaving people behind in the transition to a digital, smarter network	<ul style="list-style-type: none"> <li>We have a Business Plan commitment to 'offer 1.2 million vulnerable customers a bespoke, smart energy action plan every two years'.</li> <li>We will also use our digital solutions to build an 'early warning system' of areas that are at risk of being left behind in the energy transition, perhaps due to network constraints, planned third party investment and housing stock.</li> </ul>
Moving to a smarter, digitalised network should not come at the cost of addressing existing capacity constraints	<ul style="list-style-type: none"> <li>Our digitalisation and data approach for DSO includes investments in our data management to ensure that we have better data to predict where capacity constraints might be over the RIIO-ED2 period, and intervene early to give our customers better choice.</li> <li>Digitalisation and data also enable innovative connection offers, such as flexible connections which allow customers to connect to our network in areas of existing constraints.</li> <li>Therefore, we believe that digitalisation and data will help, and not hinder our work to address existing capacity constraints.</li> </ul>

# 10. Digitalisation Strategy: digitalisation chapter

## What a DSO function might look like in 2030?

Our ambition is to be the leading DSO in the UK, which means going significantly beyond Ofgem's baseline expectations.

We believe that digitalisation and data is the most effective way of delivering the transformation needed for DSO and making sure that DSO is an independent facilitator of markets and platforms. Therefore, we have developed a vision for the role digitalisation and data might play in a DSO by 2030 to make sure that our plans are sufficiently ambitious:



### Smart and flexible

- 90% of low voltage substations have enhanced monitoring equipment installed.
- Intelligent control centre uses artificial intelligence (AI) and automation to balance the network and dispatch DER.
- 100% smart meter coverage enables reduction in customer interruptions and minutes lost.
- Near real time forecasting available, using machine learning (ML) and external data to improve accuracy.

### Infrastructure

- Asset data quality monetised within the RAV.
- Data science, analytics and cyber security are core competencies.
- 25% of today's tasks are conducted by drones, robotics and AI.

### Customers and stakeholders

- 25% of customer base are participating in flexibility markets.
- Automated, API based data exchange with customers, partners and third parties.
- Customers are able to view their network usage and carbon footprint in real time.
- 60% of customer interactions are managed through self service channels.

## The case for change

The energy system is evolving from large scale centralised power stations to a more decarbonised, and decentralised electricity system where our customers are empowered to play a central role in our transition to net zero. WPD is also evolving to meet our customers' needs, taking on additional responsibilities as a DSO to transition from a traditional passive network, to a more active regional network where demand and generation are balanced locally. As our customers adopt LCTs or generate power more locally, we recognise the need for enhanced network planning and forecasting data to ensure our network can support any of our DFES pathways. We have a long established innovation portfolio under our Future Network programme, which has set the foundation for our DSO capabilities. For example, our OpenLV innovation project demonstrated how data can be used to support emerging flexibility solutions. The project gathered around 15 million data points each day and provided access to local communities, allowing customers to harness this data to advance their net zero ambitions.

# 10. Digitalisation Strategy: digitalisation chapter

## Our vision for the future

We already publish network data including long term (up to five years) and shorter term forecasting (up to two years), which is up to two years and based on a greater certainty of flexibility needs. In RIIO-ED2 we will significantly expand our market data provision across a range of timescales to optimise short term and longer term markets. We will use ML and AI to determine the optimal contract lengths for our market participants. We will provide a more granular level of network data than today, including directional power flows, asset capability (design ratings and health/condition), network configuration and present and historic operation. This granular network data will be enabled by deploying the next generation of sensors on our LV network and utilising smart meter data, which are core elements of our new Network Visibility Strategy. We are investing in our planning state estimation and data historian platforms, which will enable us to consolidate all our real time data sources into one place, including SCADA, monitoring, and smart meter data. This will equip our operations staff with 360 degree network visibility, to improve operational decision making and improve our long term network planning processes.

This improved network visibility and insight will enable us to work much more closely with National Grid ESO, ensuring that flexibility dispatch decisions are made in the interests of the whole system. We will share granular network data on timescales, network operation, flexibility procurement and flexibility dispatch with NG ESO using standardised and automated data exchange methods. All our improved network and market data will be automatically stored on our Open Cloud Data Platform. Market participants will access this data through a range of self-serve options including interactive maps and raw data. We are also planning a significant upgrade to our DSR operational systems to automate process and workflow, and develop APIs which will allow market participants to interact with us using automated data exchanges.

Finally, our Innovation Hub will facilitate greater collaboration, as we work with third parties to test and trial new ways of working in a controlled, development, environment. For DSO, this could be the provision of market support services for flexibility management.

## Benefits for customers

During RIIO-ED1 we have been able to use more than 590 MWh of flexibility, resulting in savings of over £40 million in reinforcement costs for our customers. We anticipate a significant expansion of the use of flexibility over the RIIO-ED2 period.

Improving the frequency and granularity of our market data will reduce assumptions and drive increased competition in flexibility markets, lowering costs for customers and increasing resiliency by providing improved flexibility options. Closer collaboration with NG ESO will reduce costs for customer by improving whole system decision making, and reduce the risk of any conflicts. Introducing our Innovation Hub will drive the creation of new, innovative services in the future, such as vehicle to grid flexibility models which will enable easier and increased access for our customers to participate in flexibility markets themselves.

## How digitalisation and data will enable us to exceed Ofgem's DSO baseline requirements

Our digitalisation and data strategy plays a key role in enabling us to meet each of Ofgem's DSO baseline requirements, as illustrated in the tables below. Note, the descriptions of some of the baseline requirements have been shortened for conciseness.

# 10. Digitalisation Strategy: digitalisation chapter

## Role 1: Planning and network development

1.1.1	DNOs to define and develop enhanced forecasting, simulation and network modelling capabilities, with processes in place to drive continual improvement to meet network and users.
1.1.2	We expect DNOs to submit a network visibility strategy and this should cover the use of all sources of network data including direct measurement from monitoring roll out, smart meter data, data analysis and modelling, and any other third party data sources.
1.1.3	DNOs to have in place standard and effective processes for sharing network planning information with other network licensees, including ESO, network users and other interested parties.
1.1.4	DNOs to have in place transparent and robust processes for identifying and assessing options to resolve network needs, using competition where efficient.

### Our Digitalisation Strategy and Action Plan

- We are investing in a state estimation platform, which will use SCADA data and measurement data from our sensors to improve our understanding of the operation of our network. This platform will be used to improve our long term planning processes to meet network and user needs.
- We are also enhancing our data historian platform, which will include consolidating smart meter data with data from our next generation of sensors. The data historian platform upgrade will be hosted on the cloud, and forms a central part of our network visibility strategy.
- Finally, our open cloud data platform will ensure that we can share network planning information with all interested stakeholders, in common data formats and aligned to a common information model.

## Role 2: Network operations

### Activity 2.1: Promote operational network visibility and data availability

2.1.1	DNOs to improve network visibility and identification and sharing of operability constraints, including publishing this data to help avoid conflicting actions being taken by other network and system operators. DNOs must take reasonable steps to access and subsequently share, including by publishing, data and operability constraint information in a timely manner.
2.1.2	We expect DNOs to submit a network visibility strategy and this should cover the use of all sources of network data including direct measurement from monitoring roll out, smart meter data, data analysis and modelling, and any other third party data sources.
2.1.3	DNOs to provide the ESO with information across timescales about the DER it is planning to instruct to dispatch. Data should include contracted parties, availability, and information on scheduled and unscheduled utilisation.
2.1.4	DNOs to gather sufficient information on DER characteristics and parameters to provide information and inform decisions to secure against events that could lead to disconnection of DER.
2.1.5	DNOs to make available operational data that supports network users and other relevant stakeholders to make better decisions about how to use the network. Data should be readily available in agreed and common data formats.

### Our Digitalisation Strategy and Action Plan

- We are improving our network visibility through investments in our planning state estimation platform, data historian platform and next generation of sensors deployed to our LV network.
- These investments will consolidate SCADA, smart metering and other real time data from our network, giving us better network visibility including at the low voltage level and better insight on operability constraints.
- We will use our cloud data platform to share our improved network visibility data and operability constraints with market participants in common formats, including raw data, visualisation, APIs and the common information model format.
- Sharing this data will improve coordination with the ESO and provide better transparency for other market participants, stimulating more competition and improving their use of our network.

# 10. Digitalisation Strategy: digitalisation chapter

## Role 2: Network operations

### Activity 2.2: Facilitate efficient dispatch of distribution flexibility services

2.2.1	DNOs to have and regularly review a decision making framework for when DER are instructed to dispatch in real time. The decision making process, including alternatives considered, should be transparent.		<b>Our Digitalisation Strategy and Action Plan</b> <ul style="list-style-type: none"> <li>• We are planning a significant upgrade to our DSP operational systems which are currently based on the Kiwi Power platform.</li> <li>• These enhancements will include automation and workflow, to reduce manual intervention and allow our employees to focus on more complex flexibility dispatch scenarios, or providing additional support to our customers.</li> <li>• We will also develop open APIs, allowing market participants to interact with us using automated data exchange methods, improving their experience and reducing barriers to entry.</li> <li>• Our enhanced DSR platform will be fully scalable and based in the cloud.</li> </ul>
2.2.2	DNOs shall facilitate secondary trading of distribution flexibility services and curtailment obligations. In this context, facilitating means providing the relevant operational data, ensuring the DNO has processes in place to collect the relevant data about the trade, and making the operational parameters clear.		
2.2.3	DNOs to introduce clear processes for the design, development, and communication of the decision-making framework. These should include transparent and participatory processes for stakeholder input.		
2.2.4	DNOs to develop efficient, scalable dispatch instruction infrastructure and avoid proprietary system.		

## Role 3: Market development

### Activity 3.1: Provide accurate, user friendly and market relevant information

3.1.1	DNOs collate and publish as much relevant data and information as reasonable that will help market participants identify and value opportunities to provide network services to DNOs and take market actions that support efficient whole system outcomes.		<b>Our Digitalisation Strategy and Action Plan</b> <ul style="list-style-type: none"> <li>• We are investing an automated data mastering solution and internal data platform to improve our data management, data quality and ability to catalogue and describe our data sets in a way that makes it easy for market participants to understand them.</li> <li>• All of our market data will be published on our cloud data platform, which will provide market participants with self-serve options, and a range of data formats including raw data, visualisations, APIs and the common information model.</li> <li>• Our cloud data platform will enable us to tailor information provision to groups with differing needs, by giving them a choice of options for interacting with our data.</li> <li>• We will also continually engage with market participants, and use digital engagement methods such as community forums and analysis of the popularity of data sets to inform future needs.</li> </ul>
3.1.2	DNOs should, with stakeholder input, develop robust strategies for how they will collate and publish more helpful information, wherever possible consistently and in coordination with other network licence holders, and communicate this clearly.		
3.1.3	DNOs should regularly and actively engage with market participants to understand what data and information is helpful to support market development.		
3.1.4	DNOs should, where reasonable, tailor both their information provision and engagement approaches to reflect different needs of potential market participants, including groups in vulnerable situations.		
3.1.5	DNOs should seek to ensure the information they publish is as accurate and unbiased as reasonable.		



# 10. Digitalisation Strategy: digitalisation chapter

## Role 3: Market development

### Activity 3.2: Embed simple, fair and transparent rules and processes for procuring distribution flexibility services

3.2.1	DNOs to have clear processes in place for developing and amending distribution flexibility services products, contracts, and qualification criteria, that are, wherever possible, standardised.		<b>Our Digitalisation Strategy and Action Plan</b> <ul style="list-style-type: none"><li>• All of our market data (including capacity and peer-to-peer trading data) will be published on our cloud data platform, which will provide market participants with self-serve options, and a range of data formats including raw data, visualisations, APIs and the common information model.</li><li>• We will test machine learning and AI optimisation of our long term and short term contract lengths, reflecting our network need, but ensuring that they are neutrally defined to allow for a range of flexibility providers to participate.</li><li>• Our Innovation Hub will enable third parties to engage with us and trial new ways of delivering market support services for DSO in a controlled environment which can be proven ahead of use in a production environment.</li></ul>
3.2.2	DNOs should identify the optimum combination of longer and shorter term lengths of markets and contract lengths reflecting the network need. Needs should be naturally defined, to allow for a range of flexibility providers to participate.		
3.2.3	DNOs should make available the necessary data to enable secondary trading, for example capacity and other peer to peer trading. Enabling includes defining, communicating and justifying the parameters in which these trades can take place for operability purposes.		
3.2.4	Market support services, such as pre-qualification, credit checking and settlement must enable simple cost efficient participation in markets. DNOs should enable, and never prevent, the opportunity for third parties to provide these services where they could do so more efficiently.		
3.2.5	DNOs to introduce other proportionate measures, developed with robust stakeholder engagement, to identify and address actual and perceived conflicts between its DSO and network ownership roles or other business.		

# 10. Digitalisation Strategy: digitalisation chapter

## What does this mean for our customers and stakeholders?

Ultimately, the purpose of developing our DSO capability is to enable our customers to actively participate in, and benefit from the energy transition. We have identified the key outcomes for customers delivered by each of Ofgem's DSO roles, and how these are enabled by our Digitalisation Strategy and Action Plan:

DSO Role	Digitalisation Strategy and Action Plan	Customer outcomes	How we will measure success
<b>Planning and network development</b>	We are investing in a state estimation platform, which will use SCADA data and measurement data from our sensors to improve our understanding of the operation of our network. This platform will be used to improve our long term planning processes to meet network and user needs.	<ul style="list-style-type: none"> <li>Bills will be kept lower by choosing the best option between flexibility and conventional reinforcement.</li> <li>Whole system planning will accelerate the net zero transition for customers, helping them to decarbonise their lifestyles, as soon as possible.</li> </ul>	<ul style="list-style-type: none"> <li>The use of our new platforms is embedded in the network development process.</li> </ul>
<b>Network Operation:</b> Network visibility and data	We are improving our network visibility through investments in our planning state estimation platform, data historian platform and next generation of sensors deployed to our low voltage network. These investments will consolidate SCADA, smart metering and other real time data from our network, giving us better network visibility including at the low voltage level and better insight on operability constraints.	<ul style="list-style-type: none"> <li>Customers will be able to connect more low carbon technology in areas that would have otherwise been constrained, or require further reinforcement.</li> </ul>	<ul style="list-style-type: none"> <li>Enhanced monitoring deployed at all primary substations for directional power flow.</li> <li>Directional power flow data added to our network maps.</li> </ul>
<b>Network Operation:</b> Efficient and economic distribution system	Digital platforms (combined with a new generation of sensors) will enable us to respond to changing network conditions and use flexibility as it is required.	<ul style="list-style-type: none"> <li>Less interruptions for customers at times of peak use of our network.</li> <li>Cost effective use of flexibility services keeping bills lower.</li> </ul>	<ul style="list-style-type: none"> <li>Dispatch infrastructure is scalable and complies with open standards, including APIs.</li> </ul>
<b>Market development:</b> Comprehensive market information	We are investing in an automated data mastering solution and internal data platform to improve our data management, data quality and ability to catalogue and describe our datasets in a way that makes it easy for market participants to understand them. All of our market data will be published on our cloud data platform, which will provide market participants with self-serve options, and a range of data formats including raw data, visualisations, APIs and the common information model.	<ul style="list-style-type: none"> <li>New, innovative services available to customers (For example, smart EV charging), enabling them to benefit from the energy transition.</li> </ul>	<ul style="list-style-type: none"> <li>Feedback from customer data portal is responded to within 1 week.</li> <li>Open data C-SAT from customers (via survey) is more than 4/5.</li> <li>60% of our network data will be available via APIs.</li> </ul>
<b>Market development:</b> Fair and transparent procurement	All of our market data (Including capacity and peer to peer trading data) will be published on our cloud data platform, which will provide market participants with self-serve options, and a range of data formats including raw data, visualisations, APIs and the common information model. Our Innovation Hub will enable third parties to engage with us and trial new ways of delivering market support services for DSO in a controlled environment which can be proven ahead of use in a production environment.	<ul style="list-style-type: none"> <li>More competition will result in lower costs for our customers when using flexibility.</li> <li>More competition also means a larger set of participants, which increases the resilience of our network for customers.</li> </ul>	<ul style="list-style-type: none"> <li>Feedback from customer data portal is responded to within one week.</li> <li>Open data C-SAT from customers (via survey) is more than 4/5.</li> </ul>

# Appendix A01 - Ofgem sector specific baseline standards for DSO

## Role 1: Planning and network development

WPD ref	Activity description	WPD meets	WPD exceeds
1.1.1.	<p>DNOs to define and develop enhanced forecasting, simulation and network modelling capabilities, with processes in place to drive continual improvement to meet network and user needs.</p> <p>We expect increased monitoring equipment to be rolled out across their network where it has demonstrable net value for network planning. We expect demonstrable value to include a rigorous presentation and analysis of needs and use of data for networks and non-networks parties, well established functional and technical specifications, and cost effectiveness analysis.</p> <p>DNOs should also explore all reasonable options to use data from third parties, including harnessing smart meter data subject to data sharing agreements, to improve their simulated forecasting.</p>	<p>Our master electrical models are maintained to reflect existing connected position, as well as a future pipeline of our connections activity. We have recently migrated out models to full switch-level models (SLMs) to enable advanced automated analysis techniques that will be required to deliver DSO solutions effectively. We will continue working collaboratively with other DNOs, GDNs and NG via RDPs to identify and address boundary issues and find the best Whole System solution. Taking a broader approach to whole systems, this also includes, transport planning authorities, transport operators and other major energy users identified in the areas.</p> <p><b>Output: EHV networks to be assessed using switch level model automation by May 2024.</b></p> <p>We were the first DNO to publish longer term forecasting in 2015, initially out to 2032, but latterly aligning with industry to 2050. Our DFES data is used alongside the customer behaviour to understand the electrical impact, which is then modelled in power system analysis software to determine constraints. Volume data is made available on our DFES map.</p> <p><b>Output: Annual DFES in December throughout ED2.</b></p> <p>Our Best View is a blended scenario built from DFES data at a granular level and informed by stakeholder engagement to determine the most credible scenario for the local authority area. We have set up process for how forecasting activities are used throughout the wider business, including regulatory reporting, business planning and flexibility.</p> <p><b>Output: By 2024, a DFES toolkit will be developed to provide external stakeholders the ability to use industry building block data to derive their own scenarios.</b></p>	<p>Through ED2 our modelling capability will be improved through new software functions with will build on our switch level modelling and enable active system solutions to be modelled to understand impacts and benefits above the level which traditional power system analysis software packages are able to provide, as it includes operational post-fault network behaviour.</p> <p><b>Output: May 2024's NDP will include a security and resilience assessment using the new tooling developed.</b></p> <p>We have been the first DNO to publish a comprehensive report on customer behaviour assumptions for all DFES technologies (2021), demonstrating we not only use data to inform modelling, but are able to provide the assumptions behind that transparently. The publication of our customer behaviour assumptions benefits other DNOs and stakeholders by providing valuable learning and encourages standardisation across the industry. This has been informed by a mixture of innovation project data and network monitoring data.</p> <p><b>Output: Ahead of ED2, DFES Customer Behaviour Assumptions report to be updated to include specific insights using data derived from smart meters.</b></p> <p>Our DFES volume data is already available externally via API on our Connected Data Portal.</p> <p><b>Output: DFES data available via API now at a local authority level. By 2024 granularity will be improved to LV substation level.</b></p> <p>We will work with stakeholders to ensure our forecasts are informed by and used by relevant stakeholders. We will use power system analysis techniques built in house to inform our Network Development Plan and use this to drive visibility and agility in our ED2 investment programme. This data will be used to present a consumer-friendly version of our investment requirements and capacity needs to customers.</p> <p><b>Output: Consumer-friendly version of investment requirements developed during 2024.</b></p> <p>We will use the annual update of the DFES in conjunction with stakeholder engagement to ensure we are forecasting the credible scenario range of local growth and feed this back into our constraint identification programme. Our investment will be kept agile, responding to net zero growth and delivering the capacity needed for any scenario using our ex-ante allowances and uncertainty mechanisms.</p> <p><b>Output: Every NDP consultation to support the identification of strategic investment based on stakeholder feedback gained from DFES engagement.</b></p> <p>We will develop a periodic backwards looking assessment to examine how accurate forecast uptake (in terms of volumes, energy and peak demand) has been to include in the DFES. Our DFES data will also be improved to provide energy consumption forecasts to be used by local authorities for the wider study of GHG emissions within the LAEP process.</p> <p><b>Output: LA electricity carbon content energy reporting to be available in Summer 2025.</b></p> <p>We have planned the necessary software and data development to enable us to run dynamic/stability analysis on the network to ensure that the increased connection of STATCOMs and equipment operating in voltage control or powerflow control are not going to cause stability issues. These outputs will be shared with generators and the ESO to support system operation.</p>

# Appendix A01 - Ofgem sector specific baseline standards for DSO

WPD ref	Activity description	WPD meets	WPD exceeds
1.1.2.	<p>We expect DNOs to submit a network visibility strategy and this should cover the use of all sources of network data including direct measurement from monitoring roll out, smart meter data, data analysis and modelling, and any other third party data sources. The strategy should explain how network monitoring for planning purposes will inform planning decisions, including the use of flexibility; clear justifications for where and when monitoring is rolled out, including explanations of any targeting for equipment deployment; and the specifications of equipment, including detail on the data captured, frequency of polling, and the mode of communicating data. Note, companies may wish to combine this strategy with network monitoring and visibility for network operations under role two.</p>	<p>WPD has published a Network Visibility Strategy which consolidates all monitoring solutions, both measured and derived. Where monitoring equipment is deployed it has a CBA related to the deferral of asset replacement which is realised with more granular detail on substation loadings and profiles. <b>Output: All monitoring proposed to be installed by March 2028 and installed volumes to be reported annually.</b></p>	<p>WPD is now routinely collecting smart meter data for all substations with more than 80% smart meter penetration. This data will be used to generate derived profile information for the substations. These profiles will negate the requirement to fit monitoring equipment until demand grows or external factors lead to installation. This layered solution allows us to make the most efficient use of smart meter data and measured data. <b>Output: Smart meter informed profiles will be updated and published annual under our DFES Customer Behaviour Assumptions report from the beginning of ED2.</b></p>
1.1.3.	<p>DNOs to have in place standard and effective processes for sharing network planning information with other network licensees, including the ESO, network users and other interested parties, for example to enable innovation and support the development of local authority and devolved government plans for decarbonisation.</p> <p>As part of this, we expect DNOs to liaise with their network users to collate and share data, to publish comprehensive and comparable heat maps that provide network users high value information about where to connect, and to inform their operations.</p> <p>These geographic information system datasets should be available for download or for access independently of DNO websites (for example, via Web Map Service server connections). Ofgem-led reforms to the LTDS will seek to licence minimum standards against these improvements.</p>	<p>We proactively engage with bordering DNOs to share network data to ensure model interactions are captured. This enables a Whole System assessment between DNOs to be undertaken, ensuring it provides best value to the customers. Evidence of this will be recorded on the Whole System coordination register. We take data provided by our network users (e.g. G99 form data) and accurately represent their equipment in the network model, this includes updating any new information on the back of other whole system efforts, such as the accelerated loss of mains protection change programme (ALOMPCP). <b>Output: Whole system coordination register updated annually through ED2.</b></p> <p>Through Open Networks we have established an LAEP library to store information gathered by licensees (gas &amp; electricity distribution) ahead of requesting this information directly, so commonality of data is facilitated. <b>Output: Reduce stakeholder fatigue by using the LAEP library throughout ED2.</b></p> <p>We have the existing week 24/42 data exchange with NG to share model data for planning purposes and the OC2 2-week ahead model from the ESO for operational and design stage planning.</p> <p>We will continue to engage with NG to get future and other seasonal loading NG equivalent models for increased accuracy of assessments.</p> <p>We have continually developed and improved our heatmap activity throughout ED1 and lead collaboratively activity to ensure that in ED2 a common metadata and data dictionary approach is taken for all electricity heat maps. We will integrate current and historic network data as well as committed and planned activity to ensure the most relevant and accurate detail is provided in a standardised format. <b>Output: Common metadata and data dictionary approach for heatmaps before end of 2023.</b></p> <p>Our current heatmap is available in three ways currently, highly visual, for download and via API, meaning it is accessible independently of our website. This has been demonstrated through the recent NESM activity through ENA. This ensures that we're delivering against the DBP principles and specifically, making data assets discoverable to potential users.</p>	<p>In developing the Network Development Plan output, we will exceed the minimum requirements by developing an 'NDP heat map'. This will increase the frequency and granularity of the proposed outputs and improve the Network Capacity visibility layer through a map. Network Capacity will be calculated, not just via a simple DC load analysis in excel, but will be out-performed by using robust electrical engineering analysis in power system software as an output and ensure consistent output with the connections planning processes. <b>Output: NDP heatmap available by May 2024.</b></p> <p>We were the first DNO to publish a CIM model of an entire licence area, demonstrating early commitment. Through ED2 we will improve the granularity, accuracy and coverage of our CIM data. <b>Output: CIM data available for EHV networks from now. By 2024, HV networks made available. By 2026, LV networks made available.</b></p> <p>The implementation of our Open Cloud Platform will provide an industrialised platform to store, access and utilise our heatmap and other relevant data. We will use this to create an energy data community to not just make data available in a technology agnostic manner but to drive collaborative energy sector and beyond insight from our and others' data.</p>



# Appendix A01 - Ofgem sector specific baseline standards for DSO

WPD ref	Activity description	WPD meets	WPD exceeds
1.1.4.	<p>DNOs to have in place transparent and robust processes for identifying and assessing options to resolve network needs, using competition where efficient.</p> <p>This should include demonstrable cross-sector engagement, optioneering, and planning with sectors or vectors other than their own.</p> <p>DNOs should consider flexibility and promoting energy efficiency in addition to innovative use of existing network assets and traditional reinforcement. The process of identifying options should include engaging with other network licence holders and current and prospective network users. Options must be fairly compared against one another, with flexibility used where it is economic and efficient compared to investing in traditional reinforcement or technological solutions.</p> <p>We expect a consistent approach for valuing flexibility, taking into account the option value it provides in the context of uncertainty. DNOs must ensure transparency in their approach to allow scrutiny of decision making.</p>	<p>During ED1, we have established internal and external flexibility related processes, both technical and commercial and we have demonstrated a robustness of process through internal audit being carried out. Through the end of ED1 and beyond, we will extend the audit process to include external audit and the scope of these will be expanded as standardisation of processes internally and across industry matures.</p> <p><b>Output: External audit of DFES in 2023.</b></p> <p>Our Sustain product for flexibility being considered as part of the C31E consultation process in late 2021 is a turn down to service, which allows reductions in energy consumption based on baselines derived from our standard network planning assumptions allows energy efficiency and flexibility to be treated equally in resolving potential constraints. Sustain will provide an ongoing revenue for customers providing lower contributions to demand peak compared to their peers, enabled either through active shifting or energy efficiency.</p> <p><b>Output: Sustain product specifically targeting domestic flexibility procured as business as usual before end of ED1.</b></p> <p>Through our procurement process, as detailed in our C31E statement, we run technology agnostic tenders to determine which flexibility options should be contracted with and at what cost. These costs are compared against a conventional reinforcement option to understand which the most preferential option is. The CEM (common evaluation methodology) tool is used which allows us to compare flexibility against other network capacity provision techniques and the results are published in our DNOA alongside the comparative analysis of other options, including the recommended investment strategy.</p> <p>To date we have published two iterations of our Distribution Network Options Assessment document which uses the industry developed CEM (common evaluation methodology) tool to provide insight into the chosen investment option. We've been the first DNO to publish a DNOA in 2020 which allows us to demonstrate the transparent approach to optioneering we are taking.</p> <p>Our approach to forecasting has taken into account the latent benefits of energy efficiency and non-DSO flexibility provided by supplier time of use tariffs and other market interventions not driven by WPD. The assumptions behind this have been published in our customer behaviour assumptions report for dissemination to third parties.</p>	<p>Through ED2 we will continue to develop our approach to engaging with network users, through a variety of channels, as set out in our C31E statement.</p> <p>Work with stakeholders to present capacity requirement and options in a way that can be easily integrated with wider LAEP process. Our DNOA document will continue to provide transparency of decisions and we will develop the information provided within the publication with our stakeholders and industry. The DNOA will be assured by our independent scrutiny panel, which is being implemented ahead of ED2. Through a robust governance process, we will ensure the panel has the relevant skills to methodically assess the independence and performance of the DSO. We've been the first DNO to publish a DNOA and have so far published two iterations, and we are supporting other DNOs in beginning to undertake DNOA analysis.</p> <p><b>Output: External audit of DNOA in 2024.</b></p> <p>Development of a specific energy efficiency flexibility product which enables payment for energy efficiency measures to be front loaded, will support improved uptake of these types of measures. Sharing our flexibility data and combining this with our Social Indicator mapping to better target fuel poor and vulnerable will assist in rolling out a fair and just transition.</p> <p><b>Output: Energy efficiency flexibility product developed before end of 2024.</b></p> <p>We will develop the DNOA outputs to be used to estimate the wider cost implications of energy system transition, for instance, incorporating DFES outputs into pricing runs to estimate future DUoS charges to deliver scenario pathways.</p> <p>Having procured the largest amount of DSO flexibility in the UK, we have a wide reach of active participants delivering flexibility products for us and ensuring we are developing a rich, competitive and deep flexibility market.</p> <p>We continue to monitor performance and manage the relationship through our Flexible Power Commercial Officers, who can support Flexibility Service Providers to improve their delivery efficacy. This ongoing dialogue also enables further operational barriers to be identified and improvements to be proposed.</p> <p>Our stakeholder engagement programme run through the C31E includes a number of formal and informal touch points for us to consult and consider views of market participants. This complementary mixture of engagement channels affords us the richest picture of how we have improved the value of our offering across adjacent customers, participants and system operators.</p> <p><b>Output: Comprehensive stakeholder engagement programme run throughout ED2 and reported on annually.</b></p>

# Appendix A01 - Ofgem sector specific baseline standards for DSO

## Role 2: Network operation

### Activity 2.1: Promote operational network visibility and data availability

WPD ref	Activity description	WPD meets	WPD exceeds
2.1.1.	DNOs to improve network visibility and identification and sharing of operability constraints, including publishing this data to help avoid conflicting actions being taken by other network and system operators. DNOs must take reasonable steps to access and subsequently share, including by publishing, data and operability constraint information in a timely manner.	<p>Planning timescale data on the system needs for flexibility is shared via our Connected Data Portal.</p> <p>We also share a retrospective monthly looking backwards review of availability and utilisation accepted and dispatched for every active CMZ on the Flexible Power website</p> <p>Our Regional Development Programmes in both South West and Midlands are supporting the work on operational data exchange with the ESO and the primacy work needed to ensure conflict between ESO and DSO operations is minimised our reduced.</p> <p>As part of the RDP work we are developing processes to share more data about the operation of our network, including the flexibility services we are using and our best view on ANM systems.</p> <p><b>Output: By the end of 2023, ANM operational data will be publicly provided in real time.</b></p>	<p>We will use our experience built up during the ED1 period as a DSO to support iDNOs within our region to also develop capabilities. This will include sharing processes, documentation and systems to support iDNOs with DSO activities.</p> <p><b>Output: Shared collaborative tools developed by end of 2025.</b></p> <p>We will continue to develop the learning found from RDPs to improve the data sharing needed between DSOs and ESO/FSO into ED2 to allow us to better share real time information, and coordinate in scheduling timeframes.</p> <p>Before the end of ED1 we will be publishing flex service dispatch actions taken on the network with pricing and cost data and updating this not just annually as per the C31E process, but in much shorter timescales, aiming for near to real time.</p> <p><b>Output: Data on flexibility service dispatch to be published as open data, in as close to real time as possible, ahead of ED2.</b></p> <p>We have published month ahead availability and utilisation forecasts on Flexible Power. We are developing the data tools to enable this to be a week ahead acceptance and scheduling activity which will be accessible in a machine readable format via API.</p> <p>Both aid with network visibility and providing data to avoid operational conflicts.</p>
2.1.2.	We expect DNOs to submit a network visibility strategy and this should cover the use of all sources of network data including direct measurement from monitoring roll out, smart meter data, data analysis and modelling, and any other third party data sources. The strategy should explain how network monitoring for operational purposes will inform operational decisions, including enabling the management and delivery of flexibility services; clear justifications for where and when monitoring is rolled-out, including explanations of any targeting for equipment deployment; and the specifications of equipment, including detail on the data captured, frequency of polling, and the mode of communicating data. Note, companies may wish to combine this strategy with network monitoring and visibility for network planning under role one.	See 1.1.2	See 1.1.2

# Appendix A01 - Ofgem sector specific baseline standards for DSO

WPD ref	Activity description	WPD meets	WPD exceeds
2.1.3.	DNOs to provide the ESO with information across timescales about the DER it is planning to instruct to dispatch. Data should include contracted parties, availability and information on scheduled and unscheduled utilisation. Sharing this information in a timely manner should enable the ESO to identify which DER are available for its own needs and improve the ability of DER to stack value across markets.	<p>Realtime power flows for our licence areas are already available via API on our Connected Data Portal. Month-ahead forecasts are published on the Flexible Power website to outline the expected windows of availability and utilisation needed for DSO operations in each active CMZ. <b>Output: Real time data available across all voltage levels by 2027, with industry leading coverage.</b></p> <p>The embedded capacity register is updated monthly and includes large generators or demand side response assets which are providing flexibility.</p> <p>Post-tender information is published regarding the contracted parties' assets and pricing. Through the RDPs we are working with the ESO on joint procurement and joint dispatch principles, as well as information exchange and visibility.</p> <p>Our procurement reports and post-tender award reports detail the MWs of flexibility contracted in each CMZ, along with the contracted party and pricing.</p> <p>We have designed our products to be as stackable as possible, acknowledging the benefits to participants and the DNOs. We will continue to engage with providers to investigate how to better align with the wider market whilst retaining value for WPD. This is tied to our C31E processes. We expect this work to feed into the Open Networks project and work on stackability, ensuring that products were able to be scheduled in adjacent timescales to most other industry flexibility products. <b>Output: Annual report on the stackability of flexibility services against other industry services.</b></p>	<p>Through our RDPs in South West and Midlands, the data exchange in both planning timescales and real time will be supplemented by co-developed primacy rules which will enable the DSO and ESO to jointly agree a merit order stack which will be the lowest cost solution to deliver the network capacity required for transmission and distribution needs. This will be trialled before ED1, but further developed and automated during ED2. Full rollout of this across the entire network and voltage levels will be put in place as the system becomes more active. <b>Output: By the end of 2023, service dispatch will be automated to industry principles.</b></p> <p>We will work with the ESO to make the sharing of planned DER dispatch a bilateral data sharing arrangement, enabling increased visibility of service availability and utilisation. Use of the ENA standard flexibility agreement may reduce the amount of flexibility procured as services can be jointly utilised. Our approach to joint procurement and dispatch will be developed in line with ENA Open Networks primacy principles.</p>
2.1.4.	DNOs to gather sufficient information on DER characteristics and parameters to provide information and inform decisions to secure against events that could lead to disconnection of DER.	<p>We already gather significant information around DERs connected to and looking to connect to our network to ensure we understand their operation to mitigate disconnection.</p> <p>We are committed to working collaboratively across the industry to increase consistently the level of information we gather around DERs and importantly move to a digitalised capture and interaction process with DER operators.</p> <p>The ALoMP activity has demonstrated the value of greater DER asset information and we will continue to expand our Asset Management System to capture greater levels of customer asset information.</p> <p>We will use our data platforms to continually assess DER connected on our network to understand its operational parameters and performance to inform our optimised operational regimes.</p> <p>Our Network Visibility Strategy encapsulates how these aspects will be effectively implemented in more detail.</p>	<p>To ensure the transfer and sharing of relevant DER characteristics and parameters we will implement an API solution appropriate for individual operators and large scale developers alike to automate as far as possible the sharing of relevant DER information and providing regular audit capabilities, e.g. generator protection settings and outage window information. <b>Output: API for generator characteristic data exchange by 2026.</b></p>

# Appendix A01 - Ofgem sector specific baseline standards for DSO

WPD ref	Activity description	WPD meets	WPD exceeds
2.1.5.	<p>DNOs to make available operational data that supports network users and other relevant stakeholders to make better decisions about how to use the network. Data should be readily available in agreed and common data formats.</p> <p>This could include, but is not limited to:</p> <ul style="list-style-type: none"> <li>• Working network configuration data.</li> <li>• Losses recorded at substation level.</li> <li>• Outages both planned and unplanned.</li> <li>• As recorded historic Feeder MW/MVA Utilisation and calculated headroom/footroom.</li> <li>• Utilisation and curtailment of areas under the control of capacity management systems such as Active Network Management systems.</li> </ul>	<p>We have led the UK DNOs in the adoption of the Common Information Model standard for network asset and connectivity data. Starting with the 2016 NIA project we have developed business processes to align data to the CIM standard. In 2020 we became the first UK DNO to utilise the CIM format to share network asset and connectivity data externally.</p> <p><b>Output: Throughout ED2 CIM data to be published and regularly updated.</b></p> <p>In addition, we have taken a number of critical steps to harmonise the terms used both internally and externally. For example, all data published via the Connected Data Portal has consistent metadata and data dictionaries (discussed in further sections) and we have standardised our process to ensure common terms are used wherever possible.</p> <p>We are committed to extending our use of the Common Information Model to include all our assets and network connectivity and we will continue to work with industry partners to agree on common terminology wherever possible. We will seek to identify, use and build on industry standardisation initiatives such as the Energy Systems Catapult (ESC) developed glossary and Open Energy.</p> <p>We have implemented the Dublin Core metadata standard, as recommended by the EDTF. This has meant that we already consistently capture our metadata. This has enabled us to drive consistency in the presentation of data externally as well as linking related datasets and common data tags to support data discovery. We recognise that the Dublin Core metadata standard is useful to standardise the capture of information around data, however, we know that even greater value can be delivered through the expansion of standard metadata elements. We are supportive of delivering these expansions as a wider energy sector community to ensure consistency remains and serves customers and wider data users' best.</p> <p>Our current data access, sharing and processes mean that we have made significant steps towards this, namely sharing of planned outage information for relevant market participants and customers, real time data at licence area and GSP level and this will continue throughout ED2 as well as increasing the granularity in terms of voltage levels and specific network points.</p> <p>Sharing ANM and Flexibility historic and live operational data will also ensure optimised DER operation. We will engage with our stakeholders and market participants to ensure this data is made available in the right format at the right time.</p>	<p>Medium and long term forecasting is now well established and throughout ED2 we will further invest in short-term forecasting, five to 60 minutes, to ensure that future DER operation is effectively considered in the operation of the network, link to weather and other factors to mitigate the risk of DER disconnection. This will be effectively supported through our Machine Learning and State Estimation Platforms.</p> <p><b>Output: AI derived short term forecasting implemented by the end of 2023.</b></p> <p>Making more data as visible and interactive for our customers as possible is key for the value of our data to keep increasing, therefore, we are committed to delivering greater data through visual means. This will include a centralised data mapping functionality with a number of overlays so the right information can be provided at the right time without the need to utilise often complex GIS systems. This will support new connections and flexibility propositions as well as data users such as local authorities; continuing to support their net zero ambitions.</p>



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## Role 2: Network operation

### Activity 2.2: Facilitate efficient dispatch of distribution flexibility services

WPD ref	Activity description	WPD meets	WPD exceeds
2.2.1.	<p>DNOs to have and regularly review a decision making framework for when DER are instructed to dispatch in real time. The decision making process, including alternatives considered, should be transparent. This should promote coordination across services (including curtailment as part of non-firm connection agreements and ESO flexibility services), maximise liquidity, avoid market fragmentation and ensure dispatch results in the best outcome for the whole system; this includes service provision to the ESO and other distribution networks.</p> <p>As part of this decision making framework, there must be rules in place for coordinating dispatch instructions for DSO and ESO flexibility services. This could be through primacy rules or more comprehensive optimisation processes that better enable stacking of revenues for DER. The rules should be transparent, objective, and promote whole system efficiencies.</p>	<p>We receive and utilise the NG OC 2-week ahead model for planning/operational purposes, ensuring our flexibility dispatch programmes are cognisant of any transmission outages.</p> <p>We were the first DSO to have published a pricing strategy, to foster the market in areas of low competition and drive greater competition in areas of over-supply of flexibility. Pricing and value is one element that is considered when accepting availability and dispatching utilisation for operational purposes.</p> <p>We were also the first DSO to develop and publish acceptance and dispatch principles which cover security, cost, operability, competition and fairness. We have done and will continue to update these principles based on stakeholder feedback and system operability requirements.</p> <p><b>Output: By the end of 2023, service dispatch will be automated to industry principles.</b></p> <p>We have published monthly data on flexibility dispatched per zone, for both availability and utilisation. Through ED2 we will expand this datasets, using our connected data portal, enabling this information to be updated more frequently and closer to real time, as well as being able to be machine readable and accessible via API.</p> <p>As part of the RDP work we are developing processes to share more data about the operation of our network, including the flexibility services we are using and our best view on ANM systems. Initial processes, based on the sharing of planning data and basic real time information should be in place by 2022.</p> <p>We will continue to develop this data sharing into ED2 to allow us to better share real time information, and coordinate in scheduling timeframes. We will explore how secondary trading might be supported in these areas.</p>	<p>As part of our integration of flexibility services we have now established an Energy Management Centre within the DSO. This ensures that the operational decisions to utilise flexibility and the choice of services selected maintains the same level of independence from the DNO as the original design decisions to address network constraints with flexibility. The Energy Management Centre will also take the lead on developing the interactions between the DSO and DNO for operational purposes. This will ensure efficient use of flexibility and lead to the development of new processes and products to enable the DNO to make use of flexibility to address other operational issues, whilst retaining the competitive market considerations within the DSO.</p> <p><b>Output: Energy Management Centre established ahead of ED2.</b></p> <p>As part of our C31E process we are seeing feedback on our proposal to develop longer term flexibility products. This will establish a deep and wide market framework for flexibility across ED2. These follow the same structure as our existing products acquired at the week ahead, with the key difference being that they will be acquired several months in advance. By acquiring some services further in advance we provide a greater degree of certainty to customers about the utilisation of their assets and reduce the operational risks we take into the week ahead process. These new products will also allow us to develop experience of the processes and data required to operate products in multiple timeframes and will build the knowledge we need to develop closer to real time products in ED2.</p> <p><b>Output: Long and Short term flexibility markets established ahead of ED2. Real time flexibility used for operational security in 2027.</b></p>

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WPD ref	Activity description	WPD meets	WPD exceeds
2.2.2.	The DNOs shall facilitate secondary trading of distribution flexibility services and curtailment obligations. In this context, facilitating means providing the relevant operational data, ensuring the DNO has processes in place to collect the relevant data about the trade, and making the operational parameters clear (and justified in the context of network reliability and efficiency).	<p>Our existing contracts for flexibility are novatable and secondary trading, with permission from the DSO, can be enabled manually. Our post-tender reports detail all contracts awarded and the parties involved with those contracts.</p> <p><b>Output: Secondary trading implemented manually before the end of ED1.</b></p> <p>We will develop more methods of sharing information around traded activity to stimulate secondary markets.</p> <p><b>Output: Data to inform secondary trading markets implemented as open data by end of 2023.</b></p>	<p>Our recent flexibility product evolution paper aligned to the C31E process explains our proposals for the delivery of basic secondary trading capabilities for flexibility services to be delivered in the next year. We expect this to help providers better manage any non-availability and potentially trade positions to more economically efficient, but less certain assets. We will continue to develop our capabilities into ED2 to deliver more digitised support to secondary trading markets.</p> <p><b>Output: Standardised processes for secondary trading implemented by end of 2023. Secondary trading automated through APIs in 2024.</b></p> <p>Based on our experiences from secondary trading of flexibility services we will then look at how to expand this platform to enable secondary trading of curtailment obligations in a fair and transparent manner. We will also explore if forecasting processes developed for identifying flexibility service requirements can be reworked to assess if curtailment obligations are required based on current expected network conditions.</p>
2.2.3.	DNOs to introduce clear processes for the design, development, and communication of the decision making framework. These should include transparent and participatory processes for stakeholder input.	<p>Our current processes for service selection align with the ENA Principles of Dispatch established in 2019 which set out a methodology for decision making in relation to service selection. These principles ensure fairness, transparency and market stimulation.</p> <p><b>Output: By the end of 2023, service dispatch rules set which governs the decision making framework will be published.</b></p> <p>We will be carrying out extensive engagement as part of our C31E process. Service selection will for a part of this. This will extend into ED2 as we improve our processes.</p>	<p>In order for us to select flexibility services consistently and efficiently (in line with C31E) we are developing an operational system which will automate the selection of flexibility services in line with our principles published in C31E. The newly developed service selection system will make efficient service selection recommendations to network operations staff and allow them, where necessary, to adjust these recommendations in response to real network conditions. Data on the decision making can be provided in real time to third parties, enabling transparency of decision making to be maintained and the assumptions underpinning service value to be understood.</p> <p><b>Output: By the end of 2023, supporting data of operational decisions will be published as open data.</b></p>
2.2.4.	<p>DNOs to develop efficient, scalable dispatch instruction infrastructure and avoid proprietary systems. We expect clear definitions of different types of dispatch instruction for distribution flexibility services and transparent rules about when and in which markets they should be used. Circumstances for different dispatch instructions should be well-justified. Definitions of these circumstances should be developed with input and cooperation from network users.</p> <p>The application of hard dispatch controls shall be for the improved reliance on market-based mechanisms, not to the detriment of their development. Capabilities in network operations, for example in dispatch instructions and associated system architectures shall not be hard coded to the DNO. These must be developed so that they can be cost effectively assigned to another party in future, if this is needed.</p>	<p>To allow the scaling up of use of flexibility services and the move to more real time decisions to utilise services we are developing additional APIs to the Flexible Power Platform for the dispatch and monitoring of flexibility services. These will be integrated with WPD systems to allow real time dispatch of services by DSO staff. Additional integrations will then be developed with our existing network management systems to provide visibility of dispatched services to DNO operations staff and provide them with the capabilities to call on contingency services to support the network following unexpected events.</p> <p><b>Output: Real time flexibility used for operational security in 2027.</b></p> <p>WPD's approach to flexibility services has been to remove any requirements for hard dispatch mechanisms and reduce barriers by implementing software API monitoring and dispatch protocols.</p> <p><b>Output: Electronic dispatch APIs for key flexibility functions available ahead of ED2.</b></p> <p>ANM, network access and system security functions have made use of hard-wired dispatch via Connections Control Panels where these have been agreed in connection agreements.</p>	<p>The centralised flexibility data store is expected to be completed and deployed by the end Q1 2022. This is a significant milestone making technical, commercial and operational data externally available in real time within ED1. This approach will not only promote the potential value of the data, but it is our commitment continually drive value from this data.</p> <p><b>Output: Data on flexibility service dispatch to be published as open data, in as close to real time as possible, ahead of ED2.</b></p> <p>The experience gained in developing and using this flexibility data store will define the specification for the next generation data store which is planned to be deployed in ED2. The next generation data store will further unify flexibility operations across the business and ready us to respond to changing network and market needs as the UK transitions to net zero.</p> <p><b>Output: Data on flexibility service dispatch improved in terms of scope, granularity and accuracy by 2026.</b></p>

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## Role 3: Market development

### Activity 3.1: Provide accurate, user friendly and comprehensive market information

WPD ref	Activity description	WPD meets	WPD exceeds
3.1.1.	DNOs collate and publish as much relevant data and information as reasonable that will help market participants identify and value opportunities to provide network services to DNOs and take market actions that support efficient whole system outcomes. Relevant data and information include planning and operational data (such as that set out in Activity 1.1 and 2.1). This should be provided with sufficient lead times to enable wider participation in distribution flexibility services markets. It also includes information on historic and future distribution flexibility services market actions. This should include tender results, prices bid and paid, the carbon content of aggregated units, how often DER is dispatched (and volumes) and other actions taken by the DNO (with anonymisation as required), including curtailment as part of non-firm connection agreements. The information should include all requirements set out in licence conditions to support DER to identify revenue opportunities. This increases the accessibility of tendering for distribution flexibility services for flexibility providers (while also taking account of DNOs flexibility needs).	<p>We have been providing a rich suite of market and technical data to flexibility markets since 2018 - a significant portion of ED1. This information has been made publically available through our Network Flexibility Map and the Flexibility Service Value Calculator, available on both the WPD website and Flexible Power Website.</p> <p><b>Output: Flexibility market stakeholders annually consulted on provision of data, tools and publications annually.</b></p> <p>The Network Flexibility Map provides comprehensive flexibility Signposting information about potential, future, network constraints. Network constraint geographic information and flexibility service forecast information can be viewed graphically through the web-based interactive map. Alternatively, the data is available to download in commonly used formats such as excel and PDF documents. Since late 2020 the entire flexibility and Signposting mapping data set has been made available as a single download on our Energy Data Hub and Connected Data Portal. We will continue to engage with our stakeholders to maximise the value of the data we publish. We are engaging with Ofgem on our regulatory requirements (via C31E), but see these as a minimum. We will engage via our C31E process.</p> <p>We publish tender results, including price information and contracted technology type within 30 days of each tender closing. Utilised forecast data to signpost where market opportunities for flexibility services may become available, demonstrating requirement.</p>	<p>We will provide market information on a regular - monthly or even weekly basis, subject to stakeholder feedback, by the end of ED2.</p> <p>The Flexibility Service Calculator, available through the Flexible Power website, was first deployed mid-2019. This allows prospective Flexibility Service Providers (FSP) to obtain an estimation of the potential annual earnings for their asset in a particular Constraint Managed Zones (CMZ). Anyone can access the tool through the website and it is simple to use, only required an assets capacity to be inputted. The Flexibility Service Calculator is updated in line with our Flexibility Service tenders. As the tenders become more 'dynamic' or 'near real time', the pricing and value information in the valuation Flexibility Service Calculator will also be remain synchronised with Flexibility Service tendering time frames.</p> <p><b>Output: Data on flexibility service dispatch to be published as open data, in as close to real time as possible, ahead of ED2.</b></p> <p>We are developing systems that will enable us to publish tender/trade outcomes within 24hrs of closure. We expect to be able to provide information on the carbon content of assets in a machine readable format at a similar rate of refresh.</p> <p><b>Output: Data on flexibility trade data to be published as open data, in as close to real time as possible, by end of 2023.</b></p>
3.1.2.	DNOs should, with stakeholder input, develop robust strategies for how they will collate and publish more helpful information, wherever possible consistently and in coordination with other network licence holders, and communicate this clearly.	<p>As part of our annual engagement with stakeholders on services we buy and the processes we use (our Evolution of Distribution Flexibility Services document), we ask for feedback on the data we publish and how it can be improved. This then feeds into our formal C31E consultation and ultimately our Procurement Statement, stating what data we will publish.</p> <p>This sits alongside the minimum obligatory reporting set out in licence condition C31E.</p>	<p>We will publish all the relevant information on our Connected Data portal so that it is easily accessible and machine readable. Where possible we will look to align the rate at which we publish data, to when we create it, rather than just the minimum regulatory requirements. This will enable a greater level of data refresh than as required by the regulator.</p> <p><b>Output: Data on flexibility service dispatch to be published as open data, in as close to real time as possible, ahead of ED2.</b></p>

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WPD ref	Activity description	WPD meets	WPD exceeds
3.1.3.	DNOs should regularly and actively engage with market participants to understand what data and information is helpful to support market development. While there will be minimum legal requirements set out in licences, we expect DNOs to use their stakeholder engagement to consider the most effective format and frequency of publishing that data to ensure it is user friendly. The information must be easily accessible and navigable. We expect this includes publishing data in machine readable formats.	<p>Our flexibility service provider performance management is administered automatically. We proactively seek feedback from market participants through the circulation of surveys. This includes identified touch points and performance management.</p> <p>We engage with flexibility stakeholders on a bi-annual basis through webinars and engagement events and encourage feedback through these events.</p> <p>Our recently published C31E consultation has questions targeted at understanding what data market stakeholders and participants current use and what additional data they require access to. <b>Output: Flexibility market stakeholders annually consulted on provision of data, tools and publications annually.</b></p>	<p>Our Connected Data Portal (<a href="https://connectedata.westernpower.co.uk">https://connectedata.westernpower.co.uk</a>) already serves data up in a machine readable format which is also accessible by API.</p> <p>Our Flexibility Service Evolution paper sets out how we're engaging with stakeholders to design new products, services and systems to further develop markets. This includes data systems and information to more regularly and accurately serve the data.</p> <p>Annually, our C31E document will be updated to reflect the widening level of stakeholder engagement reaching the many publications and touchpoints we have with flexibility participants, such as DFES, DNOA, procurement cycles, current participants, major energy users and fuel poor/ vulnerable customers.</p>
3.1.4.	DNOs should, where reasonable, tailor both their information provision and engagement approaches to reflect different needs of potential market participants, including groups in vulnerable situations. In many instances, collaboration across DNOs in engagement is expected to reduce duplication, make it easier for stakeholders to engage and avoid stakeholder fatigue.	<p>We publish our information in a number of ways to help tailor it to different stakeholders and their needs. For example the information on our Flexibility procurement needs is published in a Map for (top provide an overview and simple interface), via a formal document (to support the procurement activities) and in raw format on our connected data hub (for bulk download). We will continue to collect feedback on how we share data and expect to publish the same data in a multitude of ways.</p> <p>We are engaging in all the relevant Open Networks work to help align our publications.</p> <p>We also tailor our engagement methods for different users. Starting with different routes through the information on our website, through to webinars, face to face surgeries and tailored community engagement. <b>Output: Reduce stakeholder fatigue by using the LAEP library throughout ED2.</b></p>	<p>In addition to tailoring our information provision and engagement approaches to target different potential market participants we are also working on developing new flexibility products that are targeted towards different types of participants. Our current C31E consultation includes our plans for launching a Sustain product, this will be based around participants delivering predetermined behaviours set at the contract stage. This new product will provide a simplified option to participate in providing flexibility services to potential market participants that are not able to commit the resource required to take part in the weekly processes associated with our existing products. In particular our new Sustain H product, which has already been trialled through an innovation project, is targeted towards domestic customers and will allow them to take part by making simple changes to their demand patterns. <b>Output: Sustain product specifically targeting domestic flexibility procured as business as usual before end of ED1.</b></p>
3.1.5.	DNOs should seek to ensure the information they publish is as accurate and unbiased as reasonable (ie correct at time of publication, as close as possible to the actual value and not skewed in any direction).	<p>The information we publish will be subject to our standard Data Assurance processes.</p> <p>Through the end of RIIO-ED1 and beyond, we will standardise our internal processes undertaken to derive this information and extend the internal audit process to include an externally appointed auditor. The scope of these will be expanded as standardisation of processes internally and across industry, starting with DFES and DNOA. <b>Output: External audit of DFES in 2023 and DNOA in 2024. Audits repeated based on the publication cycle through the price control.</b></p> <p>Much of the data we will be publishing will be extracted from core business systems and we will automate the process of publication – i.e. information on trades and dispatched flexibility will be directly reported without aggregation or manipulation, removing the likelihood of errors being introduced.</p> <p>To ensure the information published is unbiased, our independent DSO scrutiny panel will provide robust challenge and review. <b>Output: Independent DSO scrutiny panel established ahead of ED2.</b></p>	<p>Information published under our Connected Data portal is leading the industry in terms of accessibility and openness. <b>Output: Data on flexibility service dispatch to be published as open data, in as close to real time as possible, ahead of ED2. Flexibility trade data to be published by end of 2023.</b></p>



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## Role 3: Market development

### Activity 3.2: Embed simple, fair, and transparent rules and processes for procuring distribution flexibility services

WPD ref	Activity description	WPD meets	WPD exceeds
3.2.1.	<p>DNOs to have clear processes in place for developing and amending distribution flexibility services products, contracts, and qualification criteria, that are, wherever possible, standardised. The processes should be transparent and participatory, involving other DNOs, the ESO, and current and potential distribution flexibility service providers.</p> <p>DNOs should also coordinate and engage with third party platform providers, who can offer system value by providing new routes to market and driving whole system outcomes.</p> <p>DNOs should not prevent the emergence of this sector and should enable third party platforms to 'plug-in' to DNOs' flexibility procurement processes. Products and contracts should be adaptive to reflect prevailing system needs, type, and availability of flexible resources.</p> <p>The objective of these processes is to enable as wide participation in distribution flexibility services markets as possible.</p>	<p>Within our C31E statement, we set out the defined cycles for engaging with industry, market participants and other stakeholders when amending our approach to flexibility.</p> <p>We acknowledge our role as a neutral market facilitator, and as such are looking to make our products as accessible as possible. We expect third party market platforms to play an important role in future markets and so are keen to facilitate them where possible. We have experience of this through the use of different platforms to date, but this will be more embedded in our interface standards going forward. This includes the provision of standard data (already in place in ED1) and the enhanced digitalisation of our processes to simplify integration. Through ED2 we will digitalise more interactions with the Flexible Power Portal and provide standardised systems and processes which enable activities to be undertaken by others as part of their business activities. This will include aggregators, platforms and marketplaces.</p> <p><b>Output: Standardisation of data exchanges to enable third parties to serve data on our behalf by end of 2023.</b></p>	<p>In our Evolution of Distribution Flexibility Services Procurement document, we have set out how we see services evolving.</p> <p><b>Output: C31E consultation completed annually and documents published to timescales.</b></p> <p>The document sets out our intended direction in both the long and short term to products and processes. It also sets out our approach for interfacing with exchanges and marketplaces as well as other issues which need further exploration for a mutually agreeable approach in a mature market – such as grandfathering rights and non-deliverability penalties.</p> <p>This is being engaged on and will feed into our formal C31E consultation. We expect to update the document yearly.</p>

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WPD ref	Activity description	WPD meets	WPD exceeds
3.2.2.	<p>DNOs should identify the optimum combination of longer and shorter term lengths of markets and contract lengths reflecting the network need. Needs should be neutrally defined, to allow for a range of flexibility providers to participate. This will help improve market liquidity and the opportunities for innovation and dynamic competition. Individual decisions and frameworks for deciding market timeframes and contract lengths should be transparent, informed by stakeholders and justified as being the most economic and efficient solution. Notwithstanding, deviations from the standard should be justified with clear governance processes for managing change that should be clearly communicated.</p> <p>DNOs should have clear, comprehensive and transparent mechanisms and associated commercial structures for coordinating distribution flexibility services and ESO flexibility services procurement. DNOs shall not act as the commercial route for DER accessing ESO flexibility services. Transparent (and possibly tripartite) commercial agreements may be required to reflect the potential effects of DER dispatch on distribution system operability and the role of DNOs in setting dispatch parameters (as set out in Activity 2.1 and 2.2).</p> <p>These agreements should remove exclusivity clauses as far as possible, including with regard to non-firm connections. Coordination on dispatch parameters should enable a closer to real time understanding of what DER needs to be armed and available for a particular service, and what can be available to provide other services.</p> <p>DNOs should consider arrangements to support DERs to provide services that meet both DNO and ESO needs.</p>	<p>We clearly state how we currently procure, operate and dispatch flexibility services in our Procurement Statement.</p> <p>In our Evolution of Distribution Flexibility Services Procurement document, we have set out how we are proposing to build a rich, competitive and deep flexibility marketplace. Our proposals cover proposed additional products and processes which would enable long term, short term and real time markets to sit alongside each other.</p> <p><b>Output: Long and Short term flexibility markets established ahead of ED2. Real time flexibility markets widened in 2025.</b></p> <p>Having implemented the ENA standard agreement, this removes any exclusivities clauses, enabling any connection to our network to participate in providing flexibility services. We have led on work to better understand the stackability of products and continue to lead on the work on ESO coordination via Primacy Rules (which builds on our experience in the RDPs).</p> <p><b>Output: Annual report on the stackability of flexibility services against other industry services.</b></p>	<p>We have consistently been the first DNO to implement the ENA standard agreement, leading on the adoption of good practise.</p> <p><b>Output: All flexibility contracts awarded to the most recent ENA standard flexibility agreement at the time of award.</b></p> <p>We will also be deploying a coordinated service with the ESO via our Regional Development Programme.</p> <p>We will establish real time markets and use these markets to improve the security and resilience of the network.</p> <p><b>Output: Real time flexibility used for operational security in 2027.</b></p>
3.2.3.	<p>DNOs should make available the necessary data to enable secondary trading, for example capacity and other peer- to-peer trading. Enabling includes defining, communicating and justifying the parameters in which these trades can take place for operability purposes.</p>	<p>We are engaging on the delivery of basic secondary trading capabilities to be delivered ahead of ED1 within our C31E flexibility evolution paper. This focusses on the DSO role as a neutral market facilitator rather than a full trading platform. In 2022, a manual trading capability will be established, allowing trades to be processed between qualified parties. Existing contracts allow this to happen due to our DSO flexibility contracts not having terms of exclusivity and being able to be novated at our discretion.</p> <p><b>Output: Data to inform secondary trading markets implemented as open data by end of 2023.</b></p> <p>Our Flexibility Product Evolution Paper explains how we will be standardising data and processes and through digitalisation we will enable platforms to directly and automatically undertake secondary trading of contracts. We aim to further develop these requirements through our innovation portfolio, and then implement fully digitised systems in ED2.</p> <p><b>Output: Secondary trading implemented manually before the end of ED1.</b></p>	<p>We have included an EJP for the development of a robust system for the sharing of data needed to facilitate secondary trading. This sets out the timescales, systems and costs needed to enable this functionality.</p> <p><b>Output: Standardised processes for secondary trading implemented by end of 2023. Secondary trading automated through APIs in 2024.</b></p>

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WPD ref	Activity description	WPD meets	WPD exceeds
3.2.4.	Market support services, such as pre-qualification, credit checking and settlement must enable simple and cost efficient participation in markets. DNOs should enable, and never prevent, the opportunity for third parties to provide these services where they could do so more efficiently.	<p>Within our Evolution of Distribution Flexibility Services paper, we have set out our vision of a procurement hub, which will standardise and automate the capture of data required in the pre-qualification process, aligned to Open Networks good practice and enable the opportunities for third parties to undertake this function on our behalf.</p> <p><b>Output: Standardisation of data exchanges to enable third parties to serve data on our behalf by end of 2023.</b></p> <p>When first developing the Flexible Power Portal, we utilised third party developers to build and host both the website and the Flexible Power dispatch system as it proved more efficient to bring in the outside expertise required to develop this than attempting to do this in-house.</p> <p>For any future functions we require we will continue to consider whether these could be more efficiently delivered by a third party.</p>	<p>Using our proposed procurement hub, platforms will be granted access to automatically register assets onto our system as long as they meet the pre-defined criteria. This criteria can be built into the platform's own processes to ensure a seamless route to procurement handled by a third party.</p> <p><b>Output: Pre-qualification data to be able to be served to WPD by third parties over API by end of 2023.</b></p> <p>As part of our commitment to share best practice within the industry we have since opened up the Flexible Power brand to become a joint initiative involving the vast majority of the UK DNOs. Expanding this initiative to be a multi-DNO project has not only proved more efficient for all involved but will also make it easier to achieve a degree consistency across the industry and reduce the work required by potential market participants to provide services to multiple DNOs.</p> <p><b>Output: Best practice and flexibility process development shared with other DNOs ahead of ED2.</b></p>

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WPD ref	Activity description	WPD meets	WPD exceeds
3.2.5.	<p>DNOs to introduce other proportionate measures, developed with robust stakeholder engagement, to identify and address actual and perceived conflicts between its DSO and network ownership roles or other business interests.</p> <p>The introduction of such measures should enable DNOs to efficiently plan, develop and use their network, taking into account and using flexible alternatives to network reinforcement where efficient for the system, in a visibly neutral way. At a minimum, this should include demonstrable executive level accountability and board level visibility of key DSO decisions across the planning, operation and market facilitation functions. This should also include clear and separate decision making frameworks, supported by independent oversight, such as external auditing, to promote transparency and enable scrutiny. Additionally, to support the justification of DNOs' proposals as proportionate, we expect DNOs to set out conflict mitigation options that were considered but not proposed, including legal separation if this is not part of the DNO's suite of proposals. As part of their justification, DNOs should include the available supporting information on the likely costs, timings and implications of these alternative options or a narration of initial views.</p> <p>In parallel to the business planning process, Ofgem will continue to explore the value of alternative governance arrangements to help us meet government's net zero goals. Whilst the options we explore in this parallel governance work will consider local arrangements more broadly, in the short term we are keen to assess a range of options for conflict of interest management beyond what we have set out in this document, including legal separation. We know that the extent to which companies have already considered legal separation varies substantially and therefore the available information or narrative that could be submitted in their final Business Plan will range from a narrative of views, up to more detailed costs and benefits. The information in the plans will be useful starting points.</p> <p>Prior to our determinations on the RIIO-RIIO-ED2 price control, we will separately be seeking detailed cost and benefit information from companies to inform our view about governance arrangements. For the avoidance of doubt, any subsequent information provided would not form part of our decision relating to the Business Plan incentive. If we decide the baseline DSO conflict of interest requirements set out in this document are not sufficient, any costs associated with further changes beyond the baseline would be addressed separately through the appropriate mechanism, which will be confirmed as part of our determination process.</p>	<p>In early 2021, functional separation of the DSO was completed, reporting directly into the WPD Operations Director, providing executive level accountability and board level visibility. During the ED2 business planning process, options for DSO governance were testing with stakeholders and there was strong agreement for the options taken forward. <b>Output: Functional separation implemented ahead of ED2.</b></p> <p>Our forecasting framework is aligned with ESO and CCC scenarios enabling direct comparisons to be drawn and benchmarking to occur.</p> <p>Forecast volumes are supplemented with customer behaviour data from smart meters, innovation projects and network monitoring to derive the MW impact, which is transparently shared. Network requirements are identified and described in reports such as Shaping Subtransmission and the Network Development Plan, enabling the oversight on requirements. These requirements are also signposted as flexibility requirements on our network flexibility map, across a number of DFES scenarios, which feeds the market.</p> <p>Using market system need data and procurement out-turn data, the decisions behind our investments can be replicated using public datasets. We explain our decisions, the methodology tools used and the outcomes in our DNOA document for transparency. <b>Output: DNOA published throughout ED2 on a six monthly basis.</b></p>	<p>We have exceeded baselines for the ED2 by carrying out many of the expected mitigations ahead of other DNOs, within ED1.</p> <p>We will commit to going faster and further with DSO maturity to benefit our customers. Our DFES, DNOA and Shaping Subtransmission publications have been industry leading and set up a solid ground work to improve at a rapid pace of change.</p> <p>Through setting up an independent DSO scrutiny panel before the end of ED1, we will have established rigorous governance arrangements for the whole of ED2, with further improvements being undertaken as the scope of DSO increases and as the processes, roles and responsibilities become more formally codified within the industry. <b>Output: Independent DSO scrutiny panel established ahead of ED2.</b></p> <p>WPD will also take a leading role in formalising the role of the DSO, both by developing internal policies and processes within WPD as a model for DNO-DSO interaction, but also through the Open Networks programme so these can be more widely shared and adopted.</p>





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