

Network and System operators
and other interested parties

Direct Dial: 020 3961 8324

Email: flexibility@ofgem.gov.uk

Date: 28 August 2020

Next steps on our reforms to the Long Term Development Statement (LTDS) and the Key Enablers for DSO programme of work

Dear colleagues,

In December 2019, we published our consultation 'Key Enablers for DSO programme of work and the Long Term Development Statement.'¹ This letter sets out our next steps informed by the consultation responses, both for the LTDS reforms and our wider package of work on Key Enablers for distribution system operation (DSO).

DSO represents the efficient and effective development and use of the distribution system in a context of increasing technology, digitalisation and flexibility, with due regard for system and cyber security and resilience. We consider DSO to be a set of functions that fall broadly under the headings: planning and network development; network operation; and, market development. For the current and next network price controls, we expect DNOs to undertake a range of these functions under an incentives and outputs driven regulatory framework. We expect costs and activities to be clearly identified, creating a supportive framework that allows optionality on future institutional arrangements. Our Key Enablers for DSO work package drives agile regulation, making tangible progress for DSO to benefit both network licensees and wider stakeholders now, whilst maintaining broader institutional optionality.

The reforms proposed to the LTDS, and the development of further reforms under the Key Enablers for DSO work programme, including operational data, were well received by stakeholders. Strong support was given for reforms to the LTDS, with clear appetite from

¹ <https://www.ofgem.gov.uk/publications-and-updates/key-enablers-dso-programme-work-and-long-term-development-statement>

stakeholders to substantially enhance network data provisions to enable DSO. We intend to progress these reforms, and we set out our plans in more detail in this letter, with working groups to be convened before the end of 2020.

Annex 1 provides an update on our work on Key Enablers for DSO within the wider context of a changing energy system, including Modernising Energy Data, the network price control, and industry initiatives. Annex 2 sets out specific reforms that will be made to the LTDS as part of the Key Enablers work. Annex 3 sets out our intention to progress operational data reforms. In Annex 4, we set out the next steps we will take and give indicative timelines for this work to progress. Finally, the appendix details the questions and responses to the December 2019 consultation.

We thank all who responded to our consultation and helped shape these developments.

Yours faithfully,



Steve McMahon
Deputy Director, Electricity Distribution & Cross Sector Policy

Annex 1: Distribution system operation and Key Enablers

Distribution system operation (DSO) is not one activity or entity, but the delivery and coordination of a range of functions involved in developing and operating the distribution system efficiently.² For these functions to be realised, there are 'Key Enablers for DSO': material improvements to the foundational building blocks on which smart, flexible, resilient and secure networks and DSO function delivery will rely.

Whilst this letter is primarily concerned with the next steps regarding these enablers, and in particular the LTDS, for context we summarise here the DSO roles and principles. We are mindful that there are numerous initiatives on DSO, energy data improvements, and network and cyber resilience, that are relevant and related to our Key Enablers for DSO work programme, both from the Authority and Government, and from industry. Therefore, we also summarise these improvements and demonstrate how this programme of work is nested within the broader improvements underway.

DSO roles and principles are outlined in Table 1 below. In our Sector Specific Methodology Consultation for RIIO-ED2, we examined each of these roles and principles in detail, specifying expectations where DNOs need to undertake delivery of specific functions under RIIO-ED1 and what we propose they do under RIIO-ED2, and we set out a proposal for a DSO incentive and penalty regime under the next price control.³ We summarise the content here, and consider the requisite Key Enablers to deliver these functions.

Roles	Principles
Planning and network development	Plan efficiently in the context of uncertainty, taking account of the whole electricity system
Network operation	Promote operational network visibility and data availability
	Operate an economic and efficient distribution system
Market development	Provide accurate, user-friendly and comprehensive market information
	Simple, fair and transparent rules and processes for procuring DSO ancillary services, aligned with ESO markets where appropriate.

Table 1. Distribution system operation roles principles.

² <https://www.ofgem.gov.uk/publications-and-updates/ofgem-position-paper-distribution-system-operation-our-approach-and-regulatory-priorities>

³ <https://www.ofgem.gov.uk/publications-and-updates/riio-ed2-sector-specific-methodology-consultation>

Planning and network development

Improvements to planning and network development are required in order to design efficient networks in the face of uncertainty, an anticipated uptake in low carbon technologies (LCT) and distributed energy resources (DER), and new flexibility services.

It is important that the planning and development process is consistent across the different Electricity Distributors and the ESO, with licensees identifying opportunities for efficiencies through coordination. Consistency allows stakeholders to more easily engage with the information presented and access their opportunities to provide competitive solutions to network constraints.

We want Electricity Distributors to produce a coherent view of 'end-to-end network planning'. We are planning to introduce a new licence condition 25B for the Electricity Distribution Standard Licence,⁴ requiring Electricity Distributors to publish Network Development Plans (NDP). The NDPs will define network plans over a five to ten year window, including the use of flexibility services, as well as defining the expected uptake of LCTs.

The LTDS, which we are updating, will provide accurate and reliable network data to feed in to the D-FES and NDP, and reforms will enhance the provision of clear and relevant information to allow network users to properly evaluate opportunities to contract with Electricity Distributors.

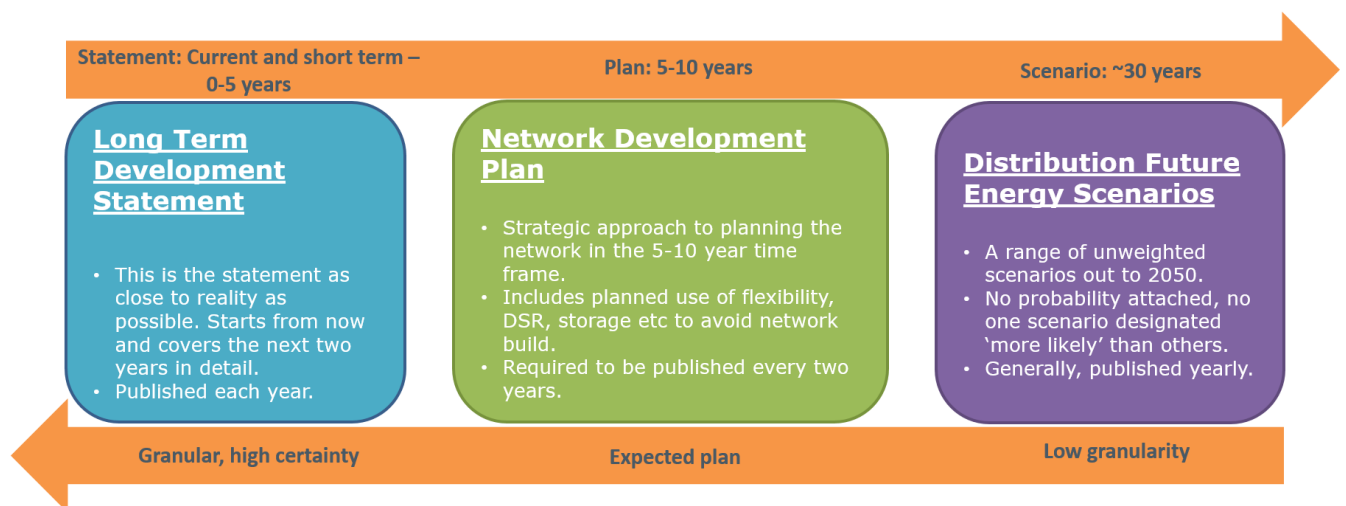


Figure 1: Timeline of how planning data publications fit together.

⁴ This requirement is derived from the Clean Energy Package and will be laid through Statutory Instrument by BEIS.

Network operation

Improvements to network operation are required in order to efficiently and effectively carry out network processes, and to adequately inform stakeholders so that they can confidently carry out their own processes.

We want Electricity Distributors to improve operational data management. Accordingly, we will be developing a licence condition requiring data improvements and data sharing of forthcoming network constraints, network outages, network configurations, and historical network utilisation data. We expect that this data will be made available on timescales that are sufficiently practical to enhance network operations. Further detail on this work is provided in section 3.

At the beginning of August 2020, we published a call for evidence on DG visibility, following action eight from the our 9 August 2019 power outage report.^{5,6} This sought to better understand the value of different types DG visibility, in order to both operate a secure and resilient network and to enhance DSO network operation capabilities. The responses to this call for evidence will inform the next steps in this area.

Market development

Improvements to market development are required in order to efficiently and effectively harness the capabilities of DER to provide network services in place of traditional reinforcement.

Electricity Distributors must clearly demonstrate how they are deciding between services and traditional reinforcement to deliver the most efficient solution, ensuring that market services are procured in an efficient, transparent, and non-discriminatory manner. Electricity Distributors and the ESO must coordinate on market design and procurement processes to ensure that revenues are stackable where possible, enabling effective market participation and optimal utilisation of resources. We are also introducing a new licence condition requiring Electricity Distributors to comply with these requirements.

We want Electricity Distributors to share more market reporting data on all current and historical procurement and utilisation of flexibility services. There is presently a dearth of transparent market reporting on which resources are contracted for flexibility services, the carbon intensity of those technologies, the bids and prices agreed for services, and the utilisation rates. Aggregate figures currently provided by some Electricity Distributors

⁵ <https://www.ofgem.gov.uk/publications-and-updates/call-evidence-visibility-distributed-generation-connected-gb-distribution-networks>

⁶ <https://www.ofgem.gov.uk/publications-and-updates/investigation-9-august-2019-power-outage>

provide insufficient information to market participants and are not always consistent. We require full and open reporting, and will impose further requirements under licence if improvements are not forthcoming. Should there be security, resilience and or commercial confidentiality issues to sharing this data, this needs to be well articulated and mitigation measures developed.

Other initiatives impacting DSO transparency

Modernising Energy Data

There is a well-established understanding across the energy industry that improvements to data are required to enable a modern energy system. The Modernising Energy Data (MED) programme is a collaboration between Ofgem, the Department for Business, Energy and Industrial Strategy (BEIS), and Innovate UK,⁷ developed in response to the Energy Data Taskforce's (EDTF) findings in 2019.⁸

The MED programme has built on the strategic direction defined by the EDTF and endorsed by Ofgem and industry. It has developed 'data best practice', a series of guidelines for modern data management,⁹ and is consulting on developing two new licence conditions for RIIO-ED2: one to obligate implementation of data best practice, and another to obligate DNOs to produce Digitalisation Strategies and Action Plans. Further, reforms to the LTDS and subsequent Key Enablers for DSO provide a clear opportunity to enhance energy system data in line with the MED programme of work, making tangible progress to improve data management.

Security of Network and Information Systems (NIS Regulations)

The DNOs have been required to undertake self-assessments for cyber security, and undertake improvements in the short-term. Under RIIO-ED2, they are requested to develop robust cyber-resilience plans.¹⁰ Ofgem propose the introduction of re-opener mechanisms to further support DNOs throughout the price control period where DNOs might not be in a position to sufficiently develop a plan; the cyber landscape changes significantly; or where there is a business justification to adjust data sharing and cyber security. The plans continue the journey for NIS regulations, and support DNOs to manage cyber risks, whilst considering business and operational needs. As such, cyber security enables DNOs to be able to appropriately and proportionally manage risks, and provide the confidence to exploit new technologies to further connect and share information, whilst building cyber resilience.

⁷ <https://modernisingenergydata.atlassian.net/wiki/spaces/MED/overview>

⁸ <https://es.catapult.org.uk/reports/energy-data-taskforce-report/>

⁹ <https://es.catapult.org.uk/guides/energy-data-best-practice-guidance/>

¹⁰ <https://www.ofgem.gov.uk/publications-and-updates/riio-ed2-sector-specific-methodology-consultation>

Industry initiatives underway

Several industry-led improvements to facilitate DSO are underway, as well as numerous relevant innovation projects and trials.

We recently approved DCUSA code modification DCP350.¹¹ The modification requires Electricity Distributors to create a standardised public register of DER greater than 1MW connected to their networks, known as the Embedded Capacity Register (ECR), thereby improving network data visibility. The Energy Networks Association's (ENA) Open Networks Project (ONP) have been developing a System Wide Resource Register (SWRR) over a number of years, which will now be aligned with the ECR. The LTDS includes an obligation for licensees to produce a register of connections. We anticipate that the obligation will stand in the licence, thereby maintaining it as a licence requirement, though it may be fulfilled through the DCUSA code.

Grid Code modification GC0139,¹² 'Enhanced Planning-Data Exchange to Facilitate Whole System Planning', seeks to increase the scope and detail of planning-data exchanged between DNOs and National Grid ESO to help facilitate the transition to a smart, flexible energy system. This modification proposes to enhance and align certain data exchange processes, providing greater granularity of data for a wider range of operating conditions. We consider the close coordination of network licensees to be of key importance, and will underpin this with new licence conditions where we find it necessary to do so. We support this modification, and anticipate that there will be significant learning developed by it that is relevant to the LTDS reforms.

The Energy Networks Association's Open Networks Project and Data Working Group

In response to the joint Ofgem and BEIS Smart Systems and Flexibility Plan in 2017,¹³ Networks and system licensees have formed working groups to discuss and develop the necessary changes required to develop a smart, flexible energy system. The ONP and, following the publication of the EDTF recommendations, the DWG, have sought to define where and how changes are required, and find suitable solutions to do so. We welcome the initiatives, and as outlined above, several resulting products have developed valuable outputs.

We will balance the needs of all stakeholders, whilst encouraging networks and system licensees to progress improvements where these are beneficial. We will continue to monitor

¹¹ <https://www.ofgem.gov.uk/publications-and-updates/dcp350-creation-embedded-capacity-registers>

¹² <https://www.nationalgrideso.com/document/164051/download>

¹³ <https://www.ofgem.gov.uk/publications-and-updates/upgrading-our-energy-system-smart-systems-and-flexibility-plan>

the progress being made on DSO and associated Key Enablers, in order to ensure the best outcomes for consumers.

Annex 2:

Reforms to Long Term Development Statement

As a result of the informal consultation feedback, we will be progressing with an update and expansion to the LTDS. The core LTDS reforms are set out below, which we expect to be undertaken by an industry and stakeholder working group, chaired by Ofgem. This working group will be responsible for defining updates to the LTDS.

We expect that the updates will improve networking planning data, modernising the data to meet users' needs. This work will underpin the delivery of a number of DSO functions. Amongst other things, it will allow users, including flexibility providers, to better understand the opportunities on the network. Reform to the LTDS will be the first licence condition explicitly addressing the interoperability of network data, part of modernisation of energy data initiatives, in line with Energy Data Taskforce Recommendations.

Delivery

Delivery governance

Reforms to the LTDS require a range of activities to be undertaken by various parties. In order for the reforms to both meet users' needs, and be practicable for Electricity Distributors, we proposed a governance arrangement including a working group chaired by Ofgem and including a cross section of the energy industry. A delivery partner, who will assimilate the findings of the working group into a single new form of statement for the LTDS, will support the working group. Through the consultation, we received strong support for this structure.

To begin the reforms, it is proposed that the working group will be convened in late 2020, and will consist of a number of sub-groups tasked with specific objectives and outputs; all of which fall under the scope of defining required changes to the LTDS. Electricity Distributors will need to feed in to this process, to determine what is feasible and practicable, and will themselves be expected to improve their own data management to meet the findings of the working group. Electricity Distributors will be expected to do this themselves, and leverage learning available from Innovation projects, such as Western Power Distribution's (WPD) Common Information Model NIA project,¹⁴ from wider data initiatives, and from coordination with the work being done on Grid Code modification GC0139. Many processes are underway in this area, and we expect that any costs will be marginal for Electricity Distributors already undertaking reforms.

¹⁴ https://www.smarternetworks.org/project/nia_wpd_016

The proposed independent delivery partner will support Ofgem and the working group in developing the LTDS form of statement. The delivery partner will coalesce the findings from the working group and be tasked with compiling a suitable form of statement that meets users’ needs, one that is practicable based on Electricity Distributors’ input. We expect to procure this service.

Figure 2 below outlines the roles and outputs of groups engaged in the LTDS reforms. Figure 3 proposes workstream groups for the LTDS working group. Description of the activities under the subgroups are further explained in the following sections.

Group	Outputs
<p>Working group</p> <p>Chair: Ofgem Expected representatives: Network licensees (DNOs, IDNOs, ESO, TOs); suppliers; generators; aggregators; platforms; tech firms</p>	<ul style="list-style-type: none"> • Undertake assessments of the LTDS • Define users’ needs for LTDS and FoS format, content • Define application to IDNOs
<p>Delivery partner</p> <p>To be procured</p>	<ul style="list-style-type: none"> • Write FoS and CIM implementation • Define heatmaps and GIS data
<p>Network licensees</p> <p>DNOs and IDNOs</p>	<ul style="list-style-type: none"> • Provide input on data and feasibility • Undertake data improvements to meet new LTDS and FoS

Figure 2. Proposed delivery governance, roles and outputs for LTDS reforms.

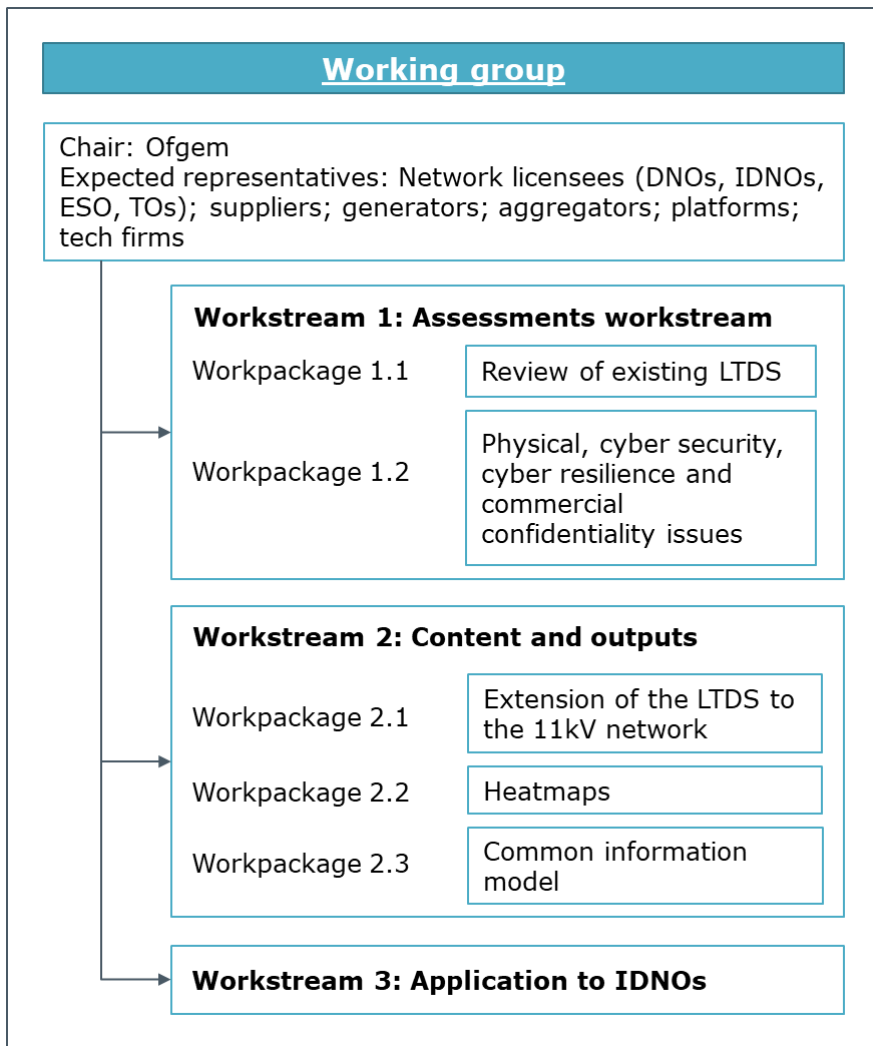


Figure 3 Proposed LTDS workstreams and workpackages

Assessments

Assessment of existing LTDS data

The existing form of statement was developed in 2011. The tables held within the form of statement are compiled and published by DNOs as Microsoft Excel spreadsheets. In our consultation, we asked whether spreadsheet based data sharing should be retained in addition to network models. We received overwhelming support to retain an Excel spreadsheet, primarily to enable non-experts or those without access to power systems analysis software to inspect the LTDS data. We acknowledge this support, and will retain the existing spreadsheet based data sharing.

We consider that improvements may be required in the presentation of network topologies;

network topology is the schematic description of a network arrangement. It presents information about connections as a high-level diagram, and does not describe the granular make-up of the network. This is currently shared as series of single line diagrams.

The existing LTDS includes partial data on network topologies. We intend to require the sharing of network topology under a common and standardised model format. We believe this will help prospective flexibility providers to better understand distribution networks, and what capability the network has to transfer their power. Information and data relating to asset ratings and historical utilisation profiles can be overlain onto the network topology.

At present, industry stakeholders cannot easily propose changes to the form of statement of the LTDS as the format is set out in a direction to each licensee from Ofgem. As part of the overall review of the LTDS, we will consider whether other methods of governance for the form of statement could provide benefits, equipping industry to better manage stakeholder needs.

The working group will be responsible for a general review of the existing LTDS content. This will include:

- a) A review of the existing LTDS form of statement;
- b) Identification of where network topology diagrams can be standardised; and
- c) A recommendation on the appropriate location for the form of statement in industry codes and standards.

Physical, cyber security, cyber resilience and commercial confidentiality issues

Some of the network operators raised concerns about physical, cyber security and cyber resilience issues, and suggested that these would need greater consideration when extending obligation to share network data. We acknowledge that, where such issues do exist, they must be taken seriously. Much of the data that we understand stakeholders would like access is data equivalent to what is already shared by the ESO in relation to the transmission networks.

Similarly, there are international examples of sharing comparable distribution level information as that proposed under the LTDS reforms, such as the information shared by the New England ISO.¹⁵

¹⁵ <https://www.iso-ne.com/>

One DNO also pointed out that there are examples from other industries to learn from, such as the National Underground Assets Register,¹⁶ and the importance of coordination with the Centre for the Protection of National Infrastructure¹⁷, on contentious aspects such as GIS heatmaps mentioned further below.

Physical, cyber security, cyber resilience and commercial confidentiality issues will be given full consideration by the LTDS working group. If there are circumstances where data sharing does need to be limited, these will be identified, delimited, and mitigation measures developed to allow sufficient data access to meet LTDS users' needs.

Content and outputs

Extension of the LTDS to the 11kV network

The existing LTDS is focused on the extra high voltage (EHV) network data, but does include limited information on the 11kV network. It is widely acknowledged that much of the uptake of LCTs will occur across the network including the 11kV systems. Therefore, we sought views on extending the LTDS to cover the 11kV network, and received strong support. Respondents considered that extension of the LTDS to the 11kV network would inform network planning and development, including flexibility management.

We also acknowledge that the network data at the 11kV network level is incomplete. For example, network monitoring primarily occurs in specific locations on a needs basis. This does not, however, mean that a framework for collecting and sharing 11kV network data should not be developed. Rather, we believe that a framework should be developed, and Electricity Distributors encouraged to demonstrate how they will collect and share data as this becomes available. We expect that DNOs Digitalisation Strategies and Action Plan, and the proposed DSO incentive, will provide strong means to encourage DNOs to collect and share the remaining 11kV network data as it becomes available.

The LTDS working group will be tasked with identifying what data can be collected and shared, including formats for the 11kV networks, and the best mechanism for incorporation into the LTDS data set.

Heatmaps

Heatmaps have been developed by DNOs to provide network users with relevant information to allow them to evaluate opportunities to come in to contract with the DNO; we note this is a core objective of the LTDS. Existing heatmaps have not been regulated,

¹⁶ <https://www.gov.uk/government/publications/national-underground-asset-register-project-update>

¹⁷ <https://www.cpni.gov.uk/>

and represent a progressive initiative from DNOs. Notwithstanding this productivity, existing heatmaps vary significantly in content, format, and accessibility.

In our consultation on the LTDS update, we sought views on incorporating heatmaps into the LTDS licence condition for Electricity Distributors, and if we chose to do so, how best this could be managed. We received strong support from a wide range of stakeholder to do so, finding that the existing heatmaps are a valuable tool, but executed to varying qualities, and that clearer obligations are required to bolster their utility.

We recognise that respondents suggested various means to ensure heatmaps are available and meet users' needs: some respondents suggested that heatmaps needed to contain all relevant datasets, and be updated very frequently. Others suggested the heatmaps be updated on the same annual frequency as the LTDS. Many network licensees suggested that the DWG's digital systems map will be a solution for all geographical network data.

We believe that the heatmaps must be readily available on network licensees' websites, and contain information for the five-year duration of the LTDS, including network headroom. It is proposed that all Geographical Information System (GIS) data should be readily available to download, or otherwise be accessed, by users.¹⁸ The LTDS working group will be tasked with defining the most desirable and feasible frequency of update to heatmaps. Likewise, the LTDS working group will consider the specific details of GIS datasets, including the structure of geodatabases and attribute fields in GIS data.

We consider that a sensible approach is for standard licence condition 25 to set a minimum standard on heatmaps, and encourage Electricity Distributors to exceed this in line with the proposed DSO incentive in the RII0-ED2 network price control. The LTDS working group will be tasked with defining the minimum standards for network heatmaps, in line with user expectations.

The digital systems map being developed by the DWG will not be regulated at this time. Whilst we recognise the value of a centralised platform for digital mapping data, we also consider that most users will wish to load GIS data into their own analysis software, and therefore focus here on the data minimum standards, rather than the platform on which it is hosted. Further, we acknowledge the value that the digital systems map has created, and take assurances from the network licensees that the strong progress made so far will mean that the task of incorporating heatmaps into the LTDS will be completed with ease and in a timely manner.

¹⁸ Common data files should be available that can be readily loaded into GIS software. This may be via direct download, or via Web Map Service (WMS) server type connections.

Common Information Model

All respondents expressed support for data standardisation and interoperability, especially as the amount of data and information being exchanged increases. Of those respondents that went on to identify a specific standard, the Common Grid Model Exchange Standard implementation of CIM,¹⁹ already in use by the European Network of Transmission System Operators for Electricity (ENTSO-E), was unanimously advocated.²⁰

We received comments around CIM governance and interest in representation at EU governance bodies. It is, of course, important that CIM does not develop separately in GB to the EU. While there is presently uncertainty about how membership will work post-Brexit, we do not see this as a barrier for the LTDS, and we will continue to engage with our colleagues in the EU team as this progresses.

There are significant variations in the cost estimates of converting to CIM across the industry, with the ENA estimating £10.5m and 39 months to implement CIM for their week 24 and week 50 planning data submissions.²¹ While in the screening submission for the Flexr project, that seeks to translate numerous dataset from the DNO systems into one common language and create a single open portal, Electralink and Northern Powergrid have submitted high level estimates of £10m and 24 months.²²

The work being done by these projects would require much, if not all, of the work to develop the CIM model for Electricity Distributors' systems that will be required for the LTDS. In essence, this cost will be incurred whether or not the LTDS work progresses; this makes the value of extending this to the LTDS especially attractive. In addition, we expect costs to be offset by the reduced burden of data entry and exchange once complete. We note, for example, that WPD is sharing network model data in the CIM format, and have identified a strong business case for managing data in this format to improve existing business processes.²³ Accordingly, it is reasonable to anticipate benefits for data users who will be able to access and work with the data more easily across multiple boundaries.

In addition, as observed by the ENA,²⁴ it is highly unlikely that the current methods of information exchange, based on spreadsheets, will meet requirements going forward. It

¹⁹ <https://www.entsoe.eu/digital/cim/cim-for-grid-models-exchange/>

²⁰ <https://www.entsoe.eu/digital/cim/>

²¹ <https://www.energynetworks.org/assets/files/ONP-WS1B-P4%20Data%20Exchange%20Report-PUBLISHED.pdf>

²² <https://www.ofgem.gov.uk/publications-and-updates/electricity-nic-2020-initial-screening-submission-flexr>

²³ <https://www.westernpower.co.uk/our-network/energy-data-hub/common-information-model>

²⁴ ENA Open Networks workstream 1B product 4 has assessed the current exchange of network planning data at week 24, 42 and 50, finding shortcomings in the sharing of Microsoft Excel spreadsheets.

<https://www.energynetworks.org/electricity/futures/open-networks-project/workstream-products-2020/ws1b-planning-and-forecasting.html>

follows that this work is an important step in progressing towards a system capable of meeting users' needs.

Beginning the process of converting to CIM now, both through the LTDS and industry Innovation projects, will also lay the groundwork for future data sharing in the format meaning that converting other data sets will be less costly. Some flexibility providers that work across network boundaries, such as those also selling services to the ESO, suggest that the interoperability afforded by CIM will allow better, more coordinated, service provision.

We are of the opinion that sharing model data under the LTDS should build on the work done through Grid Code modification GC0139 (week 24 and 42 data exchanges).²⁵ This work is significantly progressing data exchange between the DSO and ESO with modelling of five cardinal points describing different network conditions:²⁶

- Peak demand;
- Summer minimum demand;
- Solar-peak/daytime-minimum demand;
- National high power transfer dispatch scenario; and
- National low power transfer dispatch scenario.

At present, this modelling focuses on the parts of the transmission and distribution network that interface, known as the sub-transmission network. However, it provides a basic model framework that can then be extended down to the distribution networks, as outlined above, and data infilled iteratively as network monitoring is improved.

There is some information that it will not be appropriate to share publically, such as protection and control measures relating to critical national infrastructure. However, such data may be valuable for specific stakeholders, such as other DNOs, IDNOs, and the ESO. As a general approach, we anticipate that network licensees, using a robust data triage methodology and in agreement with the LTDS working group,²⁷ will reach a consensus on this.

²⁵ <https://www.nationalgrideso.com/industry-information/codes/grid-code-old/modifications/gc0139-enhanced-planning-data-exchange>

²⁶ <https://www.energynetworks.org/assets/files/ONP-WS1B-P4%20Data%20Scope%20-%20Final%20Report-PUBLISHED.pdf>

²⁷ A data triage methodology is being developed by the ENA's Data Working Group, as referred to in the best practice guidance: <https://es.catapult.org.uk/guides/energy-data-best-practice-guidance/>. Updated guidance will be available on the Modernising Energy Data webpages: <https://modernisingenergydata.atlassian.net/wiki/spaces/MED/>

In respect of model based sharing, the LTDS working group will be tasked with determining appropriate definitions, specifications and implementations for model based sharing via CIM. It is proposed that the LTDS working group will also provide recommendations on ownership of the collection of standards and change processes.

Application to IDNOs

We anticipate that IDNOs will see a significant uptake of LCTs. In line with this, we received support for extending the LTDS to IDNOs. However, we recognise that this must be proportionate to the cost and complexity of publishing an LTDS for distant pieces of network. One suggestion was that IDNOs should be required to complete summary information in section one of the LTDS form of statement, i.e. high-level information relating to the design and operation of the network, but not the detailed tables in section two i.e. detailed circuit information or network development proposals.

Another suggestion was for IDNOs to pass information about sections of its network to the relevant DNO for inclusion in its LTDS. The latter idea has the benefit of all information covering a DNO licensee's area being accessible for stakeholders in one place. Further, some respondents suggested that a threshold would be appropriate, so that once an IDNO served a certain number of customers they became subject to the requirement for publishing an LTDS.

The LTDS working group will be tasked with further investigation of the most desirable and feasible mean to publish LTDS data for IDNOs. As both users of the LTDS and potentially publishers, we expect IDNOs to be represented in the LTDS working group.

Annex 3: Operational data – next steps under Key Enablers for DSO

Operational data can generally be understood as data that describes network processes and activities on a timescale of days ahead to months ahead. This data could include measured operational power flows, network configurations and circuit outages. Whilst it is a broad category, it is clear that many stakeholders see value in expanding the visibility and availability of operational data.

There are currently no obligations on Electricity Distributors to publish this data. We believe that operational data is highly valuable in developing distribution system operation, and facilitating flexibility use at distribution level. We consider operational data important to realising reforms to network access and charging arrangements, for example by providing data to analyse latent capacity to enable time profiles access or non-firm network access.

Below, we describe the key components of operational data that we wish Electricity Distributors to make available, and explain how these will add value to enable DSO.

Network configuration data

Configuration data shows the make-up of an energy network at a more granular level of detail than network topology alone. It provides a detailed picture of the specific route that energy will take to get from one part of the network to another. Whereas topology informs stakeholders about the existence and rating of a connection between two points. The configuration provides information about what breakers are open, or the effects of outages. There are multiple different configurations of a network that all equal the same overall topology.

Stakeholders have told us that information on configuration is important for visibility of whether an asset will be able to efficiently provide a service and therefore whether bidding into a market is worthwhile. Accordingly, it is particularly important that the ESO and DNOs exchange this information for the purposes of avoiding service procurement conflicts.

Network outage data

Outage data is the planned down time of parts of the network to allow for maintenance and other operational works. It will affect the network configuration as energy is re-routed through other parts of the network to maintain supply. While generators connected to an area of a network that will experience an outage are notified in advance, this information is not shared directly with aggregators and can affect what flexibility providers are available to provide by way of services on a certain part of a network.

Outage data can be easily overlain on the network configuration maps, and when taken in conjunction with constraint data, provides a better picture of the operational make-up of the network. It is noteworthy that outage information is published as routine by a number of overseas operators such as the New England ISO,²⁸ who provide a breakdown of day, month and year ahead outages.

Network constraint data

Network constraint data is data informing users of expected bottlenecks on the distribution networks, whether caused by voltage or thermal issues, on a days to weeks ahead basis. DNOs have demonstrated a capacity to calculate geographical and temporal network requirements for flexibility, based on these localised constraints. As such, we expect DNOs to publish data on these constraints.

Constraint types will vary according to network conditions. DNOs should publish information on network constraints such that flexibility providers can calculate network requirements relative to the ENA Open Networks Project has defined flexibility products: sustain, secure, dynamic and restore.²⁹ We also expect constraint data to be sufficiently granular in time series to show load profiles of constraints, rather than simply a binary understanding of where a constraint is expected and a time window.

Network constraint data will enable stakeholders to calculate the possible requirements for flexibility in an area, and inform them of how they can best manage their flexible assets.

Network utilisation/historian data

Data relating to the historical operational state of the network has been identified as an important category to help inform network modelling.

Much of this data is stored in Pi Historian at half-hourly intervals for the 132kV and 66/33 kV networks. As noted above, where cost effective, we expect the penetration of monitoring to provide network utilisation data to increase across the 11kV and LV networks.

We plan to require Electricity Distributors to make network utilisation data freely available where this does not adversely affect data privacy regulations. We appreciate that, given the

²⁸ <https://www.iso-ne.com/>

²⁹ ENA Open Networks workstream 1A product 3: <https://www.energynetworks.org/electricity/futures/open-networks-project/workstream-products-2020/ws1a-flexibility-services.html>

majority of 132 and 66/33kV networks has utilisation data at half hourly intervals over a multi-year period, this amounts to a large volume of data. We anticipate that Electricity Distributors will develop download portals to enable snippets of data to be downloaded.

There is a strong use case for this data from third parties wishing to better understand network utilisation on a time-series outwith the winter peak or summer minima. This type of data would allow network user to evaluate non-firm, time profiled connection options such as those being considered as part of the Ofgem access reforms.

Annex 4: next steps and indicative timelines

Long Term Development Statement reforms

Phase	Indicative timeline	Action/milestone
Setup & planning	October 2020	We will contact those that expressed an in interest in joining the working group
	November 2020	Ofgem to finalise make-up of LTDS working group (the working group membership is at Ofgem’s discretion)
	December 2020	LTDS working group convened Terms of reference agreed
Development	Q2 2021	Interim report on assessment of the existing LTDS tables
	Throughout 2021	Working group continues to develop LTDS, including decisions on LTDS application to IDNOs and heatmaps
	Q2 2022	Working group concludes
	Q3 2022	Finalisation of form of statement by delivery partner
Delivery phase 1	Q3/Q4 2022	User acceptance testing of the form of statement
	Q1 2023	Statutory Consultation
Delivery phase 2	Q2 2023	Licence Change takes effect (subject to the outcomes of the consultation)

Next Steps on Operational Data

We intend to develop and consult on an operational data licence condition, to be delivered as part of the Key Enablers for DSO work programme. We will engage extensively with both regulated and non-regulated parties in the electricity sector to develop this policy. We expect to consult informally on a new licence in the first half of 2021.

Appendix 1: Consultation responses summary

We received thirty-one responses, of which three were marked as confidential. We received responses from all of the DNOs, the ESO, and four IDNOs. We also received representations from a cross section of industry including flexibility providers, suppliers, tech firms and platform providers, not for profit organisations, and three universities.

The majority of respondents chose to email us directly; seven respondents submitted completed questionnaires via the online portal. The responses to each question are summarised below.

Question 1: We consider that improvement is required in the visibility of DG and LCTs connected to the distribution network. In addition to DG and LCT connections, can you identify areas for improvement in the current data that is shared in the LTDS?

- There was strong support for greater visibility of distributed generation and low carbon technologies, with almost all respondents explicitly supporting this.
- The majority of respondents highlighted Flexibility requirements and constraint data as priority areas to improve on.
- Many respondents wanted more granular information on the generation and demand connected to the distribution networks.
- There was significant support for the extension of the LTDS down to 11kV network.
- Several respondents identified network topology as important in allowing third parties to make sense of the information contained in the LTDS.
- Several respondents wanted better visibility of market data relating to flexibility procurement and dispatch.
- A few respondents wanted more visibility of the sections of network currently under ANM or CMZ control.
- A few respondents identified wider options for inclusion such as planning data from local authorities, water and transport.

Question 2: Can you identify areas for improvement in the presentation of network information in the current form of statement (FoS)?

- Significant numbers of respondents stated that they viewed consistency and standardisation, including unit conversions, as being important outcomes for the reform. Of those that identified standardisation a few specifically stated that CIM was the appropriate standard.

- A reasonable number of respondents wanted access to the LTDS to be improved, citing the current process of requesting information via different methods as counter to the spirit of openness.
- Several network companies expressed the view that the current format was sufficient.
- A few respondents wanted the format to be improved to allow non-specialists to more easily understand and interpret it.
- One network operator highlighted work being done on the digital systems map.
- One network suggested the inclusion of GIS data as standard.
- One network operator identified that there is a lack of reinforcement information in the current form of statement.
- One stakeholder suggested the inclusion of Plant schematics and maps.

Question 3: The EDTF and others have identified the need to collate and share 11kV and lower voltage network data. Is there value in creating a sharing mechanism for 11kV and LV network data ahead of the expected roll out of network monitoring and telemetry in RIIO-ED2 and the limited data availability in RIIO-ED1?

- Of the non-network companies that provided a response to this question, there was unanimous support for a sharing mechanism down to 11kV and significant support down to LV.
- A high percentage of respondents stated that even incomplete data sets are of value to flexibility providers and should be shared in advance of full network monitoring.
- A couple of network operators were not supportive of the proposal to develop a standardised sharing mechanism.
- One network operator was supportive, but noted that it is not currently possible to share 11kV/LV data to the same standard as 33kV and that this will be a lot of data in the future.
- One network operator raised cyber and national security.

Question 4: Given the complexity of future distribution networks, static data alone may not satisfy user needs. Should the FoS be enhanced to mandate the development of a common network model to allow power system simulation that each licensee must make available for exchange to users and interested parties? If so, what do you consider to be an appropriate standard?

- A clear majority of respondents support the development of a common network model, most notably from third parties. Of those that supported a common network model, CIM was the only option identified by respondents.
- Significant concerns were raised about cost, both from network operators and non-network operators and several of these respondents called for a CBA.
- Two respondents identified data sharing platforms as an appropriate method, although one suggested that a single platform should exist that is automatically updated from DNOs IT, while the second respondent wanted data shared by the DNOs to meet open source platform requirements.
- One network operator raised concern about commercial privacy issues.

Question 5: From a review of industry publications we consider that interoperable standards will underpin future DSO activities. Should the FoS mandate the adoption of a IEC 61970 CIM and IEC 61968 CIM for Distribution Management, such that data is collated and constructed in a manner similar to WPDs CIM innovation project model? Are these standards mature and what are the likely benefits and costs?

- Of the respondents that answered this question, there was unanimous support for an interoperable open standard, of those that felt confident to specify a standard all supported CIM; no other standards were proposed.
- Several respondents highlighted that CIM does not solve issues surrounding poor data collection and that this will need to be addressed for the full benefits of interoperable data standards to be realised.
- A few respondents, primarily DNOs, raised concerns around the cost of CIM implementation.

Question 6: Should the FoS also be retained in its current Microsoft Excel form? Is there value in this format?

- The majority of respondents saw value in retaining the excel spreadsheet form, as long as this was in addition to an interoperable standard, as some stakeholders that use the information in the LTDS will not have CIM capabilities.

Question 7: Ensuring network information remains accessible is a priority. At present there is no formal requirement for the production of heatmaps. In order to ensure future customer can access the required data, should the scope of the LTDS and FoS be extended to mandate the production of heatmaps?

- The clear majority of respondents supported the regulation of heatmaps.
- There is strong support for the creation of either a standardised format or minimum standards that allow stakeholders to compare information across licensees.
- Several stakeholders noted that the value of heatmaps is contingent upon to the accuracy of the underlying information.
- A few DNOs stated that they did not consider regulation to be required, preferring to leave it to the ENAs Data Working Group and suggesting that the Digital Systems Map will deliver the required improvements.

Question 8: Would there be benefit to adopting common guidance or formats on information presentation within heatmaps, including the presentation of technical information and cost information? What are the barriers to its adoption?

- A clear majority supported the adoption of common guidance or formats but many were not specific on the expected benefits or costs.
- Where benefits were cited:
 - Two respondents said this would support new market entrants.
 - One said it would provide an opportunity to identify the potential of distributed energy resources, and
 - One said that the benefit would be consistency of data presentation across electricity distributors.
- Where barriers were cited:
 - Two respondents noted costs but said that they believed this would be beneficial in the long run.
 - One respondent said that they thought costs of implementation would be higher than the returns, and
 - One responded cited the lack of coordination between DNOs as a barrier.

Question 9: The core focus of the LTDS is to assist users to enter into arrangements with the licensee and evaluate the opportunities for doing so. Should the scope of the heatmaps include other network needs, such as flexibility requirements? What is the best mechanism to notify network users of opportunities to enter arrangements with the licensees?

- A high percentage of respondents gave clear support for flexibility requirements to be included on heatmaps.
- Other types of information that were suggested include:
 - Information on where connecting DG will affect the transmission network.

- Predictions of substations needing reinforcement or flexibility services in coming 5 years.
- Local energy market operation,
- Active Network Management areas,
- Impacts of the network charging reforms
- Peer-to-peer trading, and
- Real time management of smart charging.
- One respondent felt that it was preferable to let the market decide rather than opting for regulation in this area.
- One respondent said that the ENA are considering this.
- One respondent wanted to exclude flexibility requirements from heatmaps in favour of this information being delivered through external platforms.
- Of the respondents that suggested possible mechanisms for communication the following options were put forward:
 - email
 - Distribution lists
 - Events
 - Direct comms.

Question 10: On what frequency should these maps be updated? Should they be updated as there are changes to the underlying data or periodically?

- Several respondents stated that the updates should be driven by when significant change happens to the underlying data.
- Several respondents said that annual was sufficient.
- A few respondents wanted as close to real time as possible.
- A few respondents wanted monthly updates.
- One respondent said every 10 days, and one respondent said every 6 months.
- One respondent suggested that the updates could be on different frequencies for different types of data.
- It was noted by several respondents that it was important to strike a balance between the cost of the updates and the usefulness to stakeholders.
- One respondent included the recommendation that the date of the last update should be available and the data that was changed in the last update should be sign posted.

Question 11: Is there a need for a common methodology or principles for estimating load growth? What potential role could the D-FES play in informing the load growth forecasts on the LTDS?

- There was near unanimous support for a common methodology for the estimating load growth.
- A significant number of respondents supported the DFES being used as an input to the LTDS.
- Two respondents stated that the value of the methodology is dependent on the accuracy of the input information.
- One respondent expressed support for a common methodology but expressed the opinion that regional differences should be accounted for.
- One respondent stated that they did not see long term value in requiring DNOs to develop standards.

Question 12: Are there any lessons that can be learned from other industry documents such as the ETYS and NG FES?

- A significant number of respondents cited that stakeholder engagement was a key learning to take from the ETYS and NG FES process.
- A reasonable number stated that standardised formats were important.
- Several respondents wanted standardised publication timescales.
- A few wanted a clearer link between DFES and procurement of service decisions.
- One respondent advocated a whole systems approach, looking across gas, heat and other sectors.
- One respondent said the DFES should not be aligned to the FES as serve different purposes.

Question 13: Do you agree that the LTDS should be enhanced to present the key assumptions for network requirements forecasting and the uptake in LCTs, or is this a role better served by the D-FES or other documents?

- A significant number of respondents wanted to see the assumptions on network forecasting and LCT uptake added to the LTDS, with several pointing out that the LTDS is mandated whereas the DFES is not.
- Several respondents wanted the DFES and LTDS link to be formalised.
- Several respondents advocated for all forecasting and scenario documents to be drawn together into a single source.

- A few respondents said that they considered it more important that the information was published than where it was published.
- One respondent stated that LCT connections should remain in the DFES and that this should be kept separate from the LTDS.

Question 14: Forecasting tools have been a focus of a number of innovation projects. Are there any mature tools or techniques that could be adopted to enhance the transparency or robustness of the load growth forecasts?

- Many respondents did not answer this question.
- Several said that they were not aware of any tools that were sufficiently mature.
- A few respondents did identify tools that they thought could be adopted:
 - WPD’s Electricity Flexibility and Forecasting system (EFFS)
 - ENWL’s Architecture of Tools for Load Scenarios (ATLAS)
 - SSE’s Thames Valley Vision
 - ESO forecasting tools
- A couple of respondents noted that a tool is only as good as the data that is available, and expressed the opinion that DNO data is not sufficient to give robust outcomes.
- One respondent said that econometric and end use models are preferable to trend analysis models.

Question 15: Do you agree that IDNOs should be issued with a direction to produce a LTDS?

- The clear majority of respondents supported IDNOs being directed to produce LTDS.
- Many respondents said that there was value in having a threshold, so that larger IDNOs are included but small IDNOs are exempt.
- A few respondents said that regional LTDS would be better, with IDNOs feeding data into their local DNOs LTDS.

Question 16: What summary information should IDNOs publish? This is currently found in section one of the LTDS FoS, such as information relating to the design and operation of all voltage levels of the distribution network. Please explain your reasoning.

- Many respondents did not answer this question.
- However, a majority said that IDNOs should publish data consistent with DNOs to allow comparison.

Question 17: What information on network data should IDNOs publish? This is currently found in section two of the LTDS FoS. Please explain your reasoning.

- Many respondents chose not to answer this question.
- However, a majority supported IDNOs requirements being consistent with DNOs
- A few respondents said that they didn't see the cost benefit of requiring IDNOs to publish this information.
- Of those that advocated partial data publication that following categories were identified:
 - Max demand (gross & net),
 - Minimum demand incl. reverse power flows (gross & net),
 - Connected & contracted generator capacity,
 - Fault level infeed data,
 - Information on distributed loads,
 - Connected flexible assets,
 - Penetration of LCTs

Question 18: Do you agree with our proposal on how the LTDS delivery body should be convened and governed?

- An Overwhelming majority of respondents support our approach.
- A couple of respondents suggested the ENA and its Data Working Group an alternative

Question 19: Would you like to nominate an individual to take part in the LTDS working group? Please set out reasons for their inclusion and any qualifying experience the nominated person has to function as a strong contributor to the group.

- Many respondents have nominated individuals to participate in the working group.

Question 20: What network monitoring parameters would you like to have access to? At what frequency?

- Monitoring parameters:
 - Several respondents commented that the 'presumed open' data principle should apply, rather than listing specific datasets.
 - A few respondents commented that smart meter data would enable greater network monitoring.
 - One DNO commented that they wished to see other DNOs network monitoring data in real-time.
 - Data types referred to included:
 - Load
 - Flow direction
 - Voltage
 - Current
 - Frequency
 - Network constraints and congestion
 - Annual and peak demand
 - Phase angle
 - Real-time thermal rating
 - Transformer health index
 - Temperature in link boxes
 - Accelerometers on poles
 - Reactive power
 - Harmonics
 - Asset type, installation date, identifier, rating,
 - Fault level
- Network granularity:
 - The ESO requested LV network running arrangements and demand transfers.
 - Several respondents commented that smart meter data improvements would reduce the need for LV network monitoring.
 - One DNO commented that they monitor the EHV and HV network at half hourly intervals.
 - One DNO commented that data should be available in granular data in real-time, though considered that further investment was required to enable this.
- Frequency of data network monitoring parameters:
 - Several respondents suggested that data should be available at a minimum half hourly frequency.

- Several respondents requested that data be made available at as high a frequency as possible, preferably in real-time.
- One university suggested all half hour monitoring data should be made public on a one week delay.
- A network licensee commented that different data types warranted different data update frequencies based on use cases, for example to inform network investment relative to network management.
- One respondent commented that historical network utilisation parameters at half hourly frequency over the full course of a year would be valuable to better estimate the likely utilisation of flexibility assets.
- One respondent highlighted cyber security issues that need to be considered relative to data sharing.
- A respondent commented that update frequency should be defined by the data needs cases.

Question 21: What would enhanced 33kV network monitoring enable that cannot be undertaken today?

- Several respondents commented that this would improve investment planning for flexibility providers by improving forecasts and certainty of business cases.
- Several respondents, including a DNO, commented that the 33kV network is sufficiently monitored, and further monitoring is not necessary.
- The ESO commented that this would improve their understanding of regional demand patterns, allow better planning, scheduling and dispatch of flexibility services.
- One DNO commented that this would improve the visibility of network constraints.
- One DNO commented that this would improve asset health monitoring, and reduce the severity of asset failures due to earlier detection of issues.
- One DNO considered that this would allow for improved whole systems network planning.
- One DNO commented that this would allow for greater asset utilisation rates.
- One DNO stated that this would provide better understanding of network harmonics and fault levels, and ultimately reduce the risk of low frequency demand disconnection events.
- One university commented that this would allow the ESO and TOs to better monitor distribution export to the transmission network.
- One university commented that this would allow improved understanding of carbon intensity monitoring.

Question 22: What would enhanced 11kV network monitoring enable that cannot be undertaken today?

- A significant number of respondents, including flexibility providers, aggregators, DNOs and the ESO, commented that this would enable flexibility markets. They considered that improvements could enable more accurate and precise assessment of flexibility requirements; enabling a route to market for DERs.
- Several respondents commented that this would improve the reliability of business cases for flexibility providers, and improve investment decision-making processes.
- A number of DNOs commented that a targeted, rather than universal, roll-out of monitoring was the most sensible approach. One DNO commented that a cost-benefit analysis would be required for such investments.
- One university commented that this would improve price signals for network usage.
- One university commented that this would enable more active network management schemes.
- One respondent commented that smart meter data may make 11kV monitoring redundant in the future.

Question 23: What would enhanced LV network monitoring enable that cannot be undertaken today?

- The majority of responses considered that enhanced LV monitoring would principally enable LCT uptake and management (in particular for EVs, heat pumps and photovoltaics):
 - Some DNOs and an IDNO commented that this would enable better service provision by enabling and better targeting outage management, investment decision making, connections management, or network operations, such as reconfiguration.
 - Many respondents commented that this would allow improved decision making for investment and installations at LV.
 - Several respondents commented that business cases for investment could be made more reliable with enhanced LC monitoring.
 - Several respondents commented that this would enable flexibility markets to be realised at LV.
 - The ESO commented that LCT impacts on forecasting generation and demand could be improved by enhanced LV monitoring.

- One university commented that the LV network is the most difficult to monitor, due to the size and network complexity.
- One respondent considered that high granularity heatmaps could be developed.
- One respondent commented that several granular metrics or datasets could be published, supporting or enabling:
 - connectivity maps,
 - phase mapping,
 - phase imbalance identification,
 - load growth forecasts,
 - fault predictions,
 - asset health monitoring.
- One university commented that this would enable better communication of constraint management issues to different parties.

Question 24: What constraints in data systems architecture do you perceive are limiting network monitoring and visibility?

- Many respondents commented that existing data systems architecture within network licensees were incapable of managing data flows in a modern fashion.
- Several respondents commented that IT systems and data structures were islanded within network licensees, meaning that there was poor data integration and management within networks:
 - One respondent commented that WPD’s CIM project was an example of how this could be resolved.
 - The ESO commented that differing data structures and definitions between the DNOs made data exchange laborious and unnecessarily complex.
 - One respondent commented that the differing assumptions behind datasets was a barrier to improved network monitoring and visibility.
- Several respondents commented that the data exchange mechanisms were poor:
 - The ESO commented that a lack of standard communication links between the ESO and DNOs was a barrier to improved network monitoring and visibility.
 - A few respondents respondent commented that the lack of standard rules for data exchange and validation is a barrier to improved network monitoring and visibility.
 - One respondent commented that the reliance on Microsoft Excel formatted data is hampering improved network monitoring and visibility.

- A few respondents commented that the ability to store data was a barrier within existing data systems architecture.
- One DNO commented that there are no real technical barriers to improving data systems architecture, and that it was instead limited by other factors including investment and data availability.
- Several respondents commented that cyber security was a major issue that needed to be better accounted for and mitigations designed in order for improvements to data systems architecture.
- A few respondents commented that General Data Protection Regulation (GDPR) was a barrier to data sharing.
- Several respondents commented on data availability and transfer required:
 - Several respondents commented that there is too little network monitoring in place to facilitate improvements in network monitoring and visibility.
 - A few respondents commented that the telecoms infrastructure for transferring data after it has been captured, was poor and limiting network visibility and monitoring.
 - A few respondents commented that an inability to access full smart meter data was barrier to improved data systems architecture, and therefore limiting network visibility and monitoring.
 - Another respondent commented that the hope that DNOs accessing smart meter data will improve network monitoring and visibility is misplaced, and that access to smart meter data will make only marginal improvements.
- Several respondents commented that there has been investment to build modern data systems architecture.
 - One respondent commented that the RIIO model insufficiently incentivises data systems architecture improvements.
 - One DNO commented that the operation and maintenance costs of improved data systems architecture needed to be better accounted for

Question 25: What operational data is most important to prioritise opening up first and why?

- Many respondents sought the following operational data:
 - Network topology
 - Network outages
 - Network constraints
 - Network configurations

- Several respondents sought datasets on:
 - Forecast demand and generation patterns
 - Fault data
 - Historical load flows across the network
 - Network capacity
- A few respondents mentioned datasets covering:
 - The ESO sought ANM headroom and footroom data, in order to facilitate DER access multiple markets.
 - The levels of AMN curtailment
 - The costs of network reinforcements
 - Statistics on flexibility procured by Electricity Distributors
- Individual respondents sought further datasets:
 - More complete IDNO data to feed in to DNO datasets
 - Information on carbon intensity
 - Smart meter data
 - Data on EV registrations
 - Data on other asset registrations
 - DNO parallels to the datasets provided by the ESO
- Individuals provided commentary on the best means to improve operational data sharing:
 - One respondent commented that they support a data licence based on that applied to the ESO.
 - One respondent commented that they support the early and iterative sharing of operational data, rather than seeking to ensure that the data itself is perfect.

Question 26: How does a lack of access to this data impact the delivery of flexibility to the system?

- Many respondents commented that lack of access to this data inhibits the development of flexibility markets for two principle reasons:
 - Investments cases for prospective providers of flexibility are not clear. Similarly, those already connected cannot understand possible business cases for providing flexibility services.
 - Electricity distributors may not know where DER are. This can result in sub-optimal planning and operation of the networks.
- A few respondents commented that limited coordination between DNOs and the ESO could: inhibit flexibility service provision; lead to over-procurement of services or

procurement of more expensive services than necessary; or, restrict the ability for flexibility providers to participate in multiple markets.

- One respondent commented that a lack of this data could lead to over-reliance on ANM schemes.

Question 27: Are there any real or perceived conflicts of interest with DNOs owning and operating ANM platforms at scale? What additional protections could be required for ANM customers?

- Many respondents commented that there is a conflict of interest with DNOs owning and operating ANM systems.
- Many respondents commented that the use of ANM was inhibiting flexibility market development.
- Many respondents commented that ANM was being used as a source of 'free flexibility', and should be appropriately compensated.
- Many respondents commented that ANM or curtailment and flexibility should all be managed through market based systems.
- Many respondents stated the flexibility should be used first, over ANM.
- Several respondents commented that ANM was a valuable network management tool to maintain system and network reliability and security.
- Several respondents requested that reporting on the use of ANM was clearer, including the decision-making on the use of ANM relative to other alternative solutions to manage network issues.
- A few respondents commented on the dispatch and control functionality of ANM schemes, suggesting that they could be undertaken by parties other than DNOs.
- One respondent stated that ANM was not problematic, since DERs are compensated by faster and cheaper networks connections.
- One respondent drew clear distinctions in the use of ANM relative to flexibility, stating that ANM was used for known and identifiable users, whereas flexibility was non-identifiable load growth; and, that ANM was generally used for generation curtailments, whereas flexibility was generally used for demand constraints.
- One respondent commented that ANM can be a technical enabler for flexibility markets.
- One respondent commented that ANM should be used when this is of the greatest value overall for consumers.
- One respondent commented that ANM does not restrict DERs from participating in flexibility markets.

- One respondents commented that any advancement in DNOs engagement in ANM should be to increase network visibility, rather than controlling network assets.
- One respondents commented that there is no conflict of interest in DNOs operating ANM schemes, unless they are biased in the use of assets, and that this is already protected against.
- One respondent commented that a single data platform should manage ANM schemes across DNOs.
- One respondent commented that ANM schemes could become critical national infrastructure, and should therefore be managed by DNOs.

Error! Reference source not found.

- A few respondents wanted DNOs to be required to use commercial flexibility before curtailment through ANM.
- A few respondents suggested that the legal separation of DNO and DSO was required.
- A couple of respondents felt that current arrangements were sufficient to prevent conflicts of interest.
- One respondent stated that DNOs should not be allowed to use ANM to provide flexibility services to the ESO.
- One felt technical arrangements were sufficient but that commercial arrangements needed review.
- One respondent want ANM functions to be carried out by a 3rd party.
- One respondent wanted ANM arrangements to be reviewed in line with the targeted charging review.
- One respondent suggested that all DNO decision on the use of ANM relative to procuring flexibility services or traditional reinforcement should be audited.
- One respondent requested that Ofgem further articulate conflicts of interest and how these should be resolved.

Error! Reference source not found.

- Many respondents did not provide an answer to this question.
- The examples non-network parties gave were:
 - A heatmap showing zero constraint but issues on the Transmission network meant the connection could be subject to Statement of Works.
 - DNO inconsistency in G99 application including what they charge participants for.
 - DNO not seeking to procure flexibility in a constrained area of network.

- Smart meter data privacy issues making visibility of LCT difficult.
- A company looking to supply reactive power to DNO have found network data lacking.
- Examples given by Network licensees were:
 - No longer able to access data on EVs through DVLA.
 - Access to Ofgem FITs register
 - SMART meter information could allow flexibility on LV to prevent need for reinforcement.
 - Trips have occurred that network monitoring and data could have avoided.
- Visibility of demand could help with blackstart arrangements.

Question 30: Are there any other issues related to enabling DSO that have not been considered that you think are important? Please provide details of your considerations.

- Respondents gave a wide reaching set of answers to this question. The issues that were raised are:
 - DSO roles in RIIO ED2 and funding for them,
 - Developing a fluid flexibility market,
 - ESO/DNO primacy rules,
 - Difficulty of recruiting Demand Side Response,
 - Better consideration of IDNO-DSO interactions,
 - Clear overarching principles for DNOs on conflicts of interest and participation in commercial markets, or exclusion thereof,
 - Division of DNOs businesses into those parts that could function as DSO,
 - Whole systems approach,
 - ANM arrangements,
 - Conflicting needs at national and DNO level, for example the need for more low carbon assets at national level versus deferring reinforcement at network level.
 - Funding LCT uptake,
 - Links with charging reforms,
 - Effects of heat and transport of Low Voltage network,
 - DNO role in dispatch and control of flexibility assets.

