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By email only to flexibility@ofgem.gov.uk

Key enablers for DSO programme of work and the Long Term Development Statement

Dear Alex

Thank you for the opportunity to provide feedback on the above consultation. Our response should be treated as consolidated on behalf of UK Power Networks' three distribution licence holding companies: Eastern Power Networks plc, London Power Networks plc, and South Eastern Power Networks plc.

UK Power Networks welcomes the opportunity to refine and improve the Long Term Development Statement (LTDS). We recognise that the LTDS is an important source of information for our stakeholders and that we have a duty to ensure the information it contains is both accurate and up to date. We are also cognisant of the need to modernise and digitalise energy data, thereby ensuring that we enable the transition to a smarter and more flexible electricity system. The LTDS will play an important role in achieving this. However, it would not be practical for us, and users, for the LTDS to capture the full range of data on energy scenarios, forecasts, capacity and flexibility. As an alternative we are developing an approach that packages up information and results in a pipeline of publications across the year to best meet our different stakeholders' needs.

In terms of progressing the above, we have progressed the following:

- Published a Digitalisation Strategy consultation¹;
- Developed Distribution-Future Energy Scenarios, with the first report being published imminently;
- Developed a System Wide Resource Register²;
- Published our flexibility needs on open and accessible third party visibility platform³; and will
- Publish a Transparent Processes consultation in Q1 2020 to give assurance around our procurement of flexibility.

Our aim is to make network related data available in a way that accessible to all potential users. We are also listening to stakeholders on what additional information we can provide to them and at what point in time this provides greatest value. For example, if we can provide data in a way that empowers users to make their own decisions on where to connect this can help us reduce costs in the long term. Putting customers first is at the heart of everything we do and was a key driver for our development of Active Network Management (ANM), as we wanted to provide greater choice of connection options. Due to the changes happening on our networks ANM is becoming a core part of our control system that keeps the network running reliably. Whilst

¹ https://www.ukpowernetworks.co.uk/-/media/files/digital-consultation/20175-ukpn-digital-strategy_final2019.ashx

² <https://www.ukpowernetworks.co.uk/electricity/distribution-energy-resources/system-wide-resource-register>

³ <https://picloflex.com/>.



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we recognise that Ofgem wants to keep options open with regards to commercial arrangements, this should not inhibit the rollout of ANM.

In the appendix we have provided feedback to the individual questions asked in the consultation. If you have any questions regarding our response please do not hesitate to get in touch.

Yours sincerely



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Appendix: Response to questions

Part 1 – The Long Term Development Statement

Content format of form of statement

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?

In line with commitments made in the ENA's Open Networks Project we plan to publish greater information on resources connected to our network that are above 1MW. Through further refinements to the System Wide Resource Register we are aiming to:

- include ESO, TO & IDNO registers;
- potentially develop a central platform to host all company registers; and
- as part of DCP 350, build an embedded capacity register and incorporate accepted connection dates into the LTDS

We are also reviewing the merits of providing information on the following:

- expanding the register to include DER <1MW;
- information on minimum demand by substation by season;
- generation forecasted figures;
- average curtailment figures for export (or import going forward) by substation; and
- harmonic constraints.

Opportunities and challenges associated with greater data sharing

We recommend that Ofgem looks at a broader level than what is in the LTDS. Whilst we will look to improve the LTDS many of our initiatives will share data via a different route. Below we have outlined examples of these.

We have already started to include information on our upcoming requirements for provision of flexibility services. We also plan to evolve this to provide a greater level of information, such as geographical and connectivity visibility. For example in London we have published heat maps down to distribution substations to help users understand the headroom available for EV charge points⁴. Whilst we recognise the potential value of publishing data of DER below 1MW, we are also aware of the challenges associated with acquiring accurate and up to date data at this granular level. For this reason we are initially looking to publish aggregate data by technology type. Furthermore, to ensure transparency we will make it clear what data we have that can be shared and where the gaps are.

The capability to overlay data onto a connectivity model using CIM, or an equivalent, would be useful for developers looking to attain a comprehensive understanding pre-application. In addition to this, provision of relevant methodologies that can be employed by customers to better assess their new connections could be included. As we already provide significant levels of data, we will centralise a set of links and information on how to utilise this effectively that we believe will be beneficial to end users.

Historically networks have focussed the deployment of network monitoring at HV and EHV networks. However, as the way in which networks are being used has evolved, with power flows now more dynamic in nature, there is a need to re-assess and update the existing technologies to ensure the appropriate coverage of network parameters are attained.

The collection of data at lower voltages requires manual intervention such as on-site visits or the use of portable data recorders to build the requisite picture of even a small part of the network. As the energy

⁴ See https://dgmap.ukpowernetworks.co.uk/site/?q=ev_ext

landscape shifts more towards greater utilisation at LV e.g. electrification of transport and heating, there is an increasing need for greater visibility across these networks. Last year we embarked on a project to upgrade monitoring at 5,384 secondary sites across our three networks by the end of RIIO-ED1, with the immediate focus on areas where we forecast the greatest level of EV uptake. This makes up only 7% of the total number of ground mounted (GMT) secondary sites and only circa 4% of both GMT and pole mounted sites. This demonstrates the scale of the challenge we are facing.

Current visibility of generation

It should be noted that from a generation perspective we only have visibility via SCADA in real-time of HV and EHV generators directly connected to the network. Where generators are embedded in HV networks or connected at LV, visibility is limited to historic half hourly or maximum demand metering data. As smart metering becomes more comprehensive this will be essential in its contribution to modelling network utilisation at a more granular level across networks.

We are aware of generators at all voltage levels where additional works were necessary to connect to the networks, or where under G83 or similar arrangements the customer has notified us prior to installation. These customers will be included on network diagrams and we will have signed connection agreements in place with them where necessary. However, we are aware that we have many more generators connected within existing customer connections (i.e. behind the meter) than we have records of, especially at LV. These generators, which we do not have the details of, are not currently receiving any credits under DUoS for exported units, as a result they are likely consuming all units within their site or exporting only small amounts onto the networks. Nevertheless, they remain connected to the networks with the ability to export units without us as the DNO being aware of them being connected.

Question 2:

Can you identify areas for improvement in the presentation of network information in the current FoS?

Yes, we believe that there are areas of improvement in the presentation of network information that will provide a more detailed and reflective view of the distribution network at the time of the LTDS submission and, more importantly, of the network that is under development. For example, a key benefit of expanding the network information provided by DNOs is that it gives a more accurate representation of how the network will develop by providing evidence to customers on capacity constraints and the related revenue opportunities that will be created by these.

The main areas that we believe could be improved are:

- to include the full pipeline of works being undertaken as part of a development;
- to include available capacity for generation connections;
- the link between transmission and distribution requirements and other data exchanges; and
- accessibility – as the number of users and their interest increases, it will be crucial to make data accessible and usable.

The information currently provided under the FoS is a simplified representation of the distribution network at the time of submission, both in terms of schematic information and in terms of technical information about installed assets. Network developments, in the form of network reinforcement activities that have secured finance, are mentioned in other sections of the LTDS, but are not reflected in the network information section. This is also valid for other network development activities, such as asset replacement, which will change the characteristics of the network in the future.

Network capabilities provided in the LTDS, in the form of peak demand estimates and firm capacities, are intended for demand connections as they reflect a specific point in time in the year. We believe that, similarly to the information currently provided for load, a new dataset is required for generation, which captures the technical capabilities of the assets that are required when making capacity assessment.

To this end improvements have already been made between distribution and transmission arrangements, in the form of multiple load and generation scenarios at key times of the year. These are used to assess the

technical capabilities of the network when connecting solar, wind and other forms of generation and link to DNO produced heat-maps.

In our view arrangements around the exchange of network information between transmission and distribution network operators is evolving and important to address, but goes beyond the remit of LTDS and the FoS. Similarly, network modelling information, statement of works and the Appendix G process, are further examples of data exchanges that are important, but are separate to the LTDS.

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 [given] the limited data availability in RIIO-ED1?

Yes, in principle we believe there is value in sharing data at lower voltages (<=11kV). As part of achieving this we are taking a progressive approach, for example, we already share data around our 11kV substations⁵.

A key benefit of greater sharing is that customers will be able to self-serve their needs, which will lower our costs in the long-term. Nevertheless we recognise that a full CBA is required to justify any investment in new systems and what reduction of indirect costs this will result in. This will also need to consider the costs of providing and maintaining the published data if it is required in a different form to what we have it already. Whilst we have recently increased the level of data collected at 11kV, the number of distribution substations with remote monitoring remains relatively small compared to the total number on our network. However, in line with the principle of open sharing we will publically share available time-series data alongside our more widespread Maximum Demand Indicator (MDI) readings, which are manually collected and therefore updated less regularly.

Going forward there is a strong case to install remote monitoring equipment in all of our Ground Mounted Transformer (GMT) sites, however, due to the higher associated costs and weaker potential benefits, we do not currently see a rationale for rolling this out to Pole Mounted Transformers (PMTs), which typically serve fewer customers.

In broad terms, we are taking a targeted and least regrets approach, whilst also considering what data we can get from secondary sources e.g. smart meters and DVLA data on EV registrations. We believe using a blend of primary and secondary sources will result in the lowest costs for consumers by avoiding duplication of effort. Recognition should also be given to the fact that different areas are moving at different speeds with respect to the energy transition. Therefore we need to focus on where need is greatest. For example, through our involvement in the Mayor of London's EV Taskforce we have put resource into enhancing visibility of 11kV capacity headroom in our London area, as described in our response to question 1.

As can be seen we are committed to opening up data at the lower voltages, however, as part of this process we believe that Ofgem, BEIS and DNOs need to consider together the security risks of making data more accessible. For example, consideration is required how greater data access and interest could change the risk of currently designated High Impact Low Probability events, and to what extent this could be partly mitigated by controlling and recording data access rights. Furthermore, there is likely to be a need to restrict data access in locations where it creates a threat to national security.

⁵ https://dgmap.ukpowernetworks.co.uk/site/?q=ev_ext

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?

Yes we believe it should use a common model to facilitate data exchange.

With an increasingly dynamic network that includes active network management and new flexibility markets, customers should expect sufficient access to the data, which facilitates the accurate assessment of commercial risk and opportunity. Active management of the networks requires enhanced insight over and above the static planning data, and it is reasonable to assume that customers should be afforded the same opportunities wherever they are.

Based on our experience, publishing data alone does not meet the needs of many users, as many do not have technical expertise and therefore require assistance with interpreting data and getting it into a format they require. We therefore acknowledge that this will require significant work and we will need to find a balance between the level of support we provide and our costs (ultimately borne by the generality of customers). We also recognise that going forward we will need to transition from publishing static data towards releasing time-series data. As mentioned earlier in our response we are doing this in a progressive manner, which is targeting areas with the greatest need.

The ENA's Open Networks Workstream 1B has identified an extended scope for planning data to be shared between network operators so that transmission and distribution networks can be more accurately assessed and developed as increasing levels of DER connect. The proposal for increased data exchange will be considered through a forthcoming Grid Code modification and will include data for a number of different demand scenarios (e.g. winter peak demand, solar generation peak and conditions of high transmission system power transfers).

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?

Yes, we believe the adoption of the IEC CIM standard is the right way forward for the industry but there are different types of complexities to consider. The key challenge is that the implementation of the CIM standard will take different time durations for each network licence area to be ready for full data exchange based on their historic data models.

The readiness to exchange CIM compliant data models depend on multiple factors, such as the quality of the network model data; the readiness of the existing data format to map to CIM standard; adequate skills, tools and process to develop and maintain this capability⁶. By way of example, we have experienced challenges with recruiting people with the required technical expertise in this area.

The CIM standard supports interoperability but it is still evolving in the industry with multiple versions adopted by different utilities. There is a minimal representation to the international CIM working group from the GB DNOs and hence, GB distribution network characteristics and requirements need to be addressed. There is a need for a common approach and agreement from the GB DNOs before this gets mandated for implementation. Our experience is that CIM implementation is likely to be a multi-year, multi-million pound project for the each of the licensees.

⁶ CIM has been predominantly been led by the transmission operators and vendors due to their need to exchange network models. The IEC CIM 61970 suite of standard covers the transmission network while the IEC 61968 suite of standards cover the distribution networks.

Based on this, our recommendation is for DNOs to collectively assess the complexity, cost and practicality of implementation. This will help to develop a clear plan of when this can be implemented from the GB perspective and what governance and industry participation is required to maintain this. At the same time as developing this industry-led implementation plan we believe Ofgem could further consult on its expectations in this area. We also note that the ENA's Open Networks Project has already undertaken an analysis of the potential ways to collate and present planning data⁷.

Question 6:

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

We support retaining the current MS Excel format as it is universal and therefore we believe it ensures accessibility for users. Nevertheless, we open to also publishing in other formats if, for example as a result of this consultation, there is consensus from stakeholders on another option. Furthermore, in line with the recommendations of the Energy Data Taskforce, we will explore how to further open up the FoS in a range of formats (e.g. XML, APIs), in order to satisfy as broad a range of stakeholder applications and use cases as possible.

Heat-maps, direct needs identification and hosting capacity

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?

We support an agreed industry minimum standard with regards to networks providing network capacity data.

We believe there is a case for the LTDS to include capacity data linked to heat maps as these offer the benefit of providing high-level insight with a fairly brief assessment. However, this is useful for some stakeholders, but many require much enhanced levels of detail. Consequently, there needs to be a balance between the resource taken to produce the heat-map and the benefit realised. Initial focus should target improved data provision and heat-map production should be an automated by-product of that data provision. It is equally important to recognise that many stakeholders have their own systems (including GIS) and they simply want to ingest the data into and this ideally needs to be facilitated.

As part of our Digital Strategy, we are currently assessing the use of geospatial analytics for providing LTDS information to users in a visual format.

It should also be noted that heat-map data can be integrated into third party flexibility procurement systems as demonstrated with the Piclo platform. Again, this provides benefit to some stakeholders in terms of consolidating information.

Finally, whilst we agree on having a single point of access with different layers of information for users, our understanding is that this is being achieved through the ETDF and ENA working groups. Therefore, clarity is required on how these different work streams overlap and how we can best arrive at the desired outcome.

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?

Common guidelines on format and information are sensible, however the level at which this becomes prescriptive would need to be assessed. DNOs currently have differing levels of digitisation, so enablement in the short term holistically could be challenging. In our view, RIIO-ED2 presents an opportunity for setting a list of requirements following further consultation. We have already started to introduce new layers into our

⁷ <http://www.energynetworks.org/assets/files/ONP-WS1B-P4%20Data%20Exchange%20Report-PUBLISHED.pdf>

DG mapping tool, such as giving customers greater visibility of areas that may be constrained for export. Based on our customer feedback we continue to evolve such tools on a regular basis. There is an opportunity to continue to evolve this tool to give more granular information on technical capabilities and cost profiles.

By moving away from presenting static data to closer to real-time data, there is a new challenge in how you maintain up to date information that would account for factors such as changes to running arrangements and interactivity in connection queues. We believe that in order to cater for all customer types there is value not only in creating an interoperable approach (e.g. CIM), but also to provide those customers that do not have the desire to create their own models access to user friendly tools such as interactive heatmaps.

In line with this we recognise the importance of having standardised and consistent data for users to access, therefore we support heatmap data following a common format. However, this should be separate to how DNOs decide to present information, which should be allowed to vary i.e. through a GUI.

As part of the ENA's Open Networks work in 2018, a good practice guide was put in place by DNOs ahead of connection applications. For heatmaps, this included good practice on the quantification of headroom for generation and demand, voltage levels, the ability to download information from heatmaps, and the connection status of generation and demand that should be taken into account in heatmaps. We believe Ofgem could build on this and use the Open Network's Project as a vehicle.

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 Heat-maps 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?

As highlighted in our response to question 7 we currently utilise the Piclo platform to give potential flexibility providers visibility of our requirements.

We agree on the need to evolve the LTDS and make sure it is fit for purpose in the emerging system. With regards to this we believe a lot can be learned from the G81 connection process, which has resulted in us developing a way for users to login and access data through a web portal. A key benefit of this is that when we change standards or update information we can flag these changes to registered users via email. The Piclo platform also has a similar registration process that helps keep users informed.

It is widely acknowledged that currently the LTDS is relatively inflexible, static, and relies on manual input. Due to the nature of EHV this is not a major issue as there are a small number of inputs and there is not much change each year. However, at lower voltages there is a need to automate and regularly update information, for example, on the value of flexibility. We believe that rather than trying to over-engineer the LTDS, it will be more appropriate to publish this type of information in a different format.

Therefore whilst we recognise there are benefits from integrating heat-map data with flexibility data and the LTDS, we would caution against the LTDS trying to capture all of these things together. Instead there should be a rationalisation of what different user groups need and when. This can draw learnings from what the ESO does at a national level, in terms of its publication timeline.

Question 10:

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

Due to the proposed changes and expansion to LTDS, we think it is appropriate for the main components of the publication to occur annually. We also believe that such an approach would involve separating the more static elements of the LTDS from more dynamic data that could be published more regularly.

For example going forward there is potential to release network capacity updates or the System Wide Resource Register on a monthly/quarterly basis.

Going forward our aim is to automate as much as possible to enable more regular reporting.

Forecasting of network needs

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?

We believe that the D-FES should be a key input to the LTDS as one of the key components.

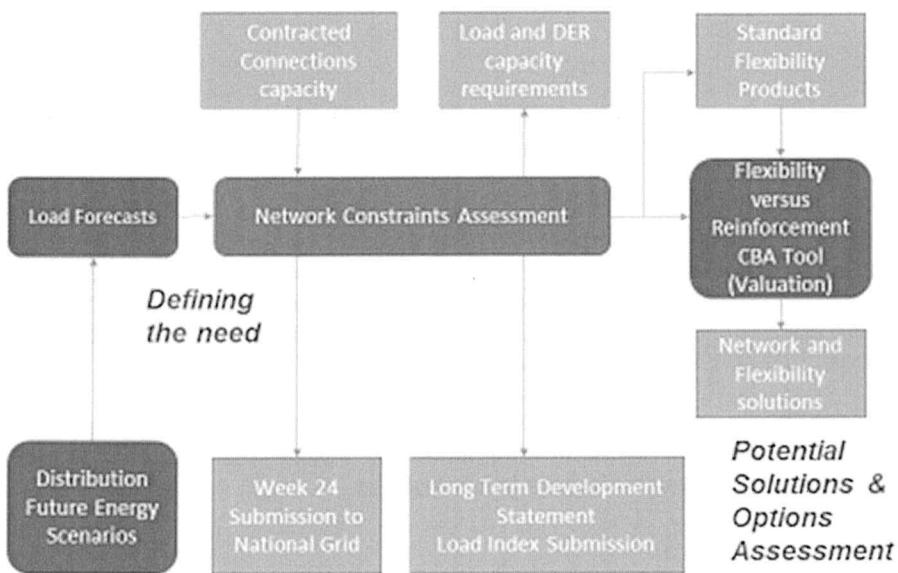


Figure 1: Process diagram showing the link between LTDS and other sources of information

The above diagram (figure 1) outlines the end to end approach that UK Power Networks is developing in terms of forecasting capacity needs. The D-FES will produce the "What technology/demand, Where, and how much of each" under different scenarios. The Network Constraint Assessment will identify and quantify system needs against the actual network limits which will drive solution optioneering.

We currently carry out a simplified uptake analysis for specific technologies such as EV which we then overlay on our network capacity at primary substation level. This is updated annually with the new measured baseline for network demand overlaid with the growth factors and published in LTDS.

As part of the ENA's Open Networks 2020 scope, Workstream 1B Product 2, will further review and standardise the scenarios that are produced through D-FES. This will include the case for DNOs' basing D-FES on nationally agreed scenarios. The 2020 work will also consider how network companies take assumptions around key "Building Blocks" (e.g. EV numbers) and convert these to demand and network capacity requirements. These changes will ensure that a consistent practice is being used across DNOs for estimating load growth and for identifying capacity shortfalls.

Question 12:

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

As our response to question 11 highlights we are looking to have greater consistency between DNOs and National Grid ESO. To this end we led on the ENA's Common Scenario project, which was completed in 2019. As a result of this work a set of common building blocks have been agreed and further work is planned on standardising other aspects such as the scenario framework, document structure and publication dates.

Regarding the ETYS, we see this as a key part of a mature structure of publications at transmission that could be similarly used at distribution level. Our view is that whilst the information and delivery body is different at transmission and distribution, the process should be very similar.

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?

The LTDS and D-FES are strongly inter-linked. However, as our response to question 9 stated there are reasons for keeping these publications separate, both in terms of practicalities e.g. timing and in terms of audience. Our forthcoming D-FES publication will detail key assumptions and will explain the link between 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?

We are in the process of developing an enhanced load forecasting system. This work is drawing on previous innovation projects such as the ATLAS project. The implication of the question is that all companies should be using the same forecasting tools. We would be concerned that such an approach could stifle innovation. We believe that a more appropriate approach would be to communicate network constraint information, derived from these tools, in a consistent way to stakeholders.

It should also be noted that to improve the robustness of our processes we have external audits on our Load Index submissions. This forms part of our wider commitment to provide market participants and customers greater assurance and transparency with regards to our outputs.

IDNOs and the LTDS

Question 15:

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

Yes, we believe that IDNOs should be required to produce the same level of information for their networks as DNOs. This will ensure that their customers get the same standards and that DNOs also gain visibility of the information to enable efficient and coordinated network development.

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.

We believe that IDNOs should publish the same level of information as DNOs as their customers will ultimately expect the same standards. Equivalent IDNO information would also be helpful for us as DNOs in terms of planning and operational requirements. Furthermore, the EU Clean Package has stated that all network operators with over 100,000 customers are required to publish network plans to the same standard⁸.

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.

As per our response to question 16, we would expect IDNOs to publish the same level of network data that DNOs will publish.

⁸ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019L0944&from=EN>

Part 2 – Key enablers for DSO

Delivery governance of the form of statement

Question 18:

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

We support Ofgem's proposals for the LTDS delivery body.

There is significant overlap with the Open Networks work underway. Open Networks could be used as part of the delivery organisation as the vehicle to develop and deliver common methodologies and standardisation.

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.

We would like to nominate Matthew (Matt) White to participate in the LTDS working group.

Matt is our network development manager and internal owner of the LTDS process. Matt has been a significant contributor of industry change work including the statement of works process and more recently the whole systems planning work at Open Networks. He is the deputy chair of the Distribution Code Review panel and steering group member of the Loss of Mains delivery programme.

Should the content of that working group move towards drafting of the obligations on licensees, be that licence conditions, a new FoS or some other document, we will be more than happy to provide additional support in that arena from our Regulation team.

Network monitoring & visibility enablers

Question 20:

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

In terms of network visibility of the distribution network, we believe our customers and stakeholders are best placed to advise what network parameters they would like to have access to.

In terms of the wider system, our joint work with National Grid, findings of the Open Networks project, and lessons from the 09 August 2019 event, have identified the following key enabling parameters for a more efficient operation of the distribution network:

- Greater visibility of DER, in particular behind the meter and embedded in the HV and LV network
- EV charging data where the charge point is not behind the meter
- Greater visibility of commercial contracts/balancing participation of DER/ESO dispatching actions
- Greater visibility of aggregated portfolios
- Enhanced DNO boundary data so that we can extend models to include more detail of adjacent networks
- Real-time sharing of T-network data (flows/voltage) in areas where T-D flows need to be coordinated

For example through the Regional Development Programme we are doing with National Grid we are working towards getting access to the following data:

- NGESO boundary constraint information.
- Visibility of flexibility instructed within the distribution network.
- Visibility of flexibility contracted within the distribution network.
- Background data for network modelling (which includes flows, topology, switch states, impedance and ratings).

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

Enhanced 33kV network monitoring could be used to manage constraints emerging from power quality issues such as harmonics and fault level. It will also support better understanding of very dynamic events such as the LFDD event on 9 August 2019.

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

Enhanced 11kV would enable us to have better visibility lower down the system and then subsequently open up markets associated with system need. As part of considering this a CBA would assess the costs associated with generating real-time data at 11kV versus the potential benefits.

This includes increased competition/access for third parties, as well as new opportunities to release additional capacity through interconnection/load transfers, and develop new services such as reactive power services and fault restoration which ultimately reduces costs to customers.

It is also worth flagging that DNOs currently use a relatively conservative methodology due to the limitations associated with MDIs. Therefore, a more accurate planning methodology could be adopted once enhanced data is available – this is part of our rationale for the LV visibility project we are now progressing (see response to question 23 below).

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

Traditionally LV network requirements have been addressed more reactively than at higher voltage levels. LV networks will be studied in response to new connections, customer contact regarding power quality or network events such as fuse operations. These events may be indicators of the need to address an LV network issue. However, as we anticipate an increase in LV network demand and generation due to decarbonisation, we are developing a proactive approach to identifying and addressing LV network constraints.

In terms of what is done today and what would be enabled by enhanced LV network monitoring please see the table below.

Table 1: The rationale for enhanced LV monitoring

	How it is done today	How it will be done as enabled by enhanced LV monitoring
Capacity Management <i>Ensuring that the network is designed to the appropriate reliability and resilience standards, while releasing capacity cost-effectively for our customers</i>	<ul style="list-style-type: none"> » Distribution planning engineers do not have visibility on the loading of LV feeders or the phase balancing » Network reinforcement is triggered by: <ul style="list-style-type: none"> ○ Maximum demand indications and short duration sampling; ○ Fuse operations or voltage violations are driven by high load 	<ul style="list-style-type: none"> » Distribution planning engineers will have access to historical loading data for each LV feeder » Reinforcement will be triggered when a feeder consistently shows high loading » Reinforcement can be deferred or achieved using “smart” solutions and network reconfiguration » Customer-to-phase connectivity will enable the detection and mitigation of phase imbalance issues to increase network capacity

	How it is done today	How it will be done as enabled by enhanced LV monitoring
Connections Management <i>Enabling new load and distributed generation connections on the network in order to access and utilise network capacity</i>	<ul style="list-style-type: none"> » Connections and planning engineers conduct time-intensive, ad-hoc studies on the network when connection requests are submitted » If the study demonstrates that a feeder may be highly loaded, a reinforcement scheme is commissioned 	<ul style="list-style-type: none"> » Distribution planning engineers will be able to model connection requests using fully-archived LV network data » Detailed load profile data can be used to offer "smart" solutions, and thus avoid the need for a reinforcement scheme
Network Operations <i>Managing the network performance in real-time</i>	<ul style="list-style-type: none"> » Network Control Centre has no visibility on the loading of LV feeders, they operate from fuse ratings » Overloading is identified when customers report outages, and on-site investigations confirm that LV fuses have operated » Network operations crews are dispatched and fuses are replaced after each instance of overload operation 	<ul style="list-style-type: none"> » Network Control Centre will be able to monitor LV network feeder loading live » Background data analytics will identify developing "problem circuits" and flag to Network Operations » Overloading can be avoided with the use of network reconfiguration and proactive intervention

Question 24:

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

We believe the hardware and associated enabling infrastructure is readily available i.e. there are no technical barriers. In the context of within individual organisations, the key constraint is the level of investment required to establish the required level of monitoring across the entire network, followed by the integration of those systems and the associated data within our existing enterprise system and data landscapes. This is a large, complex and resource intensive undertaking. In the context of national requirements the challenge is similar but with greater emphasis on how you achieve interoperability across different organisational network and IT landscapes. Collectively we also need to consider data storage capabilities as data volumes significantly increase. Cloud solutions present the obvious solution to this latter point and the enduring operational costs of this need to be determined based on the associated size, retention, latency and accessibility requirements.

In broad terms there are two investment options; the first is to solely focus on data capture and release, the second is to go beyond this by introducing SCADA and a level of control. Due to the changes taking place on our network we believe the second option will provide more long-term value and will enable us to facilitate smarter, more digital, networks without compromising security. As part of our Business Plan for RIIO-ED2 we will further investigate the costs and benefits of these options, which will include undertaking willingness to pay research. As part of this we will examine how the use of cloud based services will increase opex and how we can achieve the optimal balance between data provision and data visualisation/interpretation.

Flexibility trading enablers

Question 25:

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

We prioritise the data we release on stakeholder engagement, as highlighted by how we listened and responded with regards to providing more granular capacity data in London to facilitate EV charge point deployment.

Based on our engagement and observations we believe there is merit in prioritising:

- Granular network data where constraints have a higher probability of occurring. This will allow both us and the market to respond in a timely and efficient manner;
- Information on generation outages as this impacts the financials of many of our customers; and
- IDNO network data to get them aligned to where DNOs are.

Question 26:

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

We have been working with stakeholders to increase data transparency and access to facilitate quicker and efficient connections and to enable the market to support both our requirements and others such as the ESO. We also plan to report operational information such as dispatch events, which will increase visibility.

We are aware that a lack of data coordination between transmission and distribution networks has made it challenging for flexibility providers to optimise their resources and efficiently revenue stack. For example, there has been cases where a DER has been dispatched by the ESO behind ANM, which has then led to inefficient re-dispatch at our level. Through projects such as Power Potential we are actively addressing this type of issue.

Flexibility dispatch and control enablers

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?

It is important to demarcate ANM, as being developed by DNOs in GB, with the commercial arrangements around flexibility procurement. Whilst the two are linked, they represent different issues. For example, ANM systems intend to provide greater visibility and control of networks and form a critical part of the control room of the future. Given the changes taking place across our networks we are very confident that ANM is needed to cost efficiently operate the distribution system. Alongside this is the current design of the market, which dictates contractual arrangements and how different resources are dispatched. Importantly, ANM should not preclude different market design options from being realised in the future; to the contrary it should be seen as an enabler. Nevertheless, we recognise that DNOs need to better demonstrate how ANM will be developed to ensure fair and open market access for DER and we will aim to do this ahead of RIIO-ED2.

Our flexible connections currently can involve direct DER control in return for cheaper, flexible network access. This has been necessary due to specifics of the installations e.g. single DER vs portfolio. These connection arrangements do not preclude participation of the DER to markets and do not require that participation takes place through the ANM system. The providers can use any equipment or route to market they wish. As part of the Regional Development Programme with National Grid we are exploring whether there are synergies to deliver other System Operator services through the same infrastructure.

We are also aware of the concern that DNOs might overuse generator curtailment agreed as part of the connection to solve network constraints instead of buying flexibility in the marketplace. This is not action that we would take (unless in case of fault or emergency) as it would be in breach of the connection agreement in place between UK Power Networks and the customer. To offer additional certainty, we have made available a curtailment analytics tool to all FDG participants that allows them to see and interrogate the impact of constraint events on their installation. We are further refining this tool and also developing regular reports to increase visibility of these constraint events.

In terms of our Flexibility Programme, it is primarily designed to interface electronically with aggregators, unless there is specific customer request for direct interface. There are no exclusivity terms and it is designed to be stackable with other revenue streams.

There has also been significant work done to address conflicts of interest through the ENA's Open Networks Project. For example this has captured Conflicts of Interest and Unintended Consequences in a published risk register⁹ and an ENA report on six steps to delivering flexibility services has made commitments¹⁰. As well as standardising DNO products this will help deliver a transparent assessment of flexibility, alongside reinforcement as part of decision-making within DNOs.

Overall, ANM is a long-term development action to make our networks smarter and ensure they are fit for purpose (i.e. it is BaU). Therefore, as long as we remain accountable for network reliability, ANM is an integral tool for this.

Question 28:

In order to preserve optionality over ANM scheme operations, what technical and commercial protections, such as technical ring-fencing, may be required?

At this point in time, we believe that there needs to be a clearer definition of terms used and a common understanding of the perceived issues before a discussion on the protections that might be required. We welcome further discussion with Ofgem on this topic.

Question 29:

Please provide real world examples where lacking timely access to usable network data, or regulatory barriers, have limited your ability to provide a DSO function or support service. Please submit any relevant evidence and documentation of examples cited.

As described earlier in this response we do not yet have monitoring and control at LV, which is where most the change is expected to happen in terms of LCT uptake and related flexibility services.

We would also benefit from having clarity on the regulatory framework with regards to enhancing the control we have at our substations. For example, we are aware that through CLASS ENWL is using network assets to provide balancing services to the ESO, but we are unclear on whether this is something supported by Ofgem. As we recognise that there are issues in DNOs being seen to 'compete' with market options in the ESO's ancillary service market, our preference is to enable these cost efficient solutions to be deployed through whole system funding transfers (licensee-licensee) in a similar way to DRS8.

Expectations were high on the value DNOs could extract from smart meter data in the RIIO-ED1 period, however, due to delays in implementation and the roll out, these benefits have not materialised. We believe that this emphasises the need for DNOs to accelerate their own roll out of LV monitoring and control, as this will help ensure the system can facilitate the volume of low carbon technology needed to meet the net zero target. Nevertheless, we recognise the importance of avoiding duplication of costs therefore we welcome a pragmatic approach that is aligned to smart meter deployment.

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.

Whilst we recognise why Ofgem is keen to maintain optionality on DSO arrangements and avoid any 'lock-in', given the scale of change underway and the response needed to manage this effectively, we would recommend a balanced approach. For example, if there is significant uncertainty on whether DNOs will be able responsible for certain functions this then undermines investment plans to meet emerging challenges.

⁹ <http://www.energynetworks.org/electricity/futures/open-networks-project/workstream-products/ws3-dso-transition/products.html>

¹⁰ <http://www.energynetworks.org/assets/files/ENA%20Flexibility%20Commitment%20Our%20Six%20Steps%20for%20Delivering%20Flexibility%20Services.pdf>

