



Key enablers for DSO programme and the Long Term Development Statement

Northern Powergrid's response to the Ofgem consultation

KEY POINTS

Ofgem should take the opportunity of reviewing the Long Term Development Statement (LTDS) to ensure it captures data that is beneficial to those seeking to connect to distribution networks and those offering services to support an efficient and optimised energy system. In reconsidering its scope Ofgem should consider what data is required and how we present it. At the same time in considering the technology and informational enablers for DSO Ofgem should aim to introduce clarity on the roles and responsibilities of parties.

- The review of LTDS is a tangible step for Ofgem to take to enable and encourage the UK's attainment of the 2050 net zero emissions legislated target at least cost – as set out in its Decarbonisation programme action plan.
- In the nearly two decades that LTDS has been active we have seen a proliferation of data being provided for our stakeholders and this trend is continuing apace.
- The format has also been transformed – from simple data tables to graphical representations and interactive tools (such as Heat Maps). Most recently we published our Distribution Future Energy Scenarios (DFES) in a new open data format with visualisation tool as well as datasets.
- A delivery body for LTDS is essential to identify, specify and deliver the changes that may be required.
- Such a delivery group should start with a fresh look at stakeholder requirements and how these can best be delivered rather than starting with the current LTDS and seeking incremental changes.
- Ofgem should refine and simplify the totality of information provision while at the same time continue to expand the data available for customers using the principles of open data.
- The non-network company responses to this consultation will be useful to inform the prioritisation of increased efficient network monitoring and information provision.
- Industry collaboration, principally through the Energy Networks Association, is standardising across networks where efficient in order to simplify the operation of flexibility markets and reduce barriers to entry or transactional costs for customers.
- In addition to assisting customers, increased data provision will support network companies to deliver efficiency whole system planning – for that reason Independent Distribution Network Operators (IDNOs) must not be left behind and need including.
- There is a key enabler missing of a regulatory nature. In order for DNOs to bring forward effective and efficient services, there needs to be more clarity from Ofgem in the roles of different parties in providing DSO functions.

Introduction

- 1) We welcome the commencement of this review into key enablers for DSO programme and the Long Term Development Statement. The first LTDS was published in November 2002 to provide data essential to customers wanting to connect to the network. Over the successive years, all DNOs have made incremental improvements to the LTDS or found alternative and perhaps more innovative means of providing data that is more current than the bi-annual process in place for the LTDS. These include the Heat Maps, the Contracted Capacity Registers (generation) and, more recently, the System Wide Resource Register (SWRR). Forecasting has also improved with the creation of the Distribution Future Energy Scenarios (DFES) and DNOs are collaborating on how best to signal future potential network constraints and opportunities for flexibility solutions.
- 2) An independent review of the needs of different groups of stakeholders, such as this consultation being led by Ofgem, is therefore appropriate to help to develop a pathway to deliver them in the most efficient manner.
- 3) Whilst many of the questions are aimed at the various third parties that might wish to gain access to and make more use of network data in the future, we have provided answers to all the questions from our perspective to give an indication of what we think can be delivered. We look forward to reviewing the responses and working with Ofgem on how best to deliver in our role as a neutral market facilitator.

Part 1 – The Long Term Development Statement

Scope and content of the 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?

- 4) Visibility of DG connections and connection offers (for connections greater than or equal to 1MW) is currently provided in Table 5 of the LTDS in terms of their capacity and their connectivity to the upstream primary substation. This is updated twice per annum.
- 5) In addition, Northern Powergrid updates and publishes monthly on its website a Contracted

Capacity Register which provides similar information updated to capture connection applications (and completions) in the month but this extends down to 72kVA. This was visited 725 times during 2019.

- 6) All DNOs are also developing, in association with the ENA Open Networks Project, a SWRR for assets greater than or equal to 1MW. This work is being developed to ensure standardisation across DNOs and is expanding the register to include flexibility resources. This will also be updated monthly.
- 7) There is overlap between these two registers and efficiencies could be achieved by just publishing one. From a customer perspective we are seeking to streamline the provision of this information. In doing so we wish to provide an improved connections service and also support the growth of flexibility markets by reducing barriers to entry (through access to information) and reduce transactional costs (by making processes simpler).
- 8) All of the above developments raise the question of the relevance of the biannual publication of this information in the LTDS when more up to date information can be found elsewhere. Consideration should therefore be given on whether the form of statement in the LTDS needs to either dispense with the need for Table 5 or redesign Table 5 along the lines of the SWRR and specify that this be updated monthly.

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

- 9) Northern Powergrid now produce an additional table (Appendix 10) which is based on Table 3 Load Data and which has a Local Authority look-up column that allows Local Authorities to filter the data to more easily identify the capacity and future load forecasts of the all the primary substations that supply their areas.
- 10) Northern Powergrid has also produced an additional table (our Appendix 11) to provide the co-ordinates and postcode feeding areas of all supply point and primary substations.
- 11) These were both developed to make it easier for regional stakeholders to identify the assets in their region so that they could easily self-serve when considering new infrastructure developments.
- 12) We have also recently developed a Local Authority visualisation tool to facilitate stakeholder engagement on our DFES which perhaps is a better way of presenting the data than the spreadsheets. This can be found at <https://odileeds.org/projects/northernpowergrid/dfes/>.

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?

- 13) Customers wanting to connect to the DNO network have an interest in both the static data (ratings) and the dynamic demand data.
- 14) The ENA Competition in Connections Code of Practice Paragraph 4.6.1 requires DNOs to make available access to such information as the Independent Connection Providers (ICPs) is reasonably likely to require in order to assess the Point of Connection on an equivalent basis as the DNO, normally on a 24/7 basis to enable ICPs to either (i) self-select a Point of Connection in combination with the Standard Design Matrix; or (ii) carry out assessment and design of the Point of Connection using our policies, standards and processes.
- 15) Northern Powergrid has an FTP site which holds all Northern Powergrid static network data in various layers e.g. EHV, HV and LV. The data is updated quarterly. Third party access is available upon request and allows the user to download the datasets for use in their own GIS software.
- 16) For the dynamic data, Northern Powergrid currently provides ICPs with load profile data (Amps) for HV feeder upon request and, so far, has had very few requests for such data. We are, however, making plans to enhance customer access to demand data in 2020 by providing ICPs with online access to historical HV feeder current and primary substation demand data.
- 17) Northern Powergrid is deploying distribution ground mounted substation monitoring on a targeted basis and so availability of dynamic data for HV/LV transformers and LV feeders is limited at present, 655 substations which is approximately 2% of the population. This will continue to increase over the ED1 period and we anticipate a further increase over ED2.

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?

- 18) Regarding this we refer to the work / recommendations undertaken in the ENA Open Networks Project WS1B P4 “Proposals for Implementation of Electronic Exchange of Network Planning

data”.

- 19) Attempting to develop a standard “network model” would be extremely challenging due to differences in network design and equipment deployment between companies and it would be debatable what advantage would be gained by constraining internal company systems to match a particular model (if indeed that were practicable).
- 20) What would be more relevant would be agreeing/specifying the scope of the information to be passed between organisations and the associated format, for example voltage range, impedances of plant and connections (as opposed to model numbers etc).
- 21) Clarity on scope would additionally support a phased implementation e.g. concentrating on exchange of Week 24 & Week 42 (33kV->132kV) data transfer as outlined by the WS1B P4 working group, before expanding to include lower voltages.

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?

- 22) As with Question 4 we refer to the WS1B P4 work / recommendations.
- 23) The WS1B P4 working group recognises that IEC Common Information Model (CIM) formats provide an open vendor agnostic method of exchanging data (either as single value updates or bulk transfers of entire portions of a network).
- 24) Whether CIM is considered mature is dependent on whether it supports the data types for a given application or whether significant non-standard extensions are required. Pragmatic discussion in the Open Networks WS1B P4 group converged on a view that provided a fit for purpose network model could be generated in a selection of the leading Power Systems Analysis tools and subsequently exported/re-imported using CIM formatted files between products from disparate vendors this should demonstrate an adequate level of maturity for initial implementations. A working group is already proposed by WS1B P4 to execute this work.
- 25) We assume the reference to WPD relates to the INM/CIM project. In Northern Powergrid data integration has been realised by holistic transfer of data into a new integrated asset/spatial database, (the “EAM/Spatial project”) and in this case it would be appropriate to establish CIM interfaces from this environment rather than create a different model such as INM. Initially it is

likely that initial CIM transfers would be via the Power Systems Analysis tool route, noted above, followed by more direct solutions as CIM capable data extract tools and Open Networks use cases become available.

- 26) An initial value of £10.5m is suggested by WS1B P4 for implementing Week 24 & Week 42 data transfers in CIM. Northern Powergrid is currently executing a review of Power Systems Design/Analysis tools which will include CIM capability thereby supporting this activity.
- 27) Clearly any additional use cases/data transfers would be subject to separate costs.

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

- 28) There may be value in retaining the current FoS in excel format for users that require the tabulated data in its current form. But, if the model data is provided in CIM format then it is expected that most users of the LTDS will be able to import the data into their own systems from that format and the current excel form may become obsolete over time for certain aspects of data.

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 heat maps. In order to ensure future customers can access the required data, should the scope of the LTDS and FoS be extended to mandate the production of heat maps?

- 29) Northern Powergrid already provides monthly updates on its website; specifically Heat Maps that provide an indication of the available capacity for the connection of demand and generation to the distribution network. All of the DNOs have Heat Maps so, if these are already being produced by all DNOs and are being developed in innovative ways then there is no need for further regulation in this area. What would benefit customers is some standardisation of approach which is being explored and developed via the ENA Data group. However, there may be an opportunity here to rationalise the provision of data to customers by taking the opportunity to eliminate duplication between the LTDS and Heat Maps.

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

- 30) We are interested in exploring this further with Ofgem and with other networks through the Data Working Group at the ENA. There is a cost versus value trade-off to be considered – i.e. is the cost of convergence justified by the benefits to our customers.
- 31) DNOs have taken different approaches to their development of Heat Maps and so a review of the information provided and method of presentation would be needed in order to decide upon common format and then determine the costs of transition. Northern Powergrid publishes Heat Maps that indicate the capacity available on the distribution network up to 132kV. We have undertaken several engagement sessions in webinar format with our Heat Map stakeholders who are currently satisfied with our approach – the latest such event being on 19 December 2019.
- 32) Northern Powergrid is currently developing a web based tool for low voltage connections, up to 210kVA, “AutoDesign”, which will allow customers to undertake their own budget estimates; providing customers with a personalised Heat Map style view of feasible connection locations for their demand requirements and immediate indication of costs. We have been demonstrating this to other network companies to see if it is useful for them as well as to our stakeholders who may use it within our region.
- 33) This tool cost £1.1m and will facilitate simple and quick checking of multiple variants of their requests. In light of the work completed as part of “AutoDesign”, it would be possible, with a reasonable amount of effort, to develop a similar process for HV feeders, costs to be determined.

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?

- 34) The Heat Maps provide an indication of where connections can be provided without reinforcement costs. They conversely also provide an indication of where headroom is currently limited but could only be used by current or future potential flexibility providers to identify

opportunities for their services should they know how underlying demand / generation could grow to create an actual constraint requiring active management. The key point here is that the Heat Maps are based on a snapshot of the network capacity at a moment in time and the impact of the future growth of demand/generation is not taken into account in this tool. The Northern Powergrid Investment Map (which is available on the Northern Powergrid website) may be a more appropriate tool as this shows geographically where our future investment plans are but, at the moment, it only records financially authorised projects.

- 35) However, Northern Powergrid is planning to engage with flexibility platforms to more formally signal the areas of the network where flexibility may add value as an option to how we manage the network.
- 36) Specific network location postal codes for an upcoming flexibility auction are available through our own internal website as well as being publicised through a number of stakeholder events and media channels. In addition to this, we have previously used a third party platform (PicloFlex) to advertise for Customer Flexibility expressions of interest.
- 37) Going forward, we will look to incorporate good practice both from first-hand experience as well as taking learning from other DNOs communicated through the Open Networks Project. We are also in the early stages of working with a number of other DNOs to assess the viability of utilising a common flexibility toolkit across DNOs that will give flexibility providers a consistent offering of DNO requirements across multiple DNOs. Open Networks Project WS1B Product 5 has recently been established to standardise the methods by which DNOs publish constraint information and flexibility requirements.

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

- 38) Northern Powergrid updates the Heat Maps annually in relation to the static data (i.e. firm capacities, maximum and minimum demands, fault levels, etc) in line with our own internal processes for determining these parameters. However, the thermal headroom is adjusted monthly in relation to connections activity and its impact upon the headroom and reset annually to capture the underlying demand increase / decrease, as appropriate.

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 DFES play in informing the load growth forecasts on the LTDS?

- 39) Northern Powergrid is collaborating with National Grid Electricity System Operator (NGESO) and the other DNOs as part of the ENA Open Networks Project to develop a common language and set of building blocks for developing a DFES and for helping to develop the NG FES. It is an iterative process that is helping to forge a common understanding on the key drivers for demand growth.
- 40) The intention has been to align the NG FES and DFES scenarios so that the data presented gives a whole industry best view of the future scenarios. This is achieved by the DFES offering local intelligence that can be used bottom up to improve both the starting positions and the future year forecasts used in the GB scenarios; whilst the NG FES provides its best information about the top down drivers and indicators influencing future load growth which helps the DFES establish itself within the national context. The common building blocks provide the means by which different future expectations can be compared across the participating network operators.
- 41) While still respecting different data and modelling preferences it has become clear that for fair comparability there is a need, over and above the use of common building blocks, for some common modelling principles too. In particular the types of load profiles applied to the expected behaviour and usage with respect to Low Carbon Technologies (LCTs) tend to come from shared innovation learning but these have not been standardised. Similarly the LCT information sources are largely national or international datasets but again are not standardised.
- 42) When looking at load growth forecasts published in the LTDS It should be recognised that the short term planning forecasts are not the same as DFES, although they could be a subset of DFES. The difference is that the DFES offers a strategic approach for understanding the long term implications out to 2050 of different decisions made in the nearer term about a range of future energy pathways and the LTDS is much more near-term.
- 43) Northern Powergrid for example publishes load growth forecasts in the LTDS aligned to the shorter term operational forecasts used in the Week 24 process, and these are not from DFES but rather are based on known accepted connections combined with a simple linear forecast

deemed suitable for short term operational planning. However there is considerable overlap with DFES in that known accepted demand connections are also used to inform that process. For the next few years either load decline or very modest load growth is forecast in most scenarios, the large upward trends being forecast to start towards the end of the 2020's and into the 2030's. The rate of change at that point makes it more likely that a subset of DFES will provide a more appropriate forecast.

- 44) In conclusion, the LTDS load growth forecasts across all the DNOs would benefit at the very least from greater visibility of the shorter term approaches to load growth forecasting being employed, and certainly some degree of standardisation in guidance, principles, and perhaps methodology could be useful.

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

- 45) Northern Powergrid is learning from the NG FES approach and has produced its first DFES in an open data format in December 2019 to facilitate engagement at the local level with regional stakeholders during Q1 and Q2 2020. The key to the whole process is stakeholder engagement and in understanding the challenges and changes planned by the key influencing bodies in each region, such as the Local Authorities, to facilitate the recently tighter targets of achieving net zero carbon reductions by 2050 (latest).
- 46) Learning from other industry documents has been an important part of the production of DFES. Without the context of national information about parameters like load growth drivers/levers, energy trends in other sectors which impact trends in the electricity sector, national energy policies, and UK wide market expectations and stakeholder feedback, it would be difficult to form a coherent view of the whole from which our region takes a share. The NG FES has been extremely useful in providing the national picture. The approach to stakeholder engagement also contains useful insights we can draw upon. For actual modelling approaches the ENA's Network Innovation Portal has been the more useful industry source as it is from the reports published there that we can find information about the behaviour and usage of emerging LCTs. Where a gap still exists is with national information about current and projected volumes of LCTs issued from the manufacturing, transport and heating and distributed generation sectors themselves and the registration of LCT connections to the network.

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 DFES or other documents?

- 47) The DFES is the better place to document the key assumptions underpinning the forecasts under each scenario considered.
- 48) The forecasts in LTDS Table 3 only extend to the five years following its publication date. Longer-term forecasts have always been undertaken but these are currently being published externally for the first time in the DFES documents as a range of scenarios to illustrate the potential future pathways due to the level of uncertainty in many of the underlying assumptions. It would make sense for the evolution of the DFES / NG FES to continue in a collaborative manner and for the assumptions to continue to be documented within the DFES / NG FES.
- 49) The LTDS only caters for a single forecast rather than a range of scenarios but this is considered appropriate for representing a near-term base-case planning scenario and our assumption of a very modest 0.5% increase lies mid-range in the short-term. However, as documented in the answer to Q11, we see that there is a need to develop a better means of determining the base-case planning scenario and publishing this in future DFES. We will be working on this based upon the regional feedback from our current round of DFES stakeholder engagement in Q1/Q2 2020.

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?

- 50) DNOs appear to have gone down two avenues to produce their forecasts, most involving either Regen or Element Energy. However all DNOs are working together, with the NGESO, to develop a common set of building blocks to underpin all scenario-based forecasting. Northern Powergrid engaged Element Energy to develop its scenario-based load forecasting tool. This was used to produce the recently published DFES and will be updated based upon stakeholder feedback received via consultation in Q1/Q2 2020. To facilitate this, Northern Powergrid partnered with the Leeds Open Data Institute (ODI) to publish its DFES in an open data format with a guidance document, a visualisation tool and all the underlying datasets made available. This is the best way to allow stakeholders to engage with the forecasts and hope to confirm this during our engagement this year.

IDNOs and the LTDS

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

51) Yes, in the interests of whole system planning it would be beneficial if IDNOs provided information on their own network capacity and load forecasts.

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.

52) A summary of the network and the standards to which it was designed and built would be useful to the DNO and also for any third party that may wish to seek a connection to the IDNO network.

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.

53) The following information is useful to the DNO:

- Peak and minimum demand forecasts;
 - Maximum demand (gross and net)
 - Minimum demand (gross and net)(including reverse powerflow)
- Connected & contracted generation capacity
- Fault level infeed data;
- Information on disturbing loads; and
- Connected flexibility resources.

54) This information is needed by the DNO to plan its network from a thermal and fault level perspective. There will be opportunities to improve whole system planning to best utilise the capacity at the connection points, for instance, if the IDNOs' development plans are not progressing as originally envisaged when the connection was provided there may be an option to release the capacity for use upstream on the DNO network. Conversely the IDNO may have customers connected to its network that are able to operate flexibly to relieve a constraint on the DNO network.

55) However, unless the IDNO has installed boundary metering, we expect that the demand figures will need to be aggregated by the IDNO from a variety of unmetered and metered demands connected to the IDNO network along with consideration of the losses incurred in distribution.

Ofgem needs to review whether it is appropriate for there to be a mandated level of network monitoring for new network developments otherwise the commercial pressures upon IDNOs would mean that it is unlikely to ever be provided.

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?

- 56) Northern Powergrid agrees that a delivery body is essential to identify, specify and deliver the changes that may be required to enable DNOs to provide the data needed by a potentially wide range of existing and emerging stakeholder groups. We are comfortable with Ofgem chairing such a body and with there being representation from DNOs / IDNOs and a range of stakeholders that have a need to access network data.
- 57) It is important that such a delivery group starts with a fresh look at stakeholder requirements and how these can best be delivered rather than starting with the current FoS and seeking incremental changes.
- 58) Since the FoS was last revised by Ofgem in 2011, all DNOs have improved the data that they provide to stakeholders, some being incremental improvements to the LTDS based upon, in our case, user surveys and others via additional means. For instance Heat Maps and the Connected Capacity Registers arose from stakeholder engagement driven by an ICE commitment and, as mentioned in response to Q1, the System Wide Resource Register went live on 31 January 2020 based upon engagement undertaken by the Open Networks Project. Some DNOs have replaced their system modelling tools and others have plans to do so and so it is important that the delivery group reaches a consensus on the destination but also recognises that different DNOs will be at different points in what data is made available today and in what format.

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.

- 59) Northern Powergrid would like to provide a representative on the group. Our qualifications for being included are that we are producers of LTDS, Heat Maps etc. and have knowledge of current data system capabilities and improvement plans.

Part 2 – Key enablers for DSO

Network monitoring & visibility enablers

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

- 60) Although we believe that this is a question for third parties requiring access to DNO monitoring information, we would like to make the following observations.
- 61) Northern Powergrid provides details of existing and planned monitoring parameters via its published Standard for the Application of System Monitoring (IMP/001/017), a copy of which can be provided. This policy details the enhancements that are being delivered as part of our smart grid enablers programme.
- 62) The capturing of data, its accuracy and/or limitations is dependent upon the network technology being used at the network location of interest. Therefore there will be differences in availability of data between voltage levels and subtle differences between different sources of the same type of data parameter. The Northern Powergrid standard referenced above provides transparency on this topic.
- 63) It is important to understand the use case for the network monitoring parameter as this in turn drives the specification of the data capture, how it is transported and how it is stored. For example, network data used for planning is based on half-hourly average measurements and can be retrieved from site on a periodic basis. The averaging period selected depends upon the parameter of interest and the network component being evaluated. Alternatively network data used for control purposes is based on instantaneous measurements transported when the parameter has changed.

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

- 64) Again, this is primarily a question for third parties requiring access to DNO monitoring information. However we do have some comments.
- 65) Half hourly demand information is available from our SCADA systems and recorded in the Plant Information (PI) historian system for all 132kV and EHV substations (transformers) and feeders. If this information were to be made available to third parties all DNOs will need to work

collaboratively on common rules for the “Data Openness Triage” to ensure appropriate and consistent application of the presumed open principles of the Energy Data Task Force. It is possible that this could result in data from circuits supplying single 132kV or EHV customers having to be excluded for commercial / data protection reasons.

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

- 66) Northern Powergrid currently collects the feeder currents from all outgoing feeder circuit breakers at primary substations and has limited monitoring information lower down the network.
- 67) As part of our smart grid enablers programme we are looking to retrieve voltage and current monitoring data from network locations that have a communications path and a suitable electronic device that can provide measurements, these will be pole mounted auto-reclosers and regulators. These devices will provide more granular data from the overhead HV networks.
- 68) In more urban areas the HV loading has the potential to be calculated with more accuracy through power flow simulation using data from the LV networks that those HV circuits feed.

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

- 69) Enhanced LV monitoring would enable DNOs to more closely monitor and manage the LV network as demands increase due to the connection of LCTs such as electric vehicle chargers and heat pumps, enabling constraint points to be identified and flexibility services to be deployed. The monitoring will also allow better management of underground network assets through the use of advanced data analytics as demonstrated in our [Foresight](#) innovation project.

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

- 70) Northern Powergrid does not currently provide third party access to 132kV and EHV dynamic data but is currently planning to provide open access to the primary substation demand data and HV feeder currents at the primary substation HV board in order to enable ICPs to determine points of connection on the HV system. This will be achieved by providing web view access to elements of our data store (PI), excluding any circuits that supply single customers. In the meantime, half-hourly profile information is provided upon request.

- 71) Customer access to network monitoring and visibility of data associated with our Active Network Management systems is planned as we rollout more locations and develop our associated Operational Technology based systems.
- 72) As more HV monitoring data is obtained from remote network locations we have plans to extend our PI system to include this data.
- 73) At present our LV monitoring data is only available via internal access to our iHost system. We are planning to make snapshots of this data available via our AutoDesign tool in future. We are also considering how best to combine LV monitoring with aggregated smart metering and we anticipate this type of IT system development occurring over the ED2 period. Feedback from stakeholders on their requirements will be a key input into the specification for this data system.
- 74) The stored network monitoring data is half-hourly averages. We use data from customer sites specifically generators to enable us to get a better understanding of latent demand. We use existing sources of metering data as this is more accurate but there are the timescales involved in getting it and we can currently only get it as half-hourly averages by the following day at the earliest. We could take “real time” monitoring from our own equipment if it is available but it is not as accurate and would need to be changed from HH to a more granular data stream. This can only be justified on a case by case basis, for instance, when a customer enters an ANM scheme due to the costs involved.

Flexibility trading enablers

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

- 75) The consultation list the following as examples for operational data:
- Network outage plans;
 - Network configurations;
 - Working/dynamic network topology;
 - Resource availability under supervisory control and data acquisition (SCADA) (generation, demand, resources contracted for operations); and
 - Constraints and conflicts.
- 76) We are keen to see the responses to this question from Distributed Energy Resource (DER) connectees, including existing and emerging flexibility providers to inform our role as a neutral market facilitator.

- 77) Network constraints are usually present during times of abnormal system operation, for instance during maintenance or fault outages. Access to planned outage information can help DG operators plan their operations, for instance to maintain their own assets during the same outage window, but such information may also be useful to flexibility service providers to identify service opportunities.
- 78) Northern Powergrid holds DG Owner and Operator forums to discuss any issues they have and in this forum does share its network outage plans with interested connected customers which would include changes to network configurations. An alternative approach might be to make outage information available to subscribers via an online system.
- 79) In order to carry out the role of neutral market facilitator, we feel that it is important for operational data on both the procurement and dispatch decision making process to be made available to providers of flexibility services. The transparency of this data will build trust in the market and work towards removing any perceived DNO/DSO conflict of interest.

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

- 80) Lack of information could give rise to barriers to entry or a lack of confidence required to grow the flexibility market. Also, there could be higher transactional costs of operating in the market for either buyers of services (NGESO or DSOs) or providers selling services.
- 81) Restricted access to operational data could be perceived as hindering DSO flexibility markets development if prospective flexibility providers mistrust the decision making process over how assets are procured and then dispatched. In addition, market participants (including NGESO/DSOs) inability to access trade data could result in sub-optimal procurement/dispatch decisions being made from a whole systems point of view.

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?

- 82) There is a need to distinguish commercially between operation of flexible connections in an ANM scheme and the operation of flexibility services. We set our thinking on this issue in our [DSO v1.1 Development plan](#) to provide clarity on the distinction. We acknowledge that more

work is required to set out the principles of ANM and flexibility procurement co-existing as well as information for connected parties and the wider market that enable scrutiny of actions and build stakeholder trust.

- 83) The technology for controlling DER in ANM scheme to manage generation related constraints can be the same as that used for dispatching DER for flexibility services, however it can also be separate and there is no technology barrier to alternative ways of dispatching flexibility in an ANM zone. It is important to maintain visibility of actions between ANM and flexibility operations.
- 84) If DNOs own and operate the link between DER and the markets, there could be a perceived conflict of interest but this can be managed. We welcome rather than oppose competition in dispatch and control of flex provision, but we see no reason why DNOs should not be allowed to own and operate a flex dispatch platform. We think this is a perceived rather than real conflict of interest that may be managed through visibility and transparency of actions taken. A perception issue can arise from confusion between the trading place and the trading counterparty. In itself, ownership of the trading place is no issue, but identity of the trading counterparty has been identified when the regulated entity is also an active participant in a competitive market. We recognise that Ofgem has already acted in this area by restricting DNOs from operating storage and there is more work planned to consider roles and responsibilities in contestable services.

Question 28: In order to preserve optionality over ANM scheme operations, what technical and commercial protections, such as technical ring-fencing, may be required?

- 85) DNOs should continue to be allowed to develop efficient systems and processes that deliver ANM and flexibility services. These need to be established according to a set of open principles that may be developed with stakeholder involvement. Trust needs to be earned through the production of metrics and information that demonstrate adherence to those established principles.
- 86) An ANM scheme allows customers to maximise their generation or demand when the distribution system has the available capacity. When either certain system intact conditions or an outage occurs the ANM scheme calculates which customer connections should be curtailed based upon the network power flows and the commercial rules being applied. These control actions are fundamental to the safe and secure operation of the distribution network and if they are not performed in the correct technical manner then widespread customer interruptions would occur due to the operation of protection equipment. The technical operation of ANM

schemes should be performed by a single party and should be designed to minimise the level of complexity of operation required. There is more optionality in the commercial rules being applied to operation of the ANM scheme and there is the potential for those rules to be set via a market arrangement that allows trading of capacity rights.

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.

87) We are keen to see the responses to this question from existing and emerging flexibility providers to inform our role as a neutral market facilitator.

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.

88) In terms of other key enablers, the most important one is of regulatory nature. New net zero targets require commitment and urgency from both companies and Ofgem. Ofgem must clearly set out what is required for the ED2 period: its ED2 business plan guidance must confirm an industry baseline of what DSO functions will be performed by the network operator.

- This should be completed by mid-2020 to enable stakeholder dialogue;
- This baseline could be built through a combination of industry proposed definition and Ofgem-led consultation.