The Voice of the Networks

Energy Networks Association

Open Networks Project

Findings of the survey on network operator current practices for evaluating and signposting future network capacity

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Executive Summary

This WS1B P5 report summarises the results of a fact-finding survey on how the capacity of GB electrical networks is currently evaluated and shared with stakeholders to articulate network needs. The reasoning behind current DNO methodologies for evaluating and reporting network capacity is explained to provide a deeper understanding to subsequently inform good practice to drive consistency and a possible standardised approach.

The Open Network's Project Initiation Document (PID) outlines the scope and programme of WS1B P5[1].

DNOs completed a comprehensive survey to determine how they currently evaluate and report network capacity with the results of the survey presented in the following report. A wide range of approaches were observed across a range of reports some being prepared by all DNOs in compliance with industry regulations and others voluntarily prepared by some DNOs.

The survey covered mandated reports prepared according to Standard Licence Conditions and industry agreements, including Long Term Development Statements, Week 24 submissions to National Grid, Load Index reporting to Ofgem, Engineering Recommendation P2/7 reporting, Statement of Works (SoW) reporting and the System Wide Resource Register. Although there is consistency between the DNOs in the format and frequency of these reports, there may be dissimilarities in how parameters are evaluated to accommodate technical variances in networks and business approaches.

More variable style and content was noted in the network capacity reports prepared by DNOs on a discretionary basis, such as heat maps, calls for flexibility services and bespoke reports associated with Distribution Future Energy Scenario, DFES, forecasts. DNOs adopt approaches matched to the range of specific applications and their associated audiences, such as using a colour scale on a map background for heat maps to be used by customers wanting to make new connections.

The following aspects were noted to vary in different network capacity reports:-

i. Reported network parameters
ii. Extent of the network covered by the report
iii. Range of dates over which network capacity is evaluated
iv. Forecast scenarios, and
v. How network capacity is presented in the report

Evaluation and reporting of network capacity were found to vary according to the report's purpose, to accommodate diverse audiences, because the same approach was not suitable for all network types and because businesses accept different levels of risk.

Overall, the survey identified some consistency in reporting network capacity that could be built on for the standardised network capacity report being developed by WS1B Product 5. Also, good practice which could be reflected in the standardised report was observed in discretionary network capacity reports developed to increase customer utility and influenced by stakeholder engagement.

One of the original drivers for establishing WS1B P5 to examine the development of a standardised network capacity report was for all DNOs to apply the DFES forecasts arising from WS1B P2 consistently. Our survey results have indicated that many of the current network capacity reports relate to the present year and so do not employ forecasts, whilst the majority of future network capacity evaluations are based on just one scenario. This one scenario was reported to be a central or best view scenario defined differently by each DNO.

1 https://www.energynetworks.org/assets/files/ON-PRJ-2020%20PID-v1%20Final%20(PUBLISHED).pdf

Although only one scenario was found to be used to establish that network capacity was exceeded, the survey established that in some cases multiple scenarios are used in the cost benefit analysis to determine the most appropriate form of mitigation. The opportunity to develop a standardised report by extending the scope of an existing report to include more scenarios shall be considered in our next steps.

We will build on the learning arising from the survey to establish potential benefits from a standard network capacity report and what such a report should include and look like. It is intended that the findings of the survey and the alternative methods identified in this report are considered in more detail to establish the pros and cons of each different potential option for a standardised approach for evaluating and presenting network capacity. Greater consistency in existing common reports, extending such products or standardising the approach currently used by just one or a few DNOs shall be considered for the basis of a standard network capacity report.

1 Introduction

1.1 About ENA and members

Energy Networks Association (ENA) represents the "wires and pipes" transmission and distribution network operators (DNOs) for gas and electricity in the UK and Ireland. ENA members control and maintain the critical national infrastructure that delivers these vital services into customers' homes and businesses.

1.2 Open Networks Work Stream 1B Product 5

Open Networks is transforming our energy networks into smart grids for the benefit of customers and stakeholders through a wide-ranging collaborative industry project involving electricity grid operators, BEIS, the energy regulator Ofgem and other interested parties.

The objective of Open Network's Work Stream WS1B is to optimise processes across the Transmission and Distribution boundary by considering key network operator activities, such as investment planning, operational planning and forecasting, from a whole electricity system perspective. The Open Network's Project Initiation Document (PID) outlines the scope and programme of WS1B P5[2].

WS1B Product 5 builds on the common understanding of forecasting scenarios produced through Product 2 to consider how distribution network capacity is evaluated and reported.

WS1B Product 5 aims to assess whether stakeholder utility could be increased by standardising how network companies evaluate available network capacity and signpost network capacity shortfalls. Inconsistent evaluation methodologies and presentation of results are perceived to confuse stakeholders whom the industry looks to further engage with as part of facilitating a more decentralised, smarter and lower carbon electrical system in future. Uniformity in network capacity analysis and reporting will allow stakeholders to assimilate and act upon results more efficiently, thus enabling greater synergy to facilitate whole system planning.

If found to be appropriate, good practice for a common approach of evaluating and reporting network capacity will be proposed along with a standardised approach for publicising when and where network capacity is exceeded and where there may be a need for network intervention, although the report would stop short of identifying what network action is required for example traditional reinforcement, ANM and flexible services.

This report fulfils the first of Product 5's outputs, namely to document how DNO's currently identify and signpost capacity shortfalls. The purpose and structure of a survey used to gather such information are explained in section 2, before presentation of the survey findings in terms of the nature of the network capacity reporting in section 3, the principles of the evaluation methodology in section 4 and the basis of reporting in section 5. Conclusions and next steps are presented in sections 6 and 7 respectively.

2 https://www.energynetworks.org/assets/files/ON-PRJ-2020%20PID-v1%20Final%20(PUBLISHED).pdf

2 WS1B P5 – Survey of Network Capacity Assessment and Signposting

A survey was undertaken to gather knowledge on the different ways that network capacities are already evaluated within and across network operators to assess consistency and potential options for subsequent standardisation. Current practices have been reviewed along with justification of why these approaches are adopted as a precursor to appraising what best practice would look like and whether stakeholders would benefit from standardisation of network capacity evaluation and reporting.

The survey template shown in Appendix A was circulated to all GB network operators via their representatives on the Product working Group, resulting in six comprehensive responses and comments from other parties which form the basis of this report.

Different aspects of how future network capacity is evaluated and presented were explored, in particular (corresponding to the survey columns):-

- **the different audiences of each network capacity report**, for example public or a specific recipient such as Ofgem,
- **how often the network capacity report is updated**, for example annual or ad hoc frequency,
- **what network capacity parameters are reported**, for example demand or generation,
- **which parts of the network are covered in the capacity report**, for example BSPs and Primaries only or 11kV and LV networks,
- **the parameters considered in the evaluation of network capacity**, for example thermal capacity, voltage or fault level,
- **varying reporting formats used to express available network capacity,** for example, percentage loading or the less granular approach of a red, amber or green scale,
- **the range of dates covered within the report**, for example only present network capacity is reported in a heat map, but future capacities may be forecast for the next five years or up to 2030,
- **which scenarios are covered by the network capacity assessment**, for example one set of capacity results may be presented for one scenario, or one set of results corresponding to the average of four scenarios may be presented, or four sets of capacity results may be presented for four named scenarios,
- **the methodology used to evaluate network capacity**, for example the simple assessment of maximum demand or a year-round study looking at every half hour period.

Survey respondents documented their approach based on the aspects listed above for many network capacity reports including those itemised in Table 1 which also reflects where the requirement behind each network capacity report originates, for example a licence condition or prepared voluntarily to increase customer service.

Table 1 : Network capacity reports

Network Capacity Report		Requirement
1.	Long Term Development Statement (LTDS)	Licence condition
2.	Week 24 submission to National Grid	Grid Code requirement by virtue of a Licence condition
3.	Load Index reporting to Ofgem in accordance with the Regulatory Instructions and Guidance (RIGs)	Licence condition
4.	Reports on compliance with Engineering Recommendation P2/7	Licence condition
5.	Statement of Works (SoW) including the Appendix G process for the transfer of data between DNOs and National Grid TSO where adopted	Associated with CUSC requirement
6.	System Wide Resource Register (SWRR)	Industry agreement developed via Open Networks Project
7.	Generation heat maps, Demand heat maps and EV heat maps	Discretionary
8.	Bespoke reporting such as WPD's "Shaping Subtransmission" and ENWL's "Regional Insights" reports	Discretionary
9.	Regional Development Plans (RDPs)	Discretionary
10.	Calls for flexibility services	Discretionary
11.	Planned Active Network Management schemes	Discretionary

Consistency in how the DNOs evaluate and report network capacity was noted to mainly depend on whether the capacity report and the associated methodology and format are mandated via the requirement to be compliant as illustrated in Figure 1. For example, all DNOs report network capacity on the same basis using Load Index categories in accordance with the Regulatory Instructions and Guidance (RIGs) as obliged by Condition 46 of the Standard conditions of the Electricity Distribution Licence.

Although the content and format of mandated reports are standardised, so the reports from different DNOs look the same, how the parameters are evaluated can differ within a DNO and between DNOs for valid reasons. Different approaches may be necessary on technical grounds such as network topology and be appropriate for the efficient development of networks. Firm capacity which is fundamental in assessing whether there is remaining network margin must be evaluated differently for radial and meshed networks otherwise individual assets normally interconnected to form a group may be shown to be overloaded whilst operating within the combined capacity of the group. Another reason why firm capacity may be calculated differently is its dependence on the cyclic nature of power flows; in some cases, the loading may be judged to be continuous, so the assigned capacity is less than where the power flow varies significantly over the whole day. Calculation of network capacity may also vary according to perceived risk; for example, the firm capacity of a substation with a maximum load of less than half of its nameplate rating could be assessed in less detail than a more highly loaded substation when it would be more appropriate to consider refinements such as the derating of connected circuits due to the proximity of other circuits. A business's attitude to risk may also influence how network capacity is evaluated, with fault levels being acceptable to 100% of equipment ratings, but less than that in cases where there is a perceived tolerance in the accuracy of the fault level calculation.

Discretionary network capacity reports, although influenced by industry good practice, allow the DNOs more latitude in their evaluation and reporting leading to a range of approaches and therefore some differences in style. In such cases, DNOs have flexibility to decide how

they will evaluate network capacity based on their customers' requirements, their access to data and technical suitability. They can also choose how to display results in a way that fits the accuracy of the results and adopt a suitable granularity. Reasoning behind such choices will be useful considerations when examining options for standardisation.

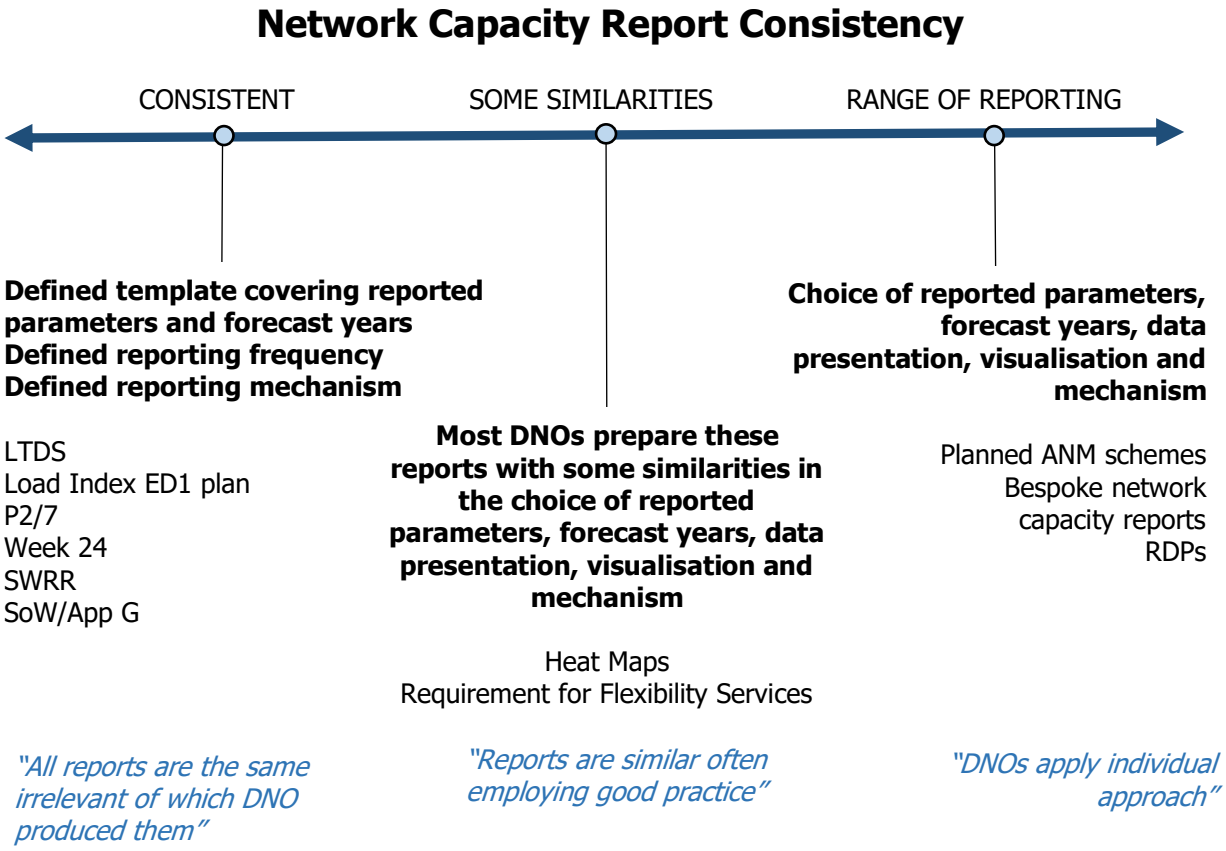

Figure 1 : Consistency in network capacity reporting

3 Network Capacity Reports

3.1 Audience

The survey identified a broad range of audiences for network capacity reports ranging from individual organisations to public reporting meeting the needs of wide-ranging stakeholders, as shown in Figure 2.

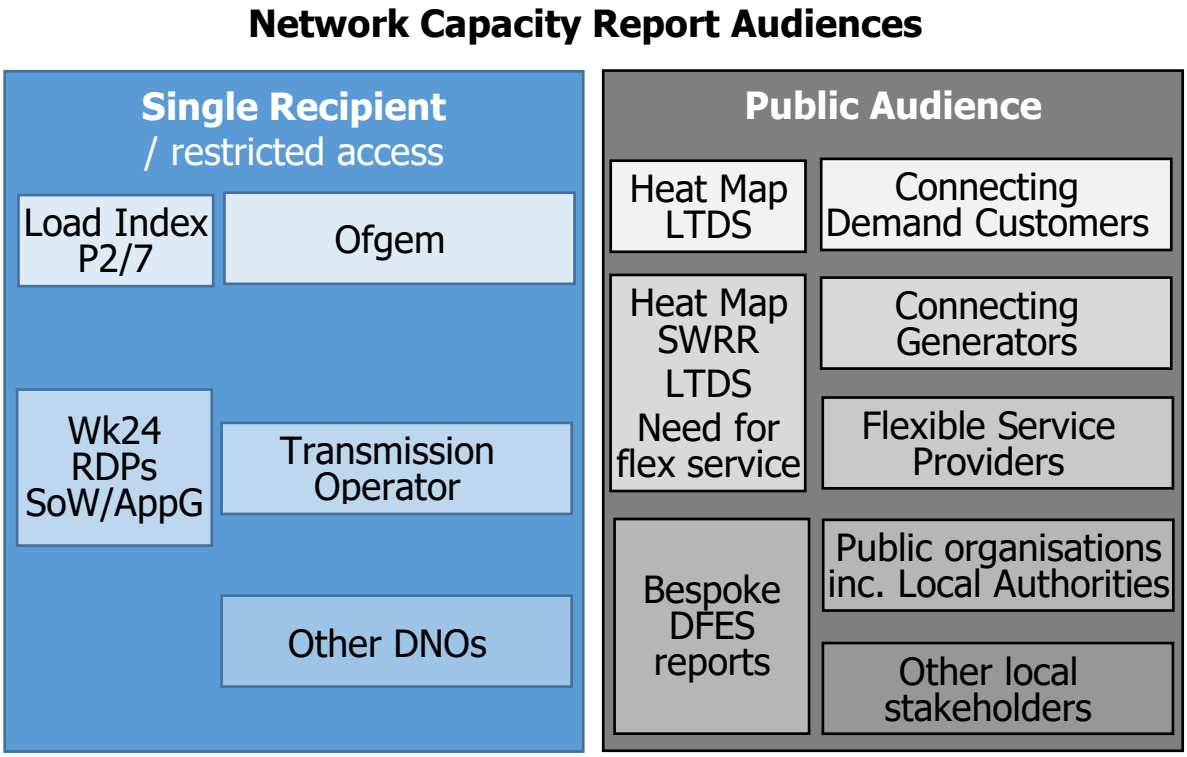

Figure 2 : Network capacity report audiences

The spectrum of the audiences highlights diverse requirements, different levels of understanding of technical aspects of network operation and a range of willingness to engage. Although DNOs have published rating and loading information in LTDS tables for 18 years[3] to enable the calculation of available network capacity, DNOs now make things simpler by augmenting the LTDS tables with heat maps which present network capacity information using simpler colour scales on map backgrounds to give immediate indications to customers wishing to connect new demands or generators to the distribution network. Audience is an important consideration in any subsequent standardisation, as their needs justify how DNOs choose to present network capacity appropriately and effectively.

3.2 Report Purpose

Network capacity reports covered by the survey were noted to have various yet specific purposes affecting the content of the reports, data formatting and the number of years in the future that capacity results are presented for. The purposes of the existing network capacity reports included:-

- Provide information on network parameters for comparison with network ratings
- Highlight where network reinforcement is required
- Publish opportunities for flexible services

[3] LTDSs were first published in November 2002 in accordance with Standard Licence Condition 25 of the Electricity Distribution Licence.

- Identify the extent of spare network capacity for new connections and where it is located
- Illustrate the potential effects of low carbon technologies including renewable distributed generation, electric vehicles and heat pumps
- Compare the electrical impacts of alternative low carbon pathways

How data will be applied is an important consideration for possible standardisation, recognising that not all future applications are fully anticipated yet.

3.3 Update frequency

The survey reflected a range of publication frequencies with some reports being updated monthly and others less often as shown in Figure 3.

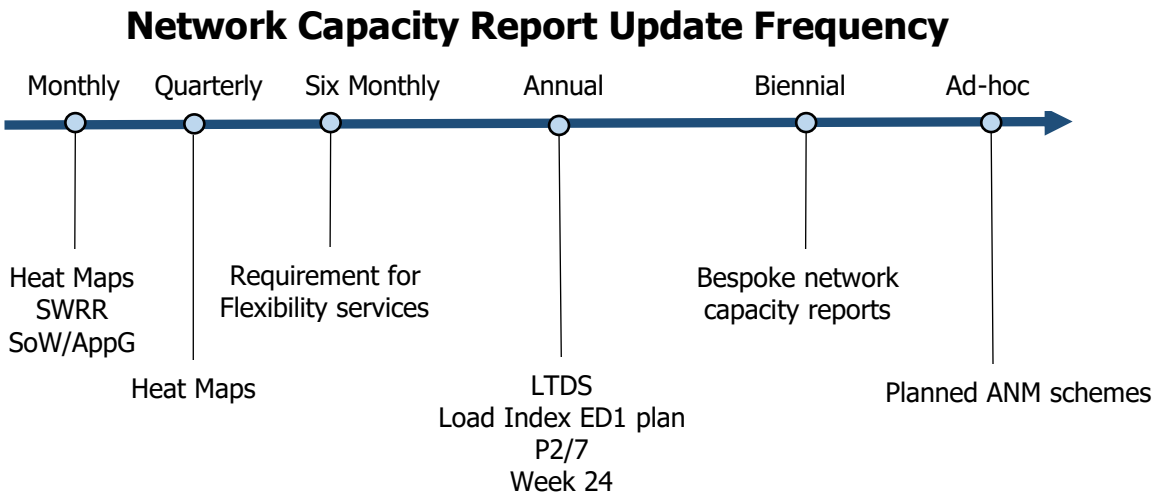

Figure 3 : Range of update network capacity report frequencies as indicated in survey responses

As expected, the frequencies that DNOs update and publish the capacity of their networks were all the same for mandated reports but were also similar for discretionary reports. Technical and practical reasons were noted to underpin update frequencies, with reports such as heat maps reflecting the fast-changing connection of new generators being updated monthly. Reports on built network assets were noted to be updated annually as they change less often and there would be little value gained from more frequent updates. Annual updates match data which has an annual repeat such as yearlong demand profiles with seasonal patterns in which maximum and minimums typically occur once a year. The least frequently updated reports were those involving complex analysis covering longer timescales such as the bespoke reports normally associated with DFES forecasts. Undertaking such analysis and publicising the results more frequently, say on an annual basis corresponding to potentially annual refresh of forecasts, would require significant extra resourcing with potentially a disproportionate increase in benefits for customers. This is because of the uncertainty around the long-term forecasts up to 2050 and modelling of new smart solutions which will alter network power flows.

Also noted from the survey results was that the latest reporting mechanisms reflect more dynamic parameters in detail, such as the SWRR monthly publication of accepted connections. Consequently, standardisation needs to be flexible enough to accommodate changes in the future including possible changes in the timescales of system parameters and including potential new parameters affecting network capacity, different network capacity sensitivities due to the increased use of active management.

Survey findings indicate that the choice of a standardised timescale for publishing network capacity reports must be considerate of the additional utility provided by updating a capacity

report along with the increased effort of producing more complex and time intensive reports more frequently.

4 Network Capacity Evaluation Methodologies

4.1 Capacity Parameters

Most network capacity reports covered by the survey were based on demand or generation with a couple of examples referring to electric vehicle capacity.

Although the number of demand network capacity reports exceeded those focusing on generation, both types are justified by the need for network reinforcement since it is driven by demand security of supply, but also commonly driven by generation capacity and maximum export during periods of minimum demand. Demand and generation network capacity were recognised in the survey to be of interest to different audiences, as industry regulators scrutinise network loading for example associated with security of supply or funding reinforcement and generators assess where there is existing capacity leading to less expensive connections.

Different forms of demand quantities were noted to be relevant to different parts of the network due to differences in what they need to typically withstand. Loading assessments of lower voltage networks should be based on gross true demand compensating for any embedded generation which is likely to comprise a low number of discrete units which could credibly be unavailable at the same time. Observed demand reflecting the diversity of an extensive downstream network is more relevant to higher voltage networks including the interface between the transmission and distribution networks because all associated embedded generation is much less likely to be all unavailable at the same time. The learning from this is that definition of the reported parameters will be an important aspect of any possible standardisation.

The importance of reporting on generation capacity is recognised as it facilitates the transition to low carbon by indicating areas where it is best to connect the additional renewable generation required to meet GB's Net Zero target. Also, reporting on demand network capacity could help with aspirations to reduce carbon by signposting opportunities for connecting EV chargers and battery storage.

4.2 Network Coverage

Survey responses indicated network capacity reporting across all parts of the network, including Grid Supply Points (GSPs) typically 400/132kV and 275/132kV, Bulk Supply Points (BSPs) typically 132/33kV, 132/22kV, 66/22kV, Primary substations typically 132/11kV, 66/11kV, 33/11kV and 22/6.6kV and Low Voltage (LV), as shown in Figure 4.

The survey highlighted that only some DNOs are currently publishing information on the available capacity on LV networks and that most reporting focuses on BSP and Primary substations. This is because there is more monitoring on higher voltage networks providing better data accuracy and because the networks are smaller making the data sets a more manageable size. Also, LV network data is likely to be more volatile and require more frequent updates than the higher voltage networks where the existing loading levels and diversity mean that power flows do not change considerably when new individual loads connect.

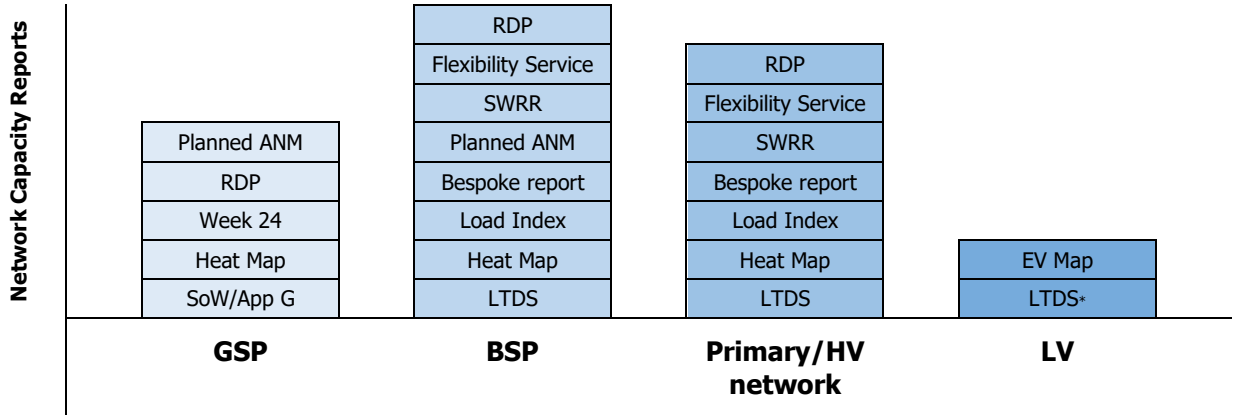

Figure 4 : Network capacity reports covering each part of the distribution network

** some DNOs publish information for HV/LV distribution/secondary substations in their LTDSs*

Discussions on the survey results judged information on LV network capacity to be less critical as LV network constraints are more easily overcome as it can be extended more quickly and with less expense than higher voltage networks. Customers connecting to EHV and HV networks were judged to be more interested in the implications of connecting to the electrical network because it is more expensive and time consuming to reinforce these networks. Perceived barriers to publishing extensive LV network data included the large quantity of assets and lack of comprehensive monitoring to provide accurate data, meaning that estimates are necessary to complete the data set. Potential connectees were expected to be the audience most interested in LV network capacity alongside flexibility entrepreneurs interested in LV connected resources, but it was acknowledged that the data could have many yet to be identified applications providing the greatest direct benefit to the largest number of domestic customers.

4.3 Network Parameters

Survey results on the methodologies used to evaluate network capacity indicated reporting based on thermal capacity, voltage and fault level.

Network topology and the requirement for detailed load flow and fault level analysis were noted in the survey to influence what network parameters are reported on. Thermal loading is often assessed using simple and quick comparisons of forecast loadings versus network firm capacities, whereas more time-consuming load flow analysis taking all credible circuit outages is necessary to assess thermal loading in more detail, including voltage rise and drop and fault levels. Detailed load flow analysis was also noted to be required for assessing interconnected networks. Consideration of power system study results was judged to provide more useful and accurate reflection of available network capacity, improving on the gaps when only thermal capacity is evaluated.

Discussion of the survey results recognised that simple thermal assessments may become inappropriate as network operation becomes more complex and we forecast new loads with different demand profiles such as electric vehicles and heat pumps. It may be necessary to analyse multiple cardinal points in addition to the maximum and minimum demand cases we currently study or undertake yearlong half hourly load flow analysis. Both approaches have the disadvantage of being more labour intensive and may be unsuitable for longer term assessments because the greater loadings may not converge with the existing network arrangements.

Where the Appendix G process is operated for signposting transmission network capacity available for DNO connections involving transfer of data between DNOs and the TSO, it is an example of explicitly reporting separate thermal and fault level availability values to together

define network capacity that may be spare for new connections. DNOs provide a monthly updated list of all generators already connected or contracted to connect at each GSP to the TSO who revert with Materiality Headroom and Fault Level Headroom values. DNOs use the returned capacity indications to assess the likelihood that new connections on the DNO network will be within the capability of the existing transmission network or whether a 'Modification Application' is required to request that the TSO identifies if any transmission works are required to accommodate the connection. A useful point to note is that although the data and analysis is updated regularly, there is no guarantee that new customers will be able to connect using the reported available capacity. Like heat map information, reported available capacity needs to be accompanied with a caveat that specific analysis based on precise parameters is required to fully evaluate each potential connection and explore how it could be accommodated in the existing network.

The useful learning from this aspect of the survey is that potential standardisation of parameters to be included in network capacity reporting should consider the increased workload versus the additional accuracy and insights.

4.4 Date Range

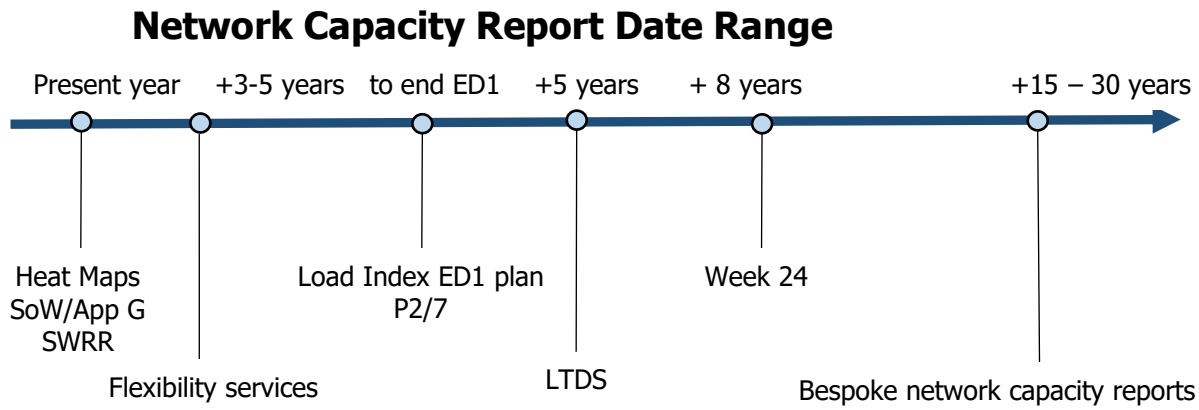

Figure 5 : Range of dates addressed in network capacity reports

Survey results indicated a range of reporting dates as shown in Figure 5 with durations being specified for mandated reports.

Most network capacity reports focus on the short-term future up to approximately 10 years. This corresponds to the period covered by business plans for the current regulatory period to ensure appropriate investment, and the planning, design and construction programmes for major network builds. The period of network capacity reports is also influenced by the duration of asset replacement programmes and whole life cycle cost benefit analysis to inform strategic investment. Assessment of network capacity for just the short-term future is supported by the greater confidence with which forecasts can be made reflecting known customers' plans and their applications to connect.

GB's Net Zero ambitions are an important consideration for the presentation of network capacity further into the future to illustrate possible pathways to reach the target and the implications for the electrical network. Customers' feedback on DNO DFES reports is that they benefit from understanding the influences on future alternative pathways enabling them to participate in the debate.

4.5 Forecast Scenarios

Survey responses confirmed that many network capacity reports do not use multiple scenarios, and indeed those reports which only present results for the present year do not consider any scenario or forecast as indicated in Table 2. These reports tend to be based on the existing position for networks and often include only already connected and contracted resources.

In most cases considering one scenario, it was reported to be a central or best view scenario defined differently by each DNO. The various definitions of the one scenario used in network capacity reports included the following:-

- Average / central assumptions across the other scenarios around both future prosperity and decarbonisation policies and behaviours, with more low carbon technologies (EVs, heat pumps, renewable generation) compared to the low prosperity scenarios, and fewer developments bringing slightly lower demand growth than the high prosperity scenarios.
- Assumes the most likely outcome in the view of the DNO and its stakeholders for each driver (EVs, HPs, GDP, houses built, etc.), adopting low, central and high assumptions as appropriate rather than all central forecasts.
- Short term forecast dominated by known planned connections and assumed growth in underlying demand sense checked against the range of DFES forecasts.
- Assumed to be the DFES forecasts for each technology type most closely matching the corresponding regional breakdown of Ofgem's Common Scenario work.

Although only one scenario is being used to establish that there was a network issue that needed mitigating, the survey established that in some cases multiple scenarios are used in the cost benefit analysis to determine the specific solution that should be employed to solve the issue as shown in Figure 6.

Table 2 : Use of forecasts in network capacity reports

No forecast scenario	One scenario	Multiple scenarios
Heat maps SoW/App G SWRR	LTDS Week 24 Load Index ED1 plan Flexible services	Bespoke network capacity reports

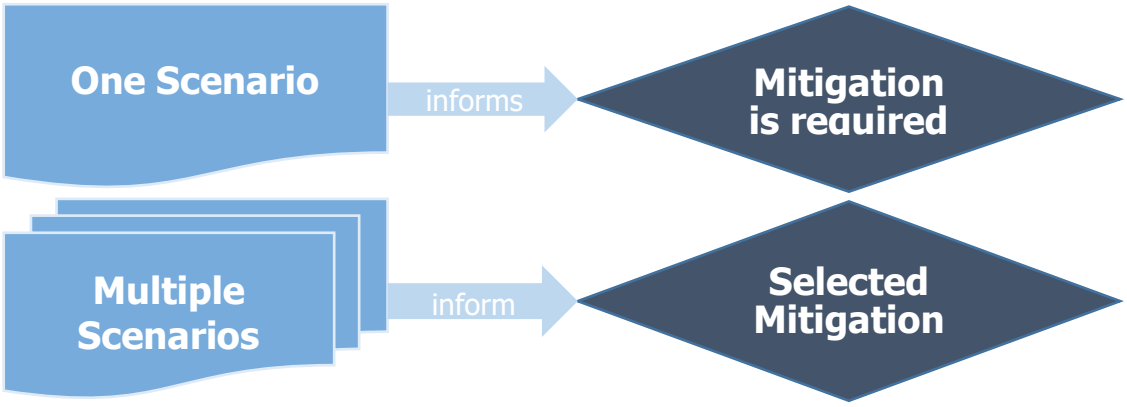

Figure 6 : Use of scenarios in network planning

Forecasts for multiple named scenarios are used to assess network capacity in the bespoke reports applying DFES outputs and considering the years furthest into the future. They are used to illustrate the range of future possible impacts on networks and identify least regret actions.

5 Network Capacity Reporting Attributes

5.1 Reporting format

The survey responses identified varying reporting formats used to express available capacity, including:-

- Tables of actual or percentage loading
- List of capacities and loadings
- Materiality headroom
- Load Index scale 1 to 5
- Red, amber or green or coloured scale
- Map view / geospatial visualisation tool

It is recognised that different stakeholders require information to be presented differently, depending on their level of experience and their ability to engage. Detailed information, e.g. time of day analysis and future projections, may be necessary to meet the needs of some such as those considering providing flexible services, whilst these details would be confusing to customers looking for information on when and where to make a new connection.

Tabular reports are preferred probably due the ability to provide detail in a compact regulated manner using a template and the possibility of further analysis. Customers' feedback on existing heat maps is that they appreciate access to underlying data to allow them to visualise it in their own way and import it to alternative software.

5.2 Reporting platform

Not all network capacity reports are publicly available as they are only provided for a single party, but otherwise the reports are hosted on the DNO websites and many modes of communication, such social media, events and email used to raise awareness of the reports and their updates. In some cases a central platform is used, for example for hosting links to each DNO SWRR (https://www.energynetworks.org/electricity/futures/open-networks-project/der-information/system-wide-resource-registers.html) or advertising flexible services (https://www.energynetworks.org/electricity/futures/flexibility-in-great-britain.html or https://picloflex.com/dashboard).

The potential benefits and consequences of adopting a central platform should be considered when scoping a potential standardised approach to network capacity evaluation and reporting.

6 Conclusions

DNOs completed a comprehensive survey to gather information on how they currently evaluate and report network capacity. A wide range of approaches were observed across numerous reports, with consistency in the report format and content between DNOs where the report was required in compliance with industry regulations, but differences when reports were prepared voluntarily by DNOs.

Survey responses were analysed to identify current methodologies applied to evaluate network capacity to establish options for potential standardisation for a common approach. Importantly the survey and subsequent discussion in the P5 subgroup looked at why specific methods are adopted to start to provide justification for any agreed standard network capacity report.

It was concluded that the following aspects of different network capacity reports vary within DNOs and between DNOs:-

vi. Reported network parameters
vii. Extent of the network covered by the report
viii. Range of dates over which network capacity is evaluated
ix. Forecast scenarios, and
x. How network capacity is presented in the report

Network capacity reports were found to vary for a variety of reasons, including:-

- Different audiences
- Different purposes
- Different technical requirements such as network topologies and operation
- Different risk tolerances

It is apparent that many network capacity reports relate to the present year and so do not employ forecasts, whilst other evaluations of future network capacity are based on just one scenario and just a few considering a range of scenario forecasts. This may lead to an opportunity to develop a standardised report by extending the scope of an existing report to include more scenarios.

7 Next Steps

The proposed next steps are to build on the learning from the survey to investigate the additional benefits and content of a potential standard network capacity report to be prepared by all DNOs. It is intended that the alternative methods identified in this report are examined further to establish the pros and cons of each as potential options for a standardised approach for evaluating and presenting network capacity. Benefits of greater consistency in mandated reports presently prepared for a single recipient shall be considered along with their adaptation for sharing publicly. Also, aspects of discretionary reports shall be considered as the basis of a standardised report.

It is recommended that options for a potential standardised report could be developed by following the logical breakdown applied in this report in a three-stage approach as shown in Figure 7.

First the audience could be specified along with the purpose of the proposed network capacity report, before defining the evaluation methodology in terms of the:-

xi. Capacity parameters
xii. Network coverage
xiii. Network parameters
xiv. Date range

xv. Forecast scenarios

and the presentation of the network capacity results could be defined in terms of the:-

xvi. Report format and

xvii. Report platform including not only where the data is published but also if it is published in a new standalone report or by amending an existing report.

Figure 7 : Three stage process for developing a potential standardised network capacity report

The preferred option for a standardised network capacity report shall be determined by asking the following questions about the identified alternative approaches for standardisation:-

- Why do we do it this way?
- Could we do it differently?
- What would be the benefits or disadvantages of doing it differently?
- Would it be appropriate to standardise on this way?

This report focuses on current practices, but the further consideration of options for standardisation should incorporate room for the development of our processes, with consideration of how network capacity will be evaluated as new techniques and load types are incorporated and become more prevalent on our network such as Active Network Management and flexible connections. Also, although the scope of this product does not extend to consideration of how the industry shall host data in the future, we shall ensure that the outputs are not restricted to a specific publishing format.

Benefits to all stakeholders shall be examined through the process of shaping a potential standardised approach and subsequently by liaising with stakeholders to establish if a single approach should be adopted. Liaison with Ofgem has been highlighted as particularly important to ensure synergy between the P5 outputs and Ofgem's ongoing work to reform the long term development statement to enhance the availability of forecasting and network data to enable DSO functionality.

Appendix A – WS1B P5 Survey Template

Open Networks WS1B P5 - Survey on network operator current practices for evaluating and signposting future network capacity

Please complete the survey below and submit to Gillian.Williamson@enwl.co.uk *by Friday 13th March. Please use a separate row for each network capacity report (see list i to vi above for DNO network capacity reports which you should include as a minimum). Please contact Gill on the above email address if you have any queries.*

DNO name	
WP1B P5 representative name	
Survey respondent name	
Survey respondent email	
Survey respondent telephone no.	

Network capacity indication report title	Recipient/ Public	Update frequency	Demand capacity forecast	Generation capacity forecast	Extent of network coverage	Parameter considered in evaluation of capacity *(tick as appropriate)*	How is network capacity presented?	Forecast date range	Scenarios for which results are presented	Methodology for establishing capacity
Example 1 *LTDS (mandated licence condition)*	*Public* *https://www.enwl.co.uk/get-connected/network-information/long-term-development-statement/introduction-to-ltds/*	*Annual update*	✓	✗	*BSP (typ 132/33kV)* *Primary (typ 33/11kV)*	✓ Thermal capacity ☐ Voltage ☐ Fault level ☐ Other *(please specify)*	*forecast demand alongside firm capacity*	*6 years – present (18/19) to 5 years in future (23/24)*	*One Scenario*	*Forecast maximum demand alongside firm capacity, considering thermal loading only, with no consideration of fault level or voltage compliance*
Example 2 *Regional Insights Report (voluntary report)*	*Public* *https://www.enwl.co.uk/get-connected/network-information/dfes/*	*Ad hoc*	✓	✓	*BSP (typ 132/33kV)* *Primary (typ 33/11kV)*	✓ Thermal capacity ☐ Voltage ✓ Fault level ✓ Reactive Power	*Colour scale*	*To 2050*	*Central Scenario*	*Some half hourly load flow analysis, with comparison of forecast thermal loading and fault levels to present equipment capabilities for future years where load flow analysis would not be useful due to lack of convergence with the present network configuration.*
						☐ Thermal capacity ☐ Voltage ☐ Fault level ☐ Other *(please specify)*				
						☐ Thermal capacity ☐ Voltage ☐ Fault level ☐ Other *(please specify)*				
						☐ Thermal capacity ☐ Voltage ☐ Fault level ☐ Other *(please specify)*				
						☐ Thermal capacity ☐ Voltage ☐ Fault level ☐ Other *(please specify)*				
						☐ Thermal capacity ☐ Voltage ☐ Fault level ☐ Other *(please specify)*				
						☐ Thermal capacity ☐ Voltage ☐ Fault level ☐ Other *(please specify)*				