

WS1B P7 Operational Data Sharing Identification of Information to Share

July 2021 | Version 1.0

DOCUMENT CONTROL

Authorities

| Version | Issue Date | Authorisation | Comments |
|---------|------------|------------------------------|----------|
| 1.0 | July 2021 | Open Networks Steering Group | |

Related documents

| | |
|-------------|--|
| Reference 1 | |
| Reference 2 | |

Change history

| Version | Change reference | Description |
|---------|------------------|-------------|
| | | |

Distribution

| |
|--|
| |
|--|

TABLE OF CONTENTS

| | |
|---|-----------|
| Introduction | 5 |
| About ENA | 5 |
| About Open Networks..... | 5 |
| 2021 Open Networks Project Workstreams..... | 6 |
| Our members and associates | 7 |
| ENA members..... | 7 |
| ENA associates..... | 7 |
| Background & Scope..... | 8 |
| Background..... | 8 |
| Outcomes & Benefits..... | 8 |
| Areas of data to be investigated and enhanced | 8 |
| Use Cases outside of GB..... | 9 |
| Existing data sharing | 9 |
| Current data..... | 9 |
| Identification of work to improve internal data exchanges & feasibility to share externally..... | 10 |
| Categories of data | 11 |
| Capacity rating and configuration..... | 11 |
| Outage Data..... | 12 |
| Constraint Data | 12 |
| Historic Utilisation Rate..... | 12 |
| Operational Forecasting | 13 |
| Use Cases..... | 13 |
| Advisory Group Feedback..... | 15 |
| Feedback..... | 15 |

| | |
|---|-----------|
| Response..... | 15 |
| Work Group Proposals..... | 16 |
| Recommendations & Next Steps to develop proposal for implementation..... | 19 |

Introduction

About ENA

Energy Networks Association (ENA) represents the owners and operators of licenses for the transmission and/or distribution of energy in the UK and Ireland. Our members control and maintain the critical national infrastructure that delivers these vital services into customers' homes and businesses.

ENA's overriding goals are to promote UK and Ireland energy networks ensuring our networks are the safest, most reliable, most efficient and sustainable in the world. We influence decision-makers on issues that are important to our members. These include:

- Regulation and the wider representation in UK, Ireland and the rest of Europe
- Cost-efficient engineering services and related businesses for the benefit of members
- Safety, health and environment across the gas and electricity industries
- The development and deployment of smart technology
- Innovation strategy, reporting and collaboration in GB

As the voice of the energy networks sector, ENA acts as a strategic focus and channel of communication for the industry. We promote interests and good standing of the industry and provide a forum of discussion among company members.

About Open Networks

Britain's energy landscape is changing, and new smart technologies are changing the way we interact with the energy system. Our Open Networks project is transforming the way our energy networks operate. New smart technologies are challenging the traditional way we generate, consume and manage electricity, and the energy networks are making sure that these changes benefit everyone.

ENA's Open Networks Project is key to enabling the delivery of Net Zero by:

- opening local flexibility markets to demand response, renewable energy and new low-carbon technology and removing barriers to participation
- providing opportunities for these flexible resources to connect to our networks faster
- opening data to allow these flexible resources to identify the best locations to invest
- delivering efficiencies between the network companies to plan and operate secure efficient networks

We're helping transition to a smart, flexible system that connects large-scale energy generation right down to the solar panels and electric vehicles installed in homes, businesses and communities right across the country. This is often referred to as the smart grid.

The Open Networks project has brought together the nine electricity grid operators in the UK and Ireland to work together to standardise customer experiences and align processes to make connecting to the networks as easy as possible and bring record amounts of renewable distributed energy resources, like wind and solar panels, to the local electricity grid.

The pace of change Open Networks is delivering is unprecedented in the industry, and to make sure the transformation of the networks becomes a reality, we have created six workstreams under Open Networks to progress the delivery of the smart grid.

2021 Open Networks Project Workstreams

- WS1A: Flexibility Services
- WS1B: Whole Electricity System Planning and T/D Data Exchange
- WS2: Customer Information Provision and Connections
- WS3: DSO Transition
- WS4: Whole Energy Systems
- WS5: Communications and Stakeholder Engagement

Our members and associates

Membership of Energy Networks Association is open to all owners and operators of energy networks in the UK.

- ▶ Companies which operate smaller networks or are licence holders in the islands around the UK and Ireland can be associates of ENA too. This gives them access to the expertise and knowledge available through ENA.
- ▶ Companies and organisations with an interest in the UK transmission and distribution market are now able to directly benefit from the work of ENA through associate status.

ENA members



ENA associates

- [Chubu](#)
- [EEA](#)
- [Guernsey Electricity Ltd](#)
- [Heathrow Airport](#)
- [Jersey Electricity](#)
- [Manx Electricity Authority](#)
- [Network Rail](#)
- [TEPCO](#)

Background & Scope

Background

Ofgem has undertaken preliminary work to scope the possibility of a licence condition to address the limited sharing of operational data to market participants.

2020 WS1B P3's work on Operational Forecasting recommends considering options for sharing forecasting information with stakeholders. This product will build on the findings of this report, and agree necessary changes with the ESO, TOs and DNOs.

Outcomes & Benefits

The work will improve the decision making of market participants, improve the trust that market participants have in network companies and contribute to national data sharing targets.

This product is applicable to Licensed Distribution Network Operators providing data to market participants for service provision but will include ESO and TO data where applicable (for example data on boundary flows of ESO/TO assets from DNO metering, ICCP data or other suitable source).

Areas of data to be investigated and enhanced

This product's objective is to set out proposals for operational data to be shared by Distribution Network Operators to non-network market participants and minimum standards for doing so. The following are within the scope:

- Capacity rating and configuration
- Outage data
- Constraint data
- Historical utilisation rates
- Operational forecasting (as per recommendations from 2020 WS1B P3's report on Operational Forecasting)

Time bounds of data sharing within this product

This product is proposing to apply to the Planning Phase and Control Phase time frames as defined in the Distribution Code

The Distribution Code DOC2.5.3 defines the following planning time frames:

1. Operational Planning Phase
 - a. Long Term Planning Phase - Calendar year 3 ahead.
 - b. Medium Term - Calendar years 1 and 2 ahead.
 - c. Short Term - The current calendar year 52 weeks ahead down to 9 weeks ahead.
2. Programming Phase
 - a. 24 hours to 8 weeks ahead inclusive
3. Control Phase
 - a. 0 to 24 hours ahead

Use Cases outside of GB

Within Europe there is a move towards centralised data exchange platforms for retail market participants, these are currently extending to include Transmission System Operators connected parties and are seeking to include customers who can share their information with third parties such as aggregators who are active in the wholesale market. This is promoted by three main objectives:

- Improved efficiency in data management, which involves greater and more consistent data quality, transparency and exploitation of economies of scale for all involved stakeholders;
- Removal of barriers for new market entrants, including the facilitation of supplier switching and fostering of new services;
- Empowerment of customers, which involves strengthening the opportunities for market participation, granting access to data for customers and authorised third parties, realising the potential of smart meters and facilitating demand response.

The data exchange platforms within Europe all vary in the type, quality or communication standard for data provided, there is a general move towards standards that are legally binding if the individual regulators have enough authority to enforce compliance.

The System Operational Guidelines (European Network Codes) bring in legislation for TSOs, DSOs, and Significant Grid Users, which is being implemented on a country by country basis but does not extend down to smaller market participants.

Out of scope

This product will not cover the following as they have been agreed as out of scope and are being/ to be covered within other products:

- ESO to DNO / DSO data exchange
- DNO / DSO to ESO data exchange
- Curtailment information for DERs connected to the system, this will come into the scope of WS1B P9
- DER to DSO / DSO service information

Existing data sharing

Current data

DNOs within GB presently produce the following information:

- Long Term Development Statement
- Embedded Capacity Register

- Appendix G data (Capacity at supply points from National Grid), shared where limitations are known or where a DNO is in the process of applying for additional DER headroom with National Grid on a GSP by GSP basis.
- Network Capacity Map (also known as Heat Maps). These show generation capacity limitations at primary substation level and above (>11kV).
- Flexibility Service requirements to mitigate reinforcement at Primary level (>=11kV), with some DNO's identifying LV requirements
- EHV Outage Information. Standard for planned outage data to be provided to impacted customers 6-8 weeks ahead (>11kV).

Single premise shutdown information provided (<=11 All of the above are datasets produced on a periodic basis. Those providing network loading and utilisation are presently only provided for peak periods showing capacity on the network for larger sized connections.

The datasets available also do not provide a breakdown of network utilisation by connection type (domestic/commercial load or generation) to allow customers to carry out their own detailed assessment on potential connections or capacity to operate in markets.

Identification of work to improve internal data exchanges & feasibility to share externally

DNOs are working towards providing data in standardised formats internally for individual use. Wider work has taken place between the DNOs to agree on standards between the companies.

- Embedded Capacity Register; DNOs are producing internally to an agreed format for publication to the wider industry.
- Common Interface Model; NG ESO and DNOs are moving towards using CIM as a standard for data transfer between systems. Industry working group (Grid Code Modification GC0139) looking at standardisation of CIM as variations exist. Model availability is dependant on network complexity.
- Inter Control Centre Protocol (ICCP) is being used for internal system to system data transfer as well as between companies for real time data (National Grid ESO to DNO) ICCP is presently being implemented on an "as required" basis.

Categories of data

Capacity rating and configuration

Thermal

Thermal rating limits for network assets are published in Long Term Development Statements. This data is in the form of asset ratings and substation ratings and is based on long term planning standards to determine which rating to use.

These ratings are therefore not directly applicable to short term operational planning, as the ratings are based on seasonal average temperatures. In operational planning and real time running of networks, DNOs have to account of actual weather at time of operation; this may limit the ratings that can be utilized. For example high solar irradiance in winter limiting overhead line or transformer cooling; or periods in the summer when the temperature is above the seasonal average which assets are rated against for the period and therefore full ratings cannot be realised.

Network Operators have been investigating dynamic ratings of assets, these are based on the actual performance of an asset against a real time limiting factor. For example the sag of an overhead line which is the limitation that drives the rating that can be applied. This will be subject to the prevailing weather conditions at the location of the asset. These ratings are not widely available and are still being investigated for long term operations and are not included in the scope of the data that P7 is proposing to make available.

Under the area of forecasting, dynamic ratings are also not presently a viable option. For example weather forecasting is not accurate enough to know the wind speed/direction and cloud cover down to a granularity that can be applied to a small area where a single asset (overhead line) is located to apply predictions to the rating that can be applied.

Voltage

Statutory limits are identified and documented within the LTDS. Capacity for additional connections or services based on voltage are calculated for new connections using a standard connection methodology. Capacity for small connections to provide reactive services are not considered as part of assessments. Existing customers are bound by connection agreements which generally have fixed reactive requirements.

Fault Level

Maximum fault level is declared with network rating for normal configuration at a site level (from National Grid exit point to Primary level)). Forecasted maximum fault level data is calculated using offline assessment tools based on expected output of connected parties and configuration.

Fault level could be provided based on the network configuration and assumptions of contribution through plant and from embedded DER. To produce real time data, online assessment tools would be required. There is work ongoing through Network Innovation investigating real time fault level recording/calculation.

This product is focused on operational data, fault levels issues impacting third parties are generally limited to customers with contracts for short term parallel only. Consideration will be given to providing information that will benefit these customers. However these customers are contractually required to contact the Network Operator to seek agreement to parallel based on the network configuration and there being no planned works/switching, sharing network configuration with customers will not remove this requirement and there may

be limited benefit to providing a solution for this within the product. This will be considered while developing proposal for how to implement the requirements for this product.

Network Configuration

Network Configuration is shared on a required basis to participants it has a direct impact on for the security of their supply or the inherent characteristics at the interface point (fault level, capacity, voltage profile). System configuration is not published in operational timeframes to inform participants of current running.

The benefit of this data would be for market participants to understand the network to which they are connected and the potential market options available to them. For example during normal operation of the system, Network Operators will reconfigure areas of their network meaning DERs will become supplied from alternative substations. Providing this data to market participants would allow them to know where they can provide services to both DNO / DSO and ESO.

Outage Data

Outage data is published as part of EHV planning by the Network Operators, this includes data on network assets which will be made unavailable due to planned and unplanned outages. This will include basic information for market participants who own or operate sites impacted by work on the EHV system.

Outage data is added to the DNO plans as made available internally and by third parties that interface with the DNO (e.g. NG ESO), data provision is currently made in accordance with the Grid Code and Distribution Code.

The method of which the data is made available varies across the DNOs but the basic data is aligned and is produced for at least six weeks in advance.

Constraint Data

Constraint data is to be split into two categories based on whether a connection is under ANM control or is a non curtailed connection.

Non curtailed Connection

DER connections that have no autonomous control to curtail their import or export of power, are normally curtailed due to planned or unplanned outages on the DNO systems. These curtailments are, in the case of planned outages on the EHV, discussed and agreed with the relevant parties prior to the curtailment through the standard Outage Data provision.

ANM Connection

DER connections that have import/export power controlled by a DNOs ANM control system under normally intact conditions, are informed of curtailments above the normal levels expected by the DNO, through the existing planning interfaces. Where curtailment levels are expected to increase due to planned works these are notified through the normal process for Outage Data provision..

Historic Utilisation Rate

No data produced at present. Can be estimated based on combination of asset ratings and peak loading data. This will only provide utilisation at peak times (for two averages; Summer and Winter), this does not provide actual utilisation of assets across the varying load profiles for a period of time.

Operational Forecasting

Network Operators currently use historic load trends throughout the year to estimate / forecast the load in relative time frames for real time operations. This has historically always provided data of sufficient accuracy to allow the safe operation of the network. The addition of new technologies (EV charging, domestic solar and batteries, heat pumps) will mean using these historic trends will become less accurate in the near future, this will therefore increase the need for forecasting models, which take account of the known connections and expected connections with the system, based on likely user usage profiles and market signals.

Forecast data will need to be split into two phases;

- Control Phase (<24 hours ahead) this will include market data.
- Programming Phase (24 hours to 8 weeks ahead). This will have to be based on expected market data based on standard profiles and weather data.

DNOs can produce forecasts based on weather data however for complete accuracy they will need scheduled data from non renewable technology types to accurately predict total system requirements.

Use Cases

Capacity Rating and Configuration

| Use Case Name | Data to be available to Market Participants | Requirements | Benefit |
|----------------------------|---|--|--|
| Capacity Rating | Site Capacity for load and generation. This will be based on nominal continuous ratings. | Rating of site to show available headroom against load profile. This will be limiting rating of the network (thermal, fault level, protection) | Will show customers capacity available for site and period when capacity is/is not available for considering service provision and aligning non availability (maintenance etc) |
| Network Configuration | EHV DER abnormal supply point | Site DER is supplied from (GSP / Grid / Primary). | Allows market participant to understand sites with constraints that they can provide service for |
| Outage Data | Site shutdown information. Network topology for EHV/HV with individual asset status | Basic outage planning data without full topology (Available for EHV, limited availability for HV, not available for LV) | Provides information on when market participants may be impacted and limited by planned and unplanned network outages. Will provide indicative curtailment levels on network due to planned work. |
| Constraint Data | Planned constraints linked to outages, Unplanned constraints linked to faults | Operational forecasting for load/generation Live network topology, network load and capacity ratings | Show areas of high utilisation to target service provision |
| Historic utilisation rates | Asset rating and loading data Circuit rating and loading data | Type of asset; need to understand level of loading that can be applied based on network topology, limitations could be capacity to secure for N-1 based on thermal or voltage limitations. | Show areas with low utilisation to allow connection and high availability for capacity Show areas of high utilisation to target service provision |
| Operational forecasting | Forecasts DNOs use to make operational planning decisions. | Sharing of the forecasts that DNOs use for generation and load on the network. Where generation is assessed using | Market participants can see the data that curtailments are based on, they can challenge these and provide data where local customer data is more accurate than DNO data leading to more accurate network assessment and potentially less curtailments. |

Advisory Group Feedback

The Advisory Group were approached for feedback on the requirements and use cases for this product. Below is the list of questions and initial answers provided.

There is no definitive answer as to what is required for the market as the moment and consensus from the group was that DNOs should publish all the data they have and allow the market to assess the use and provide feedback on where further enhancements should be made. This products therefore focuses on what data should be feasible for DNOs to publish in short time scales without putting significant resource into areas that the market may not required.

| Feedback | Response |
|---|---|
| Utilisation needs to be at half hour granularity to inform FSP whether constraints can be solved by flexibility (low utilisation) or reinforcement (high utilisation) | We are targeting half hourly data initially for utilisation of Extra-High Voltage sites however it is likely this data will be published monthly or quarterly. We will trial some sections of network for lower voltages to work out scalability and allow customers to provide feedback to understand how data can and will be beneficial |
| Recommend networks share all network data available with the market for a period and seeing which data is useful. This was one of the findings from the Energy Data Taskforce from the release of transport data. | We will start with DNOs publishing data currently available, let the market indicate what is useful and still required, and then build on this to avoid large upfront costs with little benefit |
| Will operations data be accessible via APIs? | We will initially produce data in a downloadable format. APIs are being investigated for certain aspects of the data, (e.g. EHV Outage information) however they may not be suitable for all data types unless there is a justification driven by the frequency of updates to the data. For example, the data produced for utilisation will be a periodically update; if this is quarterly then there should not be a need to provide an API for this |
| Can you share further setting out where the DNOs see challenges in releasing certain types of data? | We will be looking to understand what data can and cannot be released into the public domain due to commercially sensitivity or security concerns. We propose data that is not suitable for wide public visibility should be available to customers with a business need via applying for access through a secure portal |

Work Group Proposals

| Use Case Name | Data Included | Excluded | Information | Data Format |
|-----------------------------------|---|--|---|--|
| Capacity Rating and Configuration | <p>At GSP level provide rating of substation (firm continuous rating in MVA). This will be the capacity to which the Distribution Network Operator would normally operate the network to without taking into account short-term operational ratings and/or tripping schemes.</p> <p>Substation loading data to be provided against rating data to show headroom, this should have at least 30 minute refresh rate (target 10 minute). The data should be average values but this will depend on each DNOs current IT solution for data archiving from their scada system and it's computational limits.</p> <p>Embedded DER data to be split from boundary flow data and to be provided by technology type.</p> <p>The publishing is presently being developed by WPN (Western Power Distribution - Live Data Feed Application - Map) and UKPN (UKPN DSO Dashboard - Grid Supply Areas - Grafana (ukpowernetworks.co.uk))</p> <p>Live limitations in ANM zones and dynamic ratings to be investigated as part of the implementation proposals to understand viable timeline and options for publishing but this should not hold up initial data provision.</p> | <p>Bulk Supply Points and lower until scalability known by each DNO and resource requirements.</p> <p>Any site for which DNO does not have required telemetered data.</p> <p>Embedded DER data that is not measureable due to telemetry limitations and lack of scada.</p> | <p>Data to be published where data is available within DNO, if substations do not have telemetry then individual CBA to be carried out if there is justification for the data (for example site becomes point causing curtailment). Providing GSP data can allow each DNO to calculate requirements to scale.</p> <p>Loading data will be minimal 30 minute instantaneous values at all relevant substations.</p> | <p>XML/CSV – this will provide a simple format for the data to be produced in the shorter term and is in alignment with the present network data provided (LTDS etc)</p> <p>API – this will allow direct communication between DNO and customer systems, development requirements on DNOs will be investigated as part of the proposal for implementation to understand the resource requirement. This also only has benefit if market participants can make use of the data in this format.</p> <p>CIM – longer term this may become a standard. Subject to outcome of GC0139 and wider industry work.</p> <p>Other data formats to be investigated as part of proposal for implementation.</p> |
| Outage Data | <p>DNOs to publish outage plans for EHV systems to market participants who have a contractual link to relevant sites that may be impacted.</p> | <p>Published outage plans for HV and LV networks.</p> | <p>UK Power Networks and ENWL are starting Innovation funded projects looking at service procurement against constraints. This projects will include off setting curtailment for outages on the</p> | <p>PDF / CSV / XML - Basic provision to make relevant data available to market participants.</p> <p>API – Potential for linking of DNO to market participants systems to automate data. Outage Data will be required for market platform, general data for service</p> |

| | | | | |
|----------------------------|---|--|---|---|
| | | | network by means of curtailment trading. | requirements from market systems may take over certain data needed from Outage Plans. |
| Constraint Data | <p>For non ANM type connections curtailment information related to planned and unplanned outages to be provided to the relevant market participants. This will include data on the assumptions made to complete network assessments (generation and load profile).</p> <p>For ANM type connections, planned outage information to be provide under Outage Data to provide indication of future increased curtailment. Level of data provided will be subject to</p> <p>For all connection types impacted by constraints caused by EHV networks, these should be included in outage plans provided.</p> <p>For all connections, the reason for the curtailment is to be provided.</p> | | Going forwards P9 work requests information on all constraints applied | <p>PDF / CSV / XML</p> <p>API – potential longer term output, data may be required to go through market platform rather than direct to market participants.</p> |
| Historic utilisation rates | The capacity rating and loading data required for Capacity Rating and Configuration should be made available as achieved data. This is to the same granularity that is being produced for the | <p>BSP and lower until scalability known by each DNO and resource requirements.</p> <p>Any site for which DNO does not have required telemetered data.</p> | | As per Capacity Rating and Configuration Information. The same data will be required to provide utilisation information. |
| Operational forecasting | DNOs to publish standard generation profiles used for assessments. | | <p>ESO to provide feedback on forecasting information available for embedded generators contracted with ESO.</p> <p>SSE are running an Innovation project on Forecasting,</p> | |

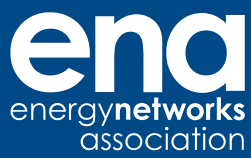
Recommendations & Next Steps to develop proposal for implementation

Some of the requirements within this product are incorporated within DNOs submissions for ED2, this will be expanded on further following the final ED2 submissions by DNO's as part of the further work on how this product will be implemented by DNO's.

The following items will be investigated as part of the next stage for implementation:

- GDPR – concerns with publishing data relating to specific customers connections. Currently in discussions within UKPN and ESO on this subject for further detail, this will provide understanding on whether data will be published at boundary points which only have single customers and therefore provides commercially sensitive data (i.e. forecasted output of generation ahead of market closure).
- Timeframe for each DNO to:
 - Confirm granularity of data available
 - Produce data sets
 - Setup method for publication and sharing of data
- Expected resource requirements for implementation
- Estimated costs
- Ability to scale down from GSP
- Methods for producing dynamic ratings rather than static continuous values
- Forecasting of DER within network
 - Time
 - Cost
 - Granularity

Is it proposed to scope the above to understand the data that can be provided by the DNOs in the short and medium timeframes. Given the data is for market participants who currently are not able to define what they need and exactly how it will be used, the recommendation is for the DNOs to make available the data that is presently available without significant resource investment, allow the market to use this and provide feedback on its use to guide exactly where focus is needed for future development.



Energy Networks Association

4 More London Riverside

London SE1 2AU

t. +44 (0)20 7706 5100

w. energynetworks.org

 [@EnergyNetworks](https://twitter.com/EnergyNetworks)

© ENA 2020

Energy Networks Association Limited is a company registered in England & Wales No. 04832301
Registered office: 4 More London Riverside, London, SE1 2AU