

Open Networks WS1A Product 9

Principles and Key Requirements to Improve
the Provision of Curtailment Information for
Stakeholders

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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.

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.

Open Networks Project

The Open Networks (ON) project is a major collaboration between ENA members and their stakeholders that will transform the way both local Distribution Networks and National Transmission Networks will operate and work for customers. Launched in January 2017, ENA's Open Networks project has started to lay the foundations of a smart energy grid in the UK.

Background to WS1A Flexible Connection (ANM) Products

The objective of Open Networks project Workstream 1A (Flexibility Services) in 2021 is to continue to define and develop transparency and standardised approaches across DNOs in their procurement of flexibility services, as well as delivering consistency with the ESO. It will continue to design changes to enable and encourage new markets and platforms for flexibility (e.g. peer-to-peer trading).

WS1A Product 9 is one of three products within Workstream 1A that is looking to address industry concerns on Flexible Connections facilitated by Active Network Management (ANM) and their interaction with Flexibility Services.

The interaction between Flexible Connection (ANM) and Flexibility Services was identified in 2020 as a key priority and this was confirmed in discussions with BEIS and Ofgem, and by stakeholders in the Advisory Group, bilateral engagements and their responses to the Flexibility consultation. As a result of this feedback, three products were identified within WS1A which seek to address key areas of concern for stakeholders as shown in Table 1 WS1A Flexible Connection (ANM) products Table 1.

This document is focused on Product 9, Curtailment information although there are material overlaps across the three products.

WS1A Product	Description
3	Principles to review legacy Flexible Connection (ANM) Contracts
8	Apportioning Curtailment Risk
9	Curtailment Information

Table 1 WS1A Flexible Connection (ANM) products

WS1A Product 9 – Curtailment Information

Background

Stakeholder feedback confirms the need for enhanced curtailment information, that is more granular, accurate and provided more frequently, to improve opportunities in flexible services and revenue stacking for assets with Flexible Connections (ANM). It could also facilitate additional services for Flexibility Service Providers (FSP), replacing the curtailment needs of Flexible Connections (ANM) with flexibility products in some circumstances.

WS1A Product 9 – Curtailment Information is focusing on developing a strategy for improving the availability of curtailment information with a phased delivery of improved curtailment information throughout the remainder of ED1.

Product Deliverables

The deliverables of WS1A Product 9 in 2021 are shown in Table 2:

Table 2 WS1A P9 Deliverables

Ref	Product Element	Activities	Deliverable	Timeline
A	Agree a curtailment information strategy with stakeholders	Workshop/consultation with stakeholders to agree approach and principles to improving curtailment information	Report which captures principles of improving curtailment information and delivery approach to end ED1	May 21
B	Determine stakeholder curtailment data needs to end ED1	- Stakeholder workshops to discuss needs (building on questionnaire results) - DNO workshops to identify options for delivery	Report that captures stakeholders' key requirements, e.g. data sets, frequency and granularity of information	May 21
C	Capture current curtailment information availability	Update ENA ONP "DNO provision of constraint information" Dec 18 report	Revised ENA ONP "DNO provision of constraint information" Dec 18 report	Mar 21
D	Compare current curtailment provision with stakeholder needs identified in B	Complete gap analysis and working with stakeholders agree priorities for a delivery plan in ED1	Gap analysis of future needs with current curtailment information and priorities identified	Jul 21
E	Develop prioritised plan to address gaps	Review potential solutions/optioneering with delivery timeframes ahead of ED2	Delivery plan approved and milestones in 2022 PID	Dec 21

Purpose of this Report

This report combines the deliverables for Ref A and B Product Elements as shown in Table 2. It captures both the approach and principles that stakeholders have indicated DNOs should take for improving curtailment information as well as specific data needs of stakeholders in this area.

The findings from this report will enable a gap analysis (as described in Table 2 Ref D) to be undertaken comparing stakeholder needs with the curtailment information currently available from DNOs. This will lead to a prioritised plan to address gaps throughout the remainder of ED1 and, where necessary, capture further improvements to be delivered in ED2.

WS1A Product 9 Participants

WS1A Product 9 members consists of representatives from all the DNOs, the ESO, the ONP and Ofgem. The DNO representatives included a mix of commercial managers and distribution system planners, with experience of Flexible Connections (ANM), and most have direct engagement with developers exploring connection options.

Stakeholder Engagement

Our Approach

A two-staged approach was taken to capture stakeholder feedback on improving curtailment information.

(i) Stakeholder Curtailment Information Questionnaire

The purpose of the stakeholder curtailment information questionnaire was to capture as much feedback as possible from a broad range of stakeholders. The questionnaire was also used as an opportunity to identify stakeholder interest in a Flexible Connection (ANM) Focus Group.

(ii) Flexible Connection (ANM) Focus Group Workshop

The Focus Group workshop was used to playback the common themes arising from the stakeholder curtailment information questionnaire with the group, identify priorities and capture any further requirements.

Feedback on curtailment information needs, both in the questionnaire and during the workshop, was sought using the various stages of the Flexible Connection journey, i.e. from before making an application through to being operational; as illustrated in Fig.1. This approach was taken because stakeholder information needs vary significantly according to the stage of connection journey.



Figure 1 Stages of a Flexible Connection journey

Stakeholder Questionnaire

Design and circulation

WS1A Product 9 members developed the stakeholder questionnaire, based on their experience and knowledge of stakeholder concerns. By necessity the questions were fairly detailed as it was important that the specific information needs were identified rather than generalisations. Taking such an approach enables solutions to be developed and prioritised. The questionnaire, and the use of Google Forms as the platform, was approved by Workstream 1A.

ENA Open Network circulated the questionnaire to stakeholders through the ON Advisory Group representatives. WS1A P9 DNO members also proactively encouraged Flexible Connection customers, active within their networks, to complete the questionnaire. The latter proved to be the better route for stakeholder access.

Uptake

In total, the questionnaire captured feedback from 19 respondents across various organisations, representing a good cross-section of stakeholders, including large and small generation / battery storage developers, residential developers, EV companies, consultants etc. In addition, given this broad cross-section of stakeholders, all DNOs were referenced in the survey by at least one respondent.

60% of respondents had either applied for, accepted and/or connected Flexible Connections already. This meant the majority of respondents had a good understanding of curtailment information requirements from their own experience and this provided access to the detailed information required.

The Flexible Connection (ANM) Focus Group workshop

Background to the Flexible Connection (ANM) Focus Group

The Open Networks Flexible Connection (ANM) Focus Group was set up to cover all three WS1A Flexible Connection (ANM) products; P3, P8 and P9 (as described in Table 1 WS1A Flexible Connection (ANM) products Table 1).

The aim of the Flexible Connection (ANM) Focus Group is to collaborate with stakeholders on the delivery of Flexible Connection (ANM) Product deliverables; agreeing mitigating solutions, and focusing on the areas that provide the most impact. It also provides an opportunity to improve stakeholder knowledge of the role of Flexible Connections and ANM technology; enhancing engagement and collaboration whilst ensuring a broader understanding of the role ANM plays (within the confines of the current regulatory arrangements) in facilitating the growth of affordable connections and avoiding delays.

Flexible Connection (ANM) Focus Group Workshop – April 2021

The first Flexible Connection (ANM) Focus Workshop was held in April, and followed on from the stakeholder curtailment information questionnaire. Given the interaction between the three Flexible Connection (ANM) Products, the Focus Group workshop was not limited to Curtailment Information (P9) and covered topics across all three Flexible Connection (ANM) products. Only topics directly relevant to P9 are covered here.

For P9, the workshop was used as an opportunity to playback the common themes arising from the stakeholder questionnaire with the group, identify priorities and capture any further requirements not covered previously.

The Flexible Connection (ANM) Focus Group workshop was well attended by both the DNOs and stakeholders, the latter included a broad range of customers, Ofgem and BEIS. This facilitated a useful discussion on priorities and data needs for improving curtailment information. The key areas and messages are outlined in the Findings section below.

Findings

Stakeholder information needs pre-application

The DNO heat maps/mapping tools are the most commonly used tools by stakeholders for obtaining curtailment information pre-application. This is followed by communication with DNO representatives with deep knowledge of the network and available capacity such as network planners.

The relative importance of improved curtailment information, versus access to the DNO representatives, was discussed at length; with stakeholders confirming communication with DNO representatives would remain a priority even with improvements to curtailment information. It is clear stakeholders value the ability to be able to discuss specific projects with system planners; although improved access to curtailment information, to enable stakeholders to self-serve, would likely reduce the volume of pre-application meeting requests between stakeholders and the DNOs.

Stakeholder Principles for improving pre-application curtailment information

- Transparency on the nature of constraints, modelling assumptions and commercial alternatives
- Granular and accurate network data
- Regular updates of heat map data
- Consistent information provision across DNOs

Stakeholder Specific Key Data Requirements

- Indicative curtailment estimates based on technology and location
- Information on active constraints
- Access to local network models
- Interactions with transmission constraints
- Connected/contracted generation and load information
- LTDS information included in heat maps
- Historical data for ANM actions/curtailment
- Comparative cost of reinforcement
- Planned network reinforcement schedule (which may alleviate constraints)

Stakeholder information needs at Offer Stage

Over 70% of respondents said they need access to curtailment information at offer stage to be able to assess curtailment risk.

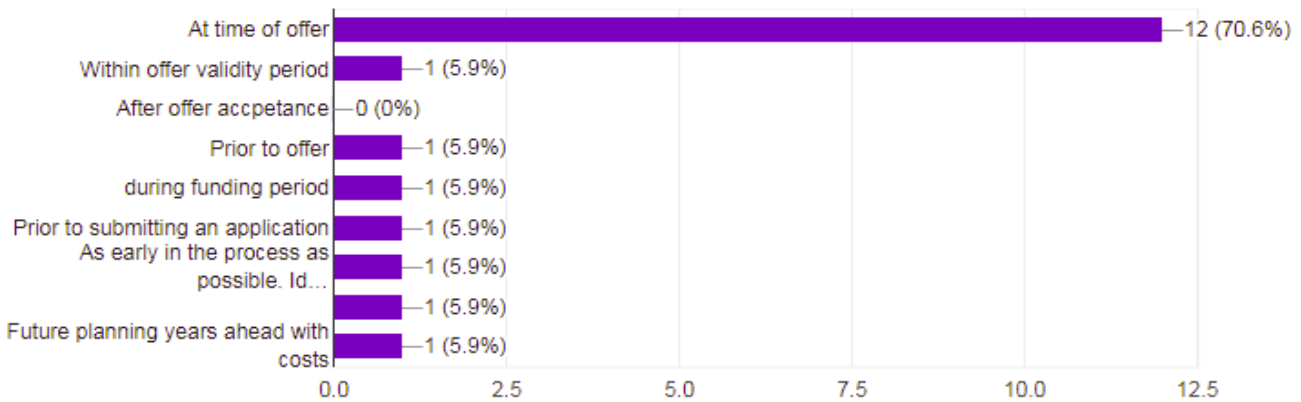


Figure 2 Questionnaire responses on when curtailment information is required to assess curtailment risk

High curtailment estimates were the most common reason stakeholders listed for declining a Flexible Connection offer, followed by uncertainty over the curtailment figures. A number of stakeholders specifically noted the conservative approach used by DNOs in calculating curtailment estimates. There was also a discussion on whether the use of third parties to carry out more detailed curtailment assessments was a valid option. It was noted that a number of organisations currently offer this but rely on detailed information from DNOs; currently data availability is inconsistent with different availability by DNO.

Stakeholders would benefit from more background information and detailed assumptions used by the DNOs and / or their curtailment models. Rather than a simple percentage of curtailment exposure developers want to understand better what the curtailment means in practice. What is driving the curtailment and what triggers it? For example, if the curtailment is driven by solar generation what volumes of solar exports trigger the curtailment, where are they located, what weather models are the DNOs using etc.? With this type of information the developer can carry out its own modelling, have a better appreciation of the sensitivities, and make informed decisions about the curtailment risk. Or the developer can approach a third party to undertake modelling on their behalf.

Currently, Flexible Connections (ANM) are unable to access most of the ESO products and services and the impact on revenue streams was also raised. Stakeholders advised that the priorities and data requirements listed below would help their decision processes and in particular, their assessment of curtailment risk and foregoing current and future potential revenue streams.

In both the stakeholder questionnaire and the Flexible Connection (ANM) Focus Group workshop, the use of battery storage standard profiles in curtailment assessments was raised. Stakeholders are concerned that DNOs need to understand better how batteries perform and are profiled. The reactive and unpredictable nature of battery storage assets present difficulties when assessing estimating curtailment. It is acknowledged both by DNOs and stakeholders that a better appreciation of the operating profile of battery storage is required at industry level.

A targeted group workshop, with third party curtailment modelling organisations and developers, will be arranged to progress solutions for battery storage profiles and access to additional background information and

assumptions.

Stakeholder Principles for improving curtailment information at Offer Stage

- Transparency on the nature of constraints, modelling assumptions and commercial alternatives
- Granular and accurate network data
- Consistent information provision across DNOs
- Speed of response from DNOs for information requests

Stakeholder Specific Key Data Requirements

- LIFO stack characteristics (capacity, technology, POC, associated constraints, etc.)
- Estimated curtailment on daily/monthly/yearly basis
- Access to local network models, including infrastructure specifications
- Access to generation and battery storage standard technology profiles
- Connected/contracted generation and load information
- Granular (HH) generation and load data, asset loading data in MW/MVAr directional profiles
- Historical outage information (frequency, duration) for n-1 constraints
- Historical data for ANM actions/curtailment
- Planned network reinforcement schedule and outage plans
- Forecasts of future generation/load growth
- Information on the impact of deviations from modelling assumptions, e.g. changes in demand, downtime from loss of communications.

Operational information needs

The majority of respondents (60%) had not yet reached energisation stage. However, from respondents with connected projects, it was clear that real-time monitoring and tracking of curtailment volumes is important.

Stakeholder Principles for Improving Operational Information

- Consistent information provision across DNOs
- Proactive information provision from DNOs
- Availability and Accessibility of information, such as through an online portal
- Speed of response from DNOs for information requests

Stakeholder Specific Key Data Requirements

- Reasons behind specific curtailment events
- Near-time, e.g. day ahead curtailment forecasts
- Notice of Planned Works which may impact curtailment
- Online portal showing historical curtailment information and real vs estimated curtailment reports
- Changing network characteristics which may impact curtailment, e.g. slow demand growth

Conclusion and Next Steps

The combined approach of a Curtailment Information Questionnaire and a Flexible Connection (ANM) Focus Group Workshop enabled the Product Team to explore the detailed stakeholder requirements. This would not have been possible without the support and engagement of stakeholders and this collaborative approach will also be used to develop solutions.

Through these exercises considerable useful information has been captured around stakeholder curtailment information needs and the principles to apply. It is clear that there are some common themes arising, such as greater transparency of assumptions and models plus granularity and frequency of network data, which need to be addressed to aid stakeholders in assessing curtailment risk.

A set of principles have been identified for each step of the Flexible Connection (ANM) process

Principles for improving pre-application curtailment information

- Transparency on the nature of constraints, modelling assumptions and commercial alternatives
- Granular and accurate network data
- Regular updates of heat map data
- Consistent information provision across DNOs

Principles for improving curtailment information at Offer Stage

- Transparency on the nature of constraints, modelling assumptions and commercial alternatives
- Granular and accurate network data
- Consistent information provision across DNOs
- Speed of response from DNOs for information requests

Principles for Improving Operational Information

- Consistent information provision across DNOs
- Proactive information provision from DNOs
- Availability and Accessibility of information, such as through an online portal
- Speed of response from DNOs for information requests

Next steps to progress this work:

- DNOs will conduct a gap analysis between the curtailment information currently provided and the stakeholder needs captured as part of this exercise (P9 Report July 2021). Curtailment information currently available from DNOs can be found in the report "[ON21-WS1A-P9-Provision of Constraint Information](#)". As part of P9, this was updated in March 2021.
- Further targeted workshop with members of the Flexible Connection (ANM) Focus Group (including DNOs, third party curtailment modelling organisations and developers) to discuss access to additional background information and assumptions etc. for third party curtailment modelling.

- Further collaboration with battery storage developers and third party modellers to explore solutions for improving battery storage profiles

ANNEX A: STAKEHOLDER Questionnaire QUestions

1. Have you ever applied for any actively managed “flexible” connections – e.g. where your connection is accommodated by actively constraining your capacity at certain times?

- If yes – please complete the following table to state how many have you applied for, in which DNO areas and how many did you accept?

DNO Area	No. Applications	No. Acceptances
ENW		
NIE		
NPG		
SSE		
SPEN		
UKPN		
WPD		

- For those you declined what were the reasons?
2. How did you find the information provided about the flexible connections application process?
 - What improvements would you like to see?
 3. What information was provided to you as part of the formal DNO offer and/or connection agreement about the curtailment your site could experience by accepting a flexible connection offer?
 - Did it meet your needs or is there more (or less) required?
 - What contractual data did you receive e.g. Position in queue, etc.

Pre-application publicly available information

1. What published DNO information did you find was useful in helping you to decide to make a flexible connection application?
 - What improvements would you like to see?

2. If the information is accessed through the DNO heat maps, do you find this approach useful?
 - Is the information updated frequently enough? If not, how frequently would you like to see the information updated?
 - Is information on the type of constraints being managed and/or level of estimated curtailment provided?
 - What improvements on curtailment information from DNO heat maps would you like to see?

3. What other information do you require at pre-application stage to assess curtailment risk at a potential site?

Curtailment Information during Application Process

1. What information do you need from DNO's to assess curtailment risk at a potential site? At what granularity and frequency? If possible group the information as essential or desirable.

Essential information	<ul style="list-style-type: none"> • ... • ... • ...
Desirable information	<ul style="list-style-type: none"> • ... • ... • ...

2. Do you currently receive the information you need or are there gaps?
 - If the latter, what are the gaps and how would you like to see them resolved?

3. At what point(s) in your decision making process do you require information from DNO's to estimate curtailment risk?
 - At time of offer
 - Within the offer period
 - Only after the offer has been accepted
 - Other (please specify)

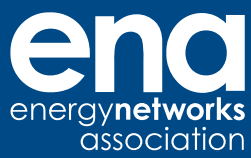
4. If you do your own assessments what method(s) do you use to estimate the level of curtailment?
 - Do you have access to all the information you need, e.g. asset specific fault rate/outage forecasts, etc.?
 - If not what information do you feel is missing?
5. Do the DNOs provide any additional information to help you understand the level of risk associated with flexible connections, e.g. impact of assumptions, downtime due to loss of communications, etc.?
6. What disclaimers do the DNOs use with regards to the estimates they provide and are these reasonable?

Post Connection and Impact of Curtailment

1. What information do you receive to understand your curtailment history?
 - Is this information easily accessible?
 - Does the information explain why the site was curtailed on particular occasions, e.g. in response to constraint, in response to communications failures, etc.
2. Does your DNO provide any information on upcoming planned works which may increase likelihood of curtailment?
3. Do you monitor and track curtailment volumes and impact on the commercials for your asset. If so, do you have access to all the data you need? What could be improved?
4. How accurate are the DNOs' curtailment estimates; do they tend to under or overestimate and is this a problem – if so in what way?
5. Does the level of accuracy/uncertainty impact your decisions on whether to stack revenues with other flexibility/balancing services?
6. If yes what additional information do you need to manage curtailment risk with revenue stacking.

Priorities

1. Are there other areas where you need additional support/information from the DNOs to understand and/or manage your curtailment risk?
2. Based on your answers in this questionnaire what do you see as priorities for improving the provision of curtailment information for flexible connection customers?



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