

Connection Agreement Review

No-go recommendation paper

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Distribution

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Contents

Executive Summary.....	5
Background.....	5
Connection Offers:.....	5
Connection Agreements:.....	5
Low frequency demand disconnection (LFDD).....	6
LFDD summary.....	6
Recommendation.....	6
Active Network Management (ANM).....	7
ANM Good practice guide.....	7
Curtailment Process and ANM Reliability Good Practice Guide (WS1:P7).....	7
Principles to Review Legacy Flexible Connections (ANM) contracts.....	7
Compliance with Engineering Recommendations.....	8
Recommendation.....	8
Flexibility Services.....	9
Flexibility Commitment.....	9
Workstream 1A development.....	9
Recommendation.....	10
Relevant code changes.....	11
Clean Energy Package.....	11
Potential Impact.....	11
Grid Code Changes.....	12
Issue summary.....	12
Distribution Code (D Code).....	13
Recent Code Modifications.....	13
Code modifications 2019.....	13
Code modifications 2020.....	13
Code modifications 2021.....	14
Recommendation.....	14

Ofgem’s Access Significant Code Review – Access Rights.....	15
Ofgem’s minded to position	15
Charging for alternative access rights	15
Recommendation	16
Report recommendation	16

Executive Summary

Through its work over the past five years the Open Networks (ON) programme has introduced real momentum into the transition to a smart and flexible energy system, and has set out a clear, least regrets delivery pathway.

The customer focus in Workstream 2 has concentrated on visibility of data and process improvements through the application, connection and operations processes. The aim was to ensure that it is fit for purpose for the customers (generators and storage) as well as the network companies.

In the ON 2021 PID the product group was tasked with reviewing current Distribution Network Operators (DNO) connection agreements (offer and agreement post-energisation) in light of more recent smart grid developments. The group has undertaken a scoping exercise in order to provide a go/no go decision for further work with specific emphasis on the following areas:

- Low frequency demand disconnection (LFDD).
- Active Network Management (ANM) connections.
- Flexibility services.
- Relevant code changes, e.g. Grid Code, Clean Energy Package and the associated licence changes, Distribution code changes.

The issues targeted in the PID have been reviewed and each section provides the reason for no further work being required. The key theme is that there are established governance processes and various stakeholder engagement forums in place which continues to develop and implement of good industry practice, therefore the ON product team recommends a 'no go' decision for further work on this product

Background

Connection Offers:

When a new customer wants to get connected, the DNO for that area must offer to connect them and set a price for this. The requirement to make an offer of connection is outlined in the Electricity Act 1989 (the Act). It ensures that all eligible customers, regardless of their connection requirements, can receive an offer for a new connection.

Connection Agreements:

Connection Agreements are contractual obligations of connecting and connected parties and are set out in either the National Terms of Connection (NTC) or site/connection specific agreements. The NTC are covered under the formal governance of the Distribution Connection and Use of System Agreement (DCUSA).

Low frequency demand disconnection (LFDD)

Low Frequency Demand Disconnection (LFDD) schemes are designed to limit the fall in frequency for extreme events beyond those defined as ‘secured’ events in the SQSS¹ and Operating Code OC6 (Demand Control) of the Grid Code².

LFDD summary

Frequency plays a very important role in power transmission and distribution in relation to the balance between the demand and generation requirements of the network. The maintenance of system frequency within set levels is required to maintain stability and prevent a full system collapse.

Under normal operating conditions National Grid as the System Operator (GBSO) is obligated to maintain the system frequency between 49.8 and 50.2 Hz. If the network generation is higher than the demand the frequency rises, however conversely if generation is lower than the demand the frequency reduces. As the generation at any instant is unlikely to equal the demand the frequency constantly varies. The variation in frequency is normally small and has little impact on customers. Any variation in frequency must be controlled to enable certain items of equipment (e.g. clocks) to operate correctly. The GBSO continuously monitors the frequency and dispatches the appropriate generator output. Should the total dispatch of generation available be insufficient to meet the demands due to a fault or loss of generation or an unexpected increase in demand, the frequency will fall.

There may be certain circumstances where the contracted frequency response may not be sufficient to maintain the system frequency between the statutory limits where the total loss of generation exceeds the amount secured for and a deficit of generation arises. In order to reduce the generation deficit (or excess in demand) to maintain stability, DNOs have low frequency relays to disconnect demand. This procedure is called LFDD and is described in Operating Code OC6 (Demand Control) of the Grid Code.

Recommendation

LFDD operation is extremely rare and generally when there is an LFDD event these are communicated via the local and national media. LFDD is covered under the National term of connection would fall under the definition of “Force Majeure”. No further work is required with respect to LFDD as this issue is already subject to established industry governance.

¹ The SQSS Review Panel, “National Electricity Transmission System Security and Quality of Supply Standard,” Version 2.3, 8th February 2017.

² National Grid Electricity Transmission plc, “The Grid Code, Issue 5, Revision 21,” 21 March 2017

Active Network Management (ANM)

ANM can be used to increase the utilisation of constrained network assets where a customer's consumption or production can be flexed by limiting the import or export at the site.

ANM Good practice guide

The ANM guide³ has been developed with the aim to:

- Provide a common understanding of ANM, identifying considerations and issues to overcome when deploying ANM at all voltage levels.
- Highlight case studies to use as reference points whilst informing a common understanding amongst DNOs.
- Create and consolidate initial reference material from DNO experience to date, to inform future standards and recommendations.

Curtailment Process and ANM Reliability Good Practice Guide (WS1:P7)

This guide⁴ considers both the methodology of how DNO's should consider curtailment for Flexible Connections and which metrics should be considered while assessing installed Active Network Management (ANM) systems.

To understand the current approach, each DNO undertook to answer two questionnaires under WS1 P7 and WS2 P7. These questionnaires were used to inform the discussion at the subsequent workshop and each DNO explains their approach to:

- General process
- Pre-application publicly available information
Curtailment estimates during application
- Post connection data

Principles to Review Legacy Flexible Connections (ANM) contracts

WS1A Product 3 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

³ <https://www.energynetworks.org/assets/images/Resource%20library/ANM%20Good%20Practice%20Guide%202015.pdf>

⁴ [https://www.energynetworks.org/assets/images/Resource%20library/ON18-WS1-P7%20Good%20Practice%20Guide%20v1.1%20\(REPUBLISHED\).pdf](https://www.energynetworks.org/assets/images/Resource%20library/ON18-WS1-P7%20Good%20Practice%20Guide%20v1.1%20(REPUBLISHED).pdf)

which seek to address key areas of concern for stakeholders as shown in Table 1 WS1A Flexible Connection (ANM) Products

Stakeholder feedback on the use of Flexible Connections (enabled with ANM technology) has highlighted concerns that these connections are having an adverse impact on the growth of flexibility services and markets. A report⁵ has been prepared as part of activity to deliver a set of principles for the review of existing Flexible Connection (ANM) contracts. The interim report captured the current contractual arrangements for Flexible Connections (enabled with ANM). It covered: the degree of standardisation; provided an overview of curtailment practices; and set out major differences / best practice / learnings from the review.

Compliance with Engineering Recommendations

ANM enabled connections are designed to comply with the requirements of the appropriate ENA Engineering Recommendations and although the principles of an ANM scheme can be applied to demand the main immediate benefits are more likely to be generation customer biased.

Recommendation

ANM enabled connections are an established alternative for customers and information is available on both ENA and DNO websites. No further work is required as ANM connection are adequately covered under existing industry arrangements which will accommodate ongoing good industry practice.

⁵[https://www.energynetworks.org/assets/images/ON21-WS1A-P3%20Review%20of%20FC\(ANM\)%20Legacy%20Contracts%20Report%20\(12%20May%202021\).pdf](https://www.energynetworks.org/assets/images/ON21-WS1A-P3%20Review%20of%20FC(ANM)%20Legacy%20Contracts%20Report%20(12%20May%202021).pdf)

Flexibility Services

Flexible technologies like electric vehicles and solar can provide 'flexibility services' to electricity networks. By releasing power back to the grid at times of high demand, and storing it during times of lower demand, local 'flexibility services' unlock additional capacity and support the connection of more low-carbon technology like wind power. The Open Networks programme is a critical contributor to the wider whole energy system transition to net zero carbon; and Ofgem/BEIS Transitioning to a Net Zero Energy System: Smart system and Flexibility Plan 2021⁶

Flexibility Commitment

ENA launched the 'ENA Flexibility Commitment' with a six-step implementation plan⁷ in June 2019. In 2019 ENA's Open Networks programme established a dedicated Flexibility Workstream (Workstream 1A) to deliver on this commitment. Since the launch of this dedicated Flexibility Workstream, Open Networks and the DNOs have made significant progress on Flexibility Services with around 3GW of flexibility planned for tender by GB Distribution Network Operators (DNOs) in 2021⁸.

Workstream 1A development

Broadly Workstream 1A explores two main areas: Flexible Services, Flexible Connections (and Non-DSO services).

- The Flexibility Service is a commercial mechanism which requires participants to deliver a change in their usual power flows in real-time or at times requested by the DSO. It is a market-led initiative that, through procurement exercises, finds customers' assets located within constrained networks that are able to deliver flexibility to help manage constraints.
- Flexible Connections (ANM) are connection options where, in return for a faster cheaper connection, the participant accepts a contractual, mandated requirement for their usual power flows to be changed by the DNO remotely, in real time, through automation. The amount of change, or curtailment, varies as per the connection agreement. For more information, please refer the Flexible connection primer document that shall be published on ENA's website soon.

⁶ <https://www.gov.uk/government/publications/transitioning-to-a-net-zero-energy-system-smart-systems-and-flexibility-plan-2021>

⁷ <https://www.enaenergy.org/assets/images/Resource%20library/ENA%20Flexibility%20Commitment%20ur%20Six%20Steps%20for%20Delivering%20Flexibility%20Services%202019.pdf>

⁸ <https://www.enaenergy.org/industry-hub/resource-library/?search=ON21-WS1A-Flexibility+Figures+2021+Full+Update+%2830+Jul+2021%29&id=267>

Recommendation

No further work is required on flexible connections as they are adequately covered under existing industry arrangements, including ON, and can accommodate ongoing good industry practice.

Relevant code changes

The purpose of this section is to review any current and relevant code changes that may impact on connection agreements.

Clean Energy Package

Ofgem's open letter on changes to licence conditions as a result of the transposition of the Clean Energy Package dated 8 December 2020⁹ notified licensees of modifications to standard licence conditions by the Electricity and Gas (Internal Markets) (No.2) Regulations 2020 Statutory Instrument (the "SI").¹⁰

These Regulations modify the standard conditions of licences¹¹ granted under the Electricity Act 1989 in order to implement, and address matters arising out of or related to, the entry into force of Directive (EU) 2019/944 on common rules for the internal market for electricity and amending the Electricity Directive. The Electricity Directive is part of a package of European energy measures collectively referred to as the "Clean Energy Package".

The Clean Energy for all Europeans Package aims to facilitate the transition from fossil fuels towards cleaner energy and to reduce greenhouse gas emissions. It is comprised of eight different pieces of legislation, including the Directive on common rules for the internal market for electricity (EU) 2019/944.

Potential Impact

The electricity distribution licence changes are covered in a keeling schedule to Ofgem's open letter¹² and are summarised below:

- Updated and additional licence changes.
- Network Development Plan (SLC25B).
- Requires the licensee to publish a Network Development Plan on or before 1 Mar 2022 and every 2 years afterwards.
- A description of those parts of the distribution system most suited to new connections and distribution of further quantities of electricity.
- A description of those parts of the distribution system where reinforcement may be required in order to connect new capacity and new loads, including to facilitate the deployment of Electric Vehicle Recharging Points.
- Information necessary for ESO's, distributors and transmission licensees with whose system they are interconnected to ensure the secure and efficient operation, coordination development and interoperability of the interconnected system.

⁹ https://www.ofgem.gov.uk/sites/default/files/docs/2020/12/electricity_directive_open_letter_0.pdf

¹⁰ <https://www.legislation.gov.uk/id/uk/si/2020/1401>

¹¹ Affected licences are Gas Supply, Electricity Supply, Electricity Distribution, Electricity Transmission and Electricity Interconnector

¹² https://www.ofgem.gov.uk/sites/default/files/docs/2020/12/annex_2_-_keeling_schedule_electricity_distribution_v2.pdf

- The Distribution Flexibility Services or Energy Efficiency Services that the Electricity Distributor reasonably expects to need and will reasonably expect to use as an alternative to reinforcement.
- Publication of data, and information in relation to the Network Development Plan.
- Prohibition on generating by the licensee (SLC31D) – updating this existing licence condition.
- Procurement and use of Distribution Flexibility Services (SLC31E) - The licensee must coordinate and direct the flow of electricity onto and over its Distribution System in an efficient, economic and coordinated manner.
- Requirements relating to Electric Vehicle Recharging Points (SLC31F) - the licensee must not own, develop, manage or operate an Electric Vehicle Recharging Point, except where:
 - They are for the distributor's own use and not generally accessible to the public.
 - The process covering the provider of last resort.
 - Prohibition on Generating by Licensee (SLC43B) – updating this existing licence condition.

Whilst there are potentially a number of changes that will be driven out of the above licence changes, we do not anticipate anything being required to be included in the Connection Agreement.

Grid Code Changes

Grid Code change 0147 covered 'Last Resort Connection of Embedded Generation' sought to clarify the enduring arrangements for emergency instructions that the ESO can issue to DNOs to disconnect embedded generators, as a last resort in an emergency situation, and after having exhausted all other commercially available options.

Issue summary

Prior to the implementation of modification GC0143 while there was a process for the ESO to instruct DNOs to take demand control actions to reduce import from the NETS, it was felt that there was not the same detailed implementation clarity, structure and legally unambiguous ability for the ESO to instruct DNOs to disconnect embedded generation as a last resort and in an emergency situation.

The changes proposed give the ESO the ability to instruct DNOs to disconnect embedded generation as a last resort in an emergency situation when other commercial solutions have been exhausted. The key points are that it is envisaged by the proposer that the 'Embedded Generation Control' section will be broadly symmetrical to the long-standing 'Demand Control' process.

As part of the Grid Code governance process Ofgem concluded that:

- implementation of the modification proposal (original proposal) will better facilitate the achievement of the objectives of the Grid Code; and
- approving the modification (original proposal) is consistent with our principal objective and statutory duties.

DNOs have a license obligation to comply with both the Grid Code and the Distribution Code and are not obliged to enter into the agreement if the requester does not undertake to be bound, so far as applicable, by the terms of the Grid Code or the Distribution Code.

Distribution Code (D Code)

DNOs are obliged under Condition 21 of their licences to maintain a D Code detailing the technical parameters and considerations relating to connection to, and use of, their electrical networks. The Energy Networks Association (ENA) as Code Administrator for the Distribution Code is the point of contact for users to find out information about that code, including how to become a party to the code (if appropriate) and the rules on modifying the code. The ENA has committed to operating their code administration functions in accordance with a Code Administration Code of Practice (CACoP).

Recent Code Modifications

The modification history is available on the D Code website¹³ and recent modifications have been reviewed.

Code modifications 2019

- DCRP/MP/19/01 - G98/G99 and G59/G83 Minor Technical Modifications and Editorial Corrections
- DCRP/MP/19/02 - EREP 130 Issue 3
- DCRP/MP/19/03 - EREC G5 Issue 5
- DCRP/MP/19/04 - Modifications to The Distribution Code and Associated Documents for a No Deal EU Exit
- DCRP/MP/19/05 - Fault Current Injection Modifications

None of these modifications impacts on connection agreements.

Code modifications 2020

- DCRP/MP/20/06 – Storage

This modification does not impact on connection agreements.

¹³ <http://www.dcode.org.uk/dcode-modifications/>

Code modifications 2021

- DCRP/MP/21/04 - EREC G12 Amendment 4 Issue 2
- DCRP/MP/21/01 - Minor Technical Modifications

None of these modifications impacts on connection agreements.

Although none of these modifications impact connection agreements DNOs are obligated to comply with the D Code therefore any future modification that did have an impact would be progressed through the D Code governance process

Recommendation

Code modifications are already subject to established industry governance which has processes to accommodate industry developments.

Ofgem's Access Significant Code Review – Access Rights

Network access rights define the nature of users' access to the network and the capacity they can use – how much they can import or export, when and for how long, and whether their access is to be interrupted and what happens if it is. Network access requires a connection from the user's equipment to the wider network, and then allocated capacity on the wider network. Small users do not have a well-defined level of access and for most other users their network access is defined via their connection agreement.

Ofgem's minded to position

New access choices would be available to new users wanting to connect, and existing users wanting to amend their access rights over time. The three aspects of access choices that Ofgem prioritised in their launch letter were:

- **Levels of firmness**¹⁴: This would provide choices about circumstances where a connection capacity could be provided albeit with a lower level of security (or "firmness"), with the user's access to such access to all or part of the connection capacity being constrained in certain circumstances. Where users agreed to a lower level of firmness their eligibility for compensation in a loss of supply scenario could be restricted.
- **Time-profiled access**: This would provide choices other than continuous, year-round access rights (e.g. 'peak' or 'off-peak' access).
- **Shared access**: This would allow users across multiple sites, connected in the same broad area, to obtain access to the wider upstream network, up to a jointly agreed aggregate capacity level.

Ofgem consider that the current distribution arrangements mean that those users with a "standard connection" have a high level of firmness and are generally only curtailed due to maintenance issues, network damage or faults. Beyond this, if a DNO wants to curtail one of these users, then the DNO would seek to agree a flexibility contract with the user.

Charging for alternative access rights

Ofgem believe that users should receive value when they obtain an access right that avoids additional network costs. This value can be provided through two means:

- Allowing the user quicker access to the network than otherwise; and/or
- Allowing them cheaper access.

There are two ways in which the value of different access right choices can be signalled to users, the connection charge, or the distribution use of system (DUoS) charge. This means

¹⁴ A connection may be restricted by conditions such as a maximum export, or constraining output under certain network conditions. This is called a "non-firm" connection. Where there are no such restrictions, the offer is referred to as "firm".

that the options for how they are valued are strongly linked to our decisions on connection charging and the design of future DUoS charges.

Ofgem's decision on how access rights are valued also has an impact on the design of these access right choices themselves (e.g. connection charges are more easily able to reflect bespoke access arrangements). Ofgem's Access SCR implementation group are currently working to scope out the implementation issues in advance of Ofgem's final decision schedule for Q1, 2022.

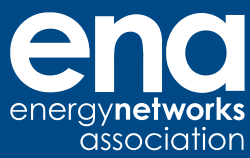
Recommendation

No further work is required on Access SCR as Ofgem will make the final decision as part of RIIO ED2 and will make the necessary licence changes to implement this.

Report recommendation

DNOs already have regulatory and licence obligations, and these are supported by established industry governance processes which includes DSO implementation. If companies do wish to improve information for stakeholders, they can continue to provide this on their websites and provide targeted stakeholder engagement sessions. Various industry forums existing to promote good industry practice, and this includes stakeholder engagement which will continue to drive improvements in the connections process and facilitate the necessary changes.

The issues targeted in the PID have been reviewed and are covered under governance processes and stakeholder engagement forums which lead to the continued implementation of good industry practice, therefore the group recommends a 'no go' for further work in this area.



Energy Networks Association

4 More London Riverside

London SE1 2AU

t. +44 (0)20 7706 5100

w. energynetworks.org

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