The Voice of the Networks

Energy Networks Association

Open Networks Project

October 2019

Facilitation of New Markets

Contents

1 Introduction

1.1 Open Networks Project

The Open Networks Project is a major energy industry initiative, run by the Energy Networks Association, that will transform the way our energy networks work, underpinning the delivery of the smart grid. This project brings together 9 of UK and Ireland's electricity grid operators, respected academics, NGOs, Government departments and the energy regulator Ofgem. The **2019 Project Initiation Document** outlines what the Open Networks Project will deliver in 2019, how it will be delivered and when. There are a number of workstreams delivering a wide range of products that are supporting the transition to a smart grid.

1.2 Workstream 1A – Flexibility Services

Workstream 1A is focused on facilitating flexibility services in the developing flexibility market and has 3 key objectives:

1. Develop and deliver good practice and convergence of directly contracted DSO services to customers across DNOs to deliver a consistent experience for customers
2. Facilitate markets outside the direct procurement of service by DSOs to allow third parties to develop effective and liquid market platforms for customers to realise value for flexibility
3. Support the wider use of DSO services by removing barriers and encouraging the consideration of flexibility solutions

1.3 Product 6 – Facilitation of New Markets

The following extract summarises the aims for Product 6 in Workstream 1A, Facilitation of New Markets, for which this report is a key deliverable.

> ***Facilitation of New Markets***
>
> *In addition to directly procured DSO services, we need to consider how we can facilitate other markets that the DSO might be able to enable or support in the future (e.g. peer-to-peer trading platforms, capacity management, trading flexibility to take on or avoid constraints). Development work should include consideration of:*
>
> - *Principles identified through WS1A P1 and proposals established through the Industry-Led Access Working Group's work on exchange of access*
> - *What data needs to be provided to facilitate new markets,*
> - *What data needs to be sent to network operators after any action/trade is made*
> - *Trial scenarios that can help to develop and understand these markets and the required DSO actions to facilitate these*

The deliverable will be a report outlining a best view on the types of non-DSO procured services and recommendations on actions required by the DSO and market participants for the facilitation of these markets.

As defined in the second objective of Workstream 1A, DNOs have a clear role in facilitating those markets that are starting to emerge that are realising value from flexibility outside the remit of DSO services. **There is a wealth of data openly available that system operators have already provided, but in order to facilitate new and emerging markets, and to help expand existing ones, additional specific data may be required.**

1.4 Scope

In the second half of 2019 flexibility markets are still extremely nascent, particularly those outside of network services. There is a wealth of innovation underway, including the BEIS FleX Competition and the Open Networks' TEF, that is exploring potential new markets, but all of these projects are still at a very early stage. In light of this, the product took a view that it would focus on the potential datasets required to facilitate new markets rather than run trials that might detract from ongoing innovation.

In addition, as outlined in Section 2.1, there is complementary work taking place in the Non-SCR group. We have aligned ourselves with their products and the intention is to consider trials in 2020 utilising the findings from this product, and their work on trading capacity and constraints, preferably in the context of one of the current TEF projects (TRANSITION, EFFS, FUSION).

Consequently, following discussion at the Advisory Group, it was decided the outcomes of the product in 2019 should be;

- Demonstrate a clear understanding of the potential flexibility markets beyond contracted services for system operators
- Define the data requirements and data format that system operators should provide to add value for stakeholders **pre-trade** to facilitate the range of activities
- Understand potential impact on the network and stipulate appropriate **pre & post-trade** data requirements for market participants
- Establish clear route for disruptors to notify system operators of new markets

1.5 Markets Included

For the purposes of this product we deemed the markets to be included as peer to peer trading of;

- Capacity – including flexibility and curtailment markets
- Energy (i.e. local supply markets)

We also decided that there needed to be a mechanism for keeping this list fresh – i.e. a formal process to accommodate (and encourage) future disruption. This is addressed in **Section 4.3**.

2 Context

2.1 Introduction

There are a number of ongoing initiatives that are relevant to Product 6 and this section outlines two of the key areas that will impact on deliverables. In addition, the section looks at the stakeholder engagement approach that was adopted by the project to ensure it was addressing the concerns of the widest range of potential participants in flexibility markets.

2.2 Non-SCR Work

In December 2018 Ofgem launched a Significant Code Review of Electricity Network Access and Forward-Looking Charges, with the objective of ensuring that electricity networks are used efficiently and flexibly, reflecting users' needs and allowing consumers to benefit from new technologies and services while avoiding unnecessary costs on energy bills in general. In its launch statement Ofgem sets out those areas that it expected to lead and those areas that it expected industry to take forward. Through the ENA the electricity system operator (ESO) and network operators formed a working group under the governance of the Open Networks project to progress those issues identified by the SCR launch statement.

A Project Initiation Document (PID) developed by the Industry led Access Working Group formed to progress the four issues raised by Ofgem was approved by the Open Networks Steering Group in April 2019. The PID identifies the Products 1 to 4 as:

- Product 1: Trading of Non-firm distributed generation curtailment obligations
- Product 2: The Exchange of Access Rights between users
- Product 3: Queue Management
- Product 4: ANM Charging.

Products 1 and 2 are directly related to **Facilitation of New Markets** so the decision has been made to work closely together so that the concepts from both groups can be tested in real trials during 2020 utilising the TEF/FleX projects. In particular the rules of engagement or principles are key inputs to this product indicating the role that DNOs must play in facilitating this market:

PRINCIPLE 1: Transparent information sharing

Sufficient information must be made available to enable users to undertake the exchange of rights.

Potential rules:

1. The network operator must make information available about a constraint to the network users impacted by that constraint.

2. The network operator must publish the process it will follow to determine which generators to curtail to alleviate the constraint under each plausible scenario
3. Parties who have traded must provide the network operator with details of the trade.

PRINCIPLE 2: Ability to maintain network continuity

Exchange of capacities must not undermine the ability of the network operator to maintain the continuity of its network.

Potential rules:

1. The network operator must pre-authorise any generator wishing to trade, by confirming that generator has the ability to comply should it become liable for a curtailment obligation.
2. The MW reduction agreed by the generator must have an equivalent impact on the constraint as the MW reduction already required by the generator with the curtailment obligation.

PRINCIPLE 3: Visibility of other potential trading parties

Those users which have 'opted in' to exchanging capacity must be aware of other potential parties with whom they can exchange.

Potential rules:

1. Generators wishing to trade must opt in to potential trading.
2. A list of generators connected to the network that have the potential to alleviate the constraint and which have opted in to trading must be made available, including:
    a) their existing curtailment obligation (if applicable);
    b) their current curtailment obligation;
    c) their flexibility or curtailment granularity; and
    d) their effectiveness in alleviating the constraint (i.e. their sensitivity factor)

PRINCIPLE 4: Transparent trading arrangements:

The parameters within which exchanges can take place must be well-defined and available to all parties.

Potential rules

1. Trades must be defined in time periods of [minimum trade duration]; and
2. Trades can take place at any point between [time period] and [time period] before the time at which the trade will take effect.

2.3 Energy Data Task Force

The future Energy System will require more detailed, accurate and timely data to enable new operational paradigms and business models. For electricity sector actors aspiring to become DSOs, digitalisation will be mission critical. The Energy Data Taskforce (EDTF), run by Energy Systems Catapult and commissioned by Government, Ofgem and Innovate UK, in a report published in June 2019, is not proposing any additional mechanisms, but believes that it is important that measures to support digitalisation are integrated into existing regulatory and policy levers. At the core of the EDTF's recommendations are two core principles:

1. Filling in the data gaps through requiring new and better-quality data; and
2. Maximising its value by embedding the presumption that Energy System Data[1] is open.

The EDTF has developed five recommendations and a host of enabling recommendations for Government, Ofgem, and industry. The EDTF's report, along with its appendices, can be accessed in full via the following link:
https://es.catapult.org.uk/news/energy-data-taskforce-report/

A key recommendation in the report is that the RIIO-2 price control should be treated as an opportunity to embed the core and supporting principles of Digitalising the Energy System although network operators should already be addressing some of these recommendations in RIIO-ED1. The EDTF recommends that Ofgem considers the following mechanisms:

- Requirement for the network operator to submit a data strategy within their RIIO-2 business plans which adopts the principles proposed by the EDTF;
- BAU to be set at a new level of transparency;
- Requirements for more data relating to the networks;
- Investment evidence to require appropriate data analysis;
- Disclosure of raw data that underpins network modelling; and
- Companies recognised for innovative mechanisms for using data to provide greater infrastructure visibility and support productive collaboration.

In 2020 the product will focus on those EDTF recommendations that have been written in to RIIO2 business plan guidance by Ofgem and consider those cited in the government's response to the CCC's Net Zero recommendations.

[1] 'Energy System Data' – *'Facts and statistics collected together in an accessible digital format which describe the Energy System and its operation (current, historic and forecast), including: the presence and state of infrastructure, operation of the system, associated market operations, policy and regulation'.* Note that the EDTF focuses on Energy System Data rather than consumer data, which is covered by GDPR.

2.4 Stakeholder Participation

A key part of the product was to review recent stakeholder input to the Open Networks project and elsewhere in the industry about flexibility in the smart grid. The group reviewed stakeholder responses to recent consultations on **Future Worlds, Impact Analysis,** and **Flexibility Market Services**. In addition, the group looked at associated Open Network products such as WS3 Product 5 which is mapping innovation across the industry and the TEF projects along with other DNO trials. Alongside this research we also presented our approach at the **Advisory Group** to ratify our approach and ascertain whether they already knew of datasets that were essential to the facilitation of new markets.

These all yielded useful information, but the product was keen to try and engage with the widest range of stakeholders including disruptors. Hence, we decided to approach those companies that had applied to the BEIS Flex Competition to see if there were new areas of data requirement. BEIS kindly agreed to send out an email on our behalf and we had nine responses:

- Entrust Smart Home
- Trusted Renewables
- InTEGRal
- Siemens
- NODES
- Centrica
- Piclo
- Electron
- GreenSync

All of these were contacted and asked to engage in a short telephone interview which used a common template. The questions were as follows:

- Project Name?
- What they applied for?
- Scale?
- Funded/Unfunded?
- Is it new?
- What service are they trying to develop?
- Is it a refinement of an existing market?
- What essential data do you require for the market to function?
- What data would be good to have in addition?
- What are the regulatory barriers?

It is worth noting that across all this stakeholder activity the product was not inundated with data requests and this is probably a reflection of the nascent state of flexibility markets and their current focus on DNO services rather than non-DNO markets. Nevertheless, all the successful bidders to BEIS FleX have been keen to access the Project TRANSITION deliverables to help them understand future data needs. It is clear that we need to start testing these non-DNO markets out in anger to really understand what datasets are key to ensuring their development.

3 Current & Developing Datasets

3.1 Introduction

There is a wealth of data already openly available that system operators have provided in order to facilitate new and emerging markets. In addition, the Open Networks project is supporting system operators in their efforts to further develop these resources. This section outlines some of the key initiatives that are already in place or underway to support emerging flexibility markets.

3.2 Flexibility in Great Britain

This page on the ENA website (http://www.energynetworks.org/electricity/futures/flexibility-in-great-britain.html) contains details of the Flexibility Services that Electricity Networks in Great Britain are utilising from Distributed Energy Resources (DER). The sections help stakeholders understand how Electricity Networks are enabling local Flexibility Markets and offering different types of Flexible Connections as part of their business as usual (BAU) operations. As the Electricity Networks drive consistency and commonality across all services across the country, the ENA Open Networks Project is setting the strategy and ensuring the implementation of Britain's smart grid making sure that all users benefit from it.

3.3 Monitoring Implementation

This is a key activity that we have undertaken to review the deployment of practices developed through the Open Networks project in 2018 to give us visibility of progress being made across individual network companies and to understand any barriers to implementation. Products include:

- **2018 WS2 P1 (Good Practice ahead of Connection Applications)**
- 2018 WS2 P4 (Information on Flexibility Services)
- 2018 WS2 P6 (Guidance on Post Connection Changes)
- **2018 WS2 P7 (Provision of Constraint Information)**
- **2018 WS1 P7 (ANM Information)**
- 2017 (Information on Distribution Connections Options)
- 2018 WS1 P2 (DER Services)

The items in bold are delivering datasets that stakeholders have highlighted as integral to facilitating future flexibility markets. As outlined in the 2019 Project Initiation document, we will be undertaking this exercise on a bi-annual basis to monitor the rollout of new products as they get developed.

3.4 System Wide Resource Register

Options to implement resource registers have been compared in the first half of 2019. The agreed approach is for each network company to implement and maintain a register for

resources >1MW that are connected to its network. Each network company register would have the same format. The registers would include resources that are already connected to transmission or distribution networks and assets that are 'accepted to connect' to networks following a connection application process. As well as general data about plant type and capacity, the registers would include information about network services that are being provided. For resources that are 'accepted to connect' but not yet connected, information on any network reinforcements that are needed will be included.

Network companies have committed to implement the first phase of their resource registers by January 2020. This would include all network resources >1MW and information on the network services being provided by these resources. The full scope of the resource registers, including information on network reinforcements, is targeted for completion by July 2020.

3.5 Summary

Dataset	Description	Availability
System Wide Resource Register	A list of connected and contracted DER >1MW connected to the distribution network. Also includes triggered reinforcement	January 2020 July 2020 for reinforcement info.
Constraint Information	An illustration of the likely impact of constraints on the availability of your connection	Available from all DNOs
Scenario Models for Distribution	Projections detailing the network impacts of low carbon technology and strategic development on the distribution network	Available from most DNOs
Heat Maps	Network maps showing current constraints on the distribution network. They include supply point capacity, thermal and fault level constraints and connection queue information	Available from all DNOs
GIS Shape Files	Network maps that can be downloaded for use in GIS mapping	Available from all DNOs

4 Future Datasets

4.1 Introduction

This section summarises the feedback gained from stakeholder feedback and research during the product in 2019. It also highlights the new route for highlighting new data requests going forward.

4.2 Themes

Stakeholder responses tended to call out the lack of granular information at the lower voltages where possibly the bulk of peer to peer flexibility trading will take place. It is at this level that the low carbon technology which offers smart grid capability is connecting. Stakeholders also wanted to have more access to data that detailed energy flows, preferably in real-time, so they could map customer behaviour and tailor their offerings appropriately. With such granular data there are potential GDPR implications although there are already initiatives in place to address these regulatory barriers to data access such as the Public Interest Advisory Group (PIAG) which has been independently convened by two charities, Sustainability First and the Centre for Sustainable Energy (CSE) to address access to smart meter data for a public-interest purpose.[2]

The other theme that became apparent was one of consistency with stakeholders wanting to see alignment between the DNOs on datasets such as the Heat Maps and the System Wide Resource Register so they only need to interrogate one source. Beyond these themes of granularity, visibility and there were no further significant requests for data for the stakeholders engaged during the course of the project.

The remaining datasets then are taken from the principles outlined by the Non-SCR workstream designed for trading constraints and capacity and primarily relate to traffic-lighting flexibility transactions so participants know when they can trade.

4.3 New Data Requests

Data is absolutely fundamental to the future of the smart grid. It is key to unlocking system and consumer benefits and managing the transition to a low carbon economy. With energy increasingly decentralised, millions of assets – solar panels, batteries, electric vehicle charge-points and heat pumps – will need to be able to communicate with system operators and market platforms. New business models will emerge that will reduce consumer bills and system costs whilst enabling decarbonisation of our energy system.

[2] https://docs.wixstatic.com/ugd/ea9deb_244fa0e7997b43ceb453762d930bab93.pdf

As stated in the introduction there is a wealth of data openly available that System Operators have already provided, but in order to facilitate new and emerging markets, and to help expand existing ones, additional specific data may be required. You can access the data networks have made available on the ENA's Distributed Energy Resources (DER) Information page. If you are looking for additional data, please submit your request to opennetworks@energynetworks.org.

Transparent, accessible, interoperable and accurate data will allow the markets to develop that will put consumers at the heart of this change while allowing system operators to support the proliferation of new business models and technologies. Requests for system operator data will be reviewed quarterly by the ENA's Open Networks Project and prioritised for delivery subject to cost and regulation. All requests will be responded to.

4.4 Summary

Dataset	Description
Real-time demand data	More visibility of energy flows across the network particularly at the granular level through smart meter data or monitoring. Another respondent asked for real time power flow (at multiple voltage levels) or an aggregated version of this.
LCT Uptake	Visibility of LCT uptake such as EVs and Electrification of Heat
Single UK Heatmap	To an agreed standard including demand and generation with NG data layered on top. With all the flex and signposting work. Refreshed regularly.
Grid Sensitivities	Visibility of where peer to peer trades can take place. For example: a. Trades must be defined in time periods of [minimum trade duration]; and b. Trades can take place at any point between [time period] and [time period] before the time at which the trade will take effect
Constraint Trading	The network operator must make information available about a constraint to the network users impacted by that constraint. The network operator must publish the process it will follow to determine which generators to curtail to alleviate the constraint under each plausible scenario Parties who have traded must provide the network operator with details of the trade.
Trade Authorisation	The network operator must pre-authorise any generator wishing to trade, by confirming that generator has the ability to comply should it become liable for a curtailment obligation. The MW reduction agreed by the generator must have an equivalent impact on the constraint as the MW reduction already required by the generator with the curtailment obligation.
Trading Visibility	Generators wishing to trade must opt in to potential trading. A list of generators connected to the network that have the potential to alleviate the constraint and which have opted in to trading must be made available, including: a. their existing curtailment obligation (if applicable); b. their current curtailment obligation; c. their flexibility or curtailment granularity; and d. their effectiveness in alleviating the constraint (i.e. their sensitivity factor)

5 Next Steps

5.1 Introduction

This final section outlines the key innovation projects that will be utilised for trials in 2020. The intention is to merge the Non-SCR with this product in 2020 to take the proposed datasets and principles forward to trials within the context of the current TEF products. This will allow the product to test the datasets and identify any gaps. Datasets identified in this report and in 2020 will be scoped and prioritised for delivery based on complexity and cost. The product will also assess the appropriateness of the principles outlined by the Non-SCR workstream.

5.2 TRANSITION

TRANSITION will design, develop, demonstrate and assess the common tools, data and system architecture required to implement the proposed models produced by the Open Networks Workstream 3 project. This will include:

- Develop roles and responsibilities for market participants, and market rules to allow market participants to transact services;
- Clarify the requirements and implement a neutral market facilitation platform for trials;
- Engage and consult with stakeholders;
- Identify up to three network learnings from the above; and
- Provide direct validation and incremental development of the Open Networks market models.

Clearly these objectives offer a range of opportunities for trialling product 6 in 2020. Initial work on market simulation exercises have already produced valuable insights into potential datasets.

5.2.1 Project LEO

Project LEO is the test site for TRANSITION based in Oxfordshire. Oxfordshire has been selected due to its replicability and high customer appetite for a smart grid architecture as changes to DNO business models, processes and systems must be suitable for all geographical locations and customer groups within our current licences. In Oxfordshire there are customer groups of all different types and sizes seeking to move sustainable energy models and keen to connect more renewable generation, energy storage, heat networks, electric vehicles and trade energy peer to peer. This project offers an ideal opportunity to trial aspects of product 6 due to:

- Project numbers make the market buoyant and ensure it stands up to academic rigour

- Diversity of customer group is high, allowing the projects to test many aspects of a smart grid
- Network asset base and arrangement is varied, but replicable across SSEN licences and GB
- Other energy vectors (e.g. heat) are being developed, enabling us to include and lead industry fora
- High level of investment in energy and co-ordination through the Ox Local Enterprise Partnership

5.3 Fusion

FUSION is looking to unlock flexibility in the distribution network: this means it can be procured by a range of market actors. Aggregators will be able to operate to aid the development of the flexibility market. By facilitating this neutral market, network flexibility will be accessible to all parties. The creation of a flexibility market will go beyond existing bilateral trading of flexibility, providing a whole systems approach to realising the value of flexibility. Customers will also be empowered to commoditise their flexibility thanks to new routes to market for existing and emerging flexibility providers in the distribution network offering opportunities to trial aspects of product 6 in 2020.

5.4 EFFS

This project is exploring in detail the additional functionality required as a DSO, to evaluate the potential options and implement systems that provide that new functionality. Building on the work by Open Networks, an aspect of EFFS is determining optimal arrangements for co-ordination and conflict resolution with other parties using flexibility services which may offer an opportunity for trials.

6 Summary

6.1 2020

System operators are committed to providing the requisite data for new markets of flexibility to flourish whilst at the same time considering system resilience and customer value. Utilising the outputs of the Non-SCR group and the innovation space provided by the TEF projects will ensure this product is able to identify robust datasets that are valuable for stakeholders in facilitating new markets.

6.2 Product Description for 2020

P6	Market Facilitation – Non DSO Services

Description
This product will test the principles/rules of engagement for potential providers to exchange capacity and curtailment obligations as identified in 2019 by the Non-SCR group within the TEF and the BEIS FleX and Power Forward projects. It will also test the data sets that were identified by 2019 WS1A P6 to enable neutral facilitation of these new markets both pre & post transaction to ensure no detrimental impact on the network.

Background
This product is a continuation of 2019 WS1A P6 and the work on the Industry Led Non-SCR Access Working Group (P1 & P2) on the exchange of capacity and curtailment obligations.

Benefits
In addition to freeing up capacity on the network through non-traditional methods, this product will allow the development of new markets. Incidental benefits should also include visibility of network actions, identifying opportunities for concurrent value stacking and resolving challenges relating to value conflicts between industry actors.

Indicative Impact for DNOs (to current process/infrastructure and associated timings & costs)
Impact: New processes are likely to be introduced. IT/infrastructure changes may be required to provide data for the facilitation of new markets and identification and management of potential conflicts.
Timing: The project will align with the timescales of the TEF projects and the BEIS FleX and Power Forward projects in order to provide insight in to ED2
Cost: Cost will vary by DNO as it will depend on the level of change based on existing systems and processes.

Public Consultation
No

Ref	Product Element	Activities	Duration	Timeline	Deliverables	Stakeholder Engagement	Approval
1A	Test principles/rules of engagement against planned market simulations in the TEF and the BEIS Flex and Power Forward projects	Identify appropriate market simulations iterative with current trial approaches. Possibly a gap analysis report looking at scenario/market model coverage – helping to demonstrate the value from running multiple projects.	2 months	By 28/2/20 – in line with TEF stage-gate	Paper summarising proven principles/rules of engagement and minimum requisite datasets pre and post transaction for network stability	TEF and the BEIS Flex and Power Forward project participants	WS1A and DSO Steering Group
		Compare principles/rules of engagement from Non-SCR work	12 months	By 30/12/20			

		Update principles/rules of engagement accordingly	12 months	By 30/12/20			
1B	Validate pre-transaction datasets utilising trials in the TEF and the BEIS Flex and Power Forward projects	Identify appropriate market simulations iterative with current trial approaches.	2 months	By 28/2/20 – in line with TEF stage-gate			
		Compare pre-transaction datasets from WS1A P6 2019	12 months	By 30/12/20			
		Agree minimum requisite pre-transaction dataset	12 months	By 30/12/20			
1C	Validate post-transaction datasets utilising trials in the TEF and the BEIS Flex and Power Forward projects	Identify appropriate market simulations iterative with current trial approaches.	2 months	By 28/2/20 – in line with TEF stage-gate			
		Compare post-transaction datasets from WS1A P6 2019	12 months	By 30/12/20			
		Agree minimum requisite post-transaction dataset	12 months	By 30/12/20			