

By email
10 May 2023

Dear the Distributed Flexibility and Enablers team,

Ofgem Call for Input on Future of Distributed Flexibility

Arup welcome this call for input, it shows forward thinking and a desire to accelerate the UK's digital transformation of the energy system and meet our net zero obligations as quickly as possible. There is a clear need to change the digital infrastructure to improve the system wide coordination and interoperability of the energy system. Without prompt and meaningful change to the uptake of local flexibility capability leaves significant opportunity untapped.

There is some great emerging work currently being developed in the industry on better digital, technological, and commercial interoperability so a concerted effort to implement these into a more aligned energy system will pay significant dividends.

Arup are keen to help implement this digital transformation and are happy to engage Ofgem further on this topic. We wish to provide the following responses to the call for input:

Section 1 - The imperative, potential, and challenges of flexibility

Q1 What do you think distributed flexibility could contribute to the energy system?

There is an increasing distributed flexibility resource which can be harnessed with the appropriate incentives, market mechanisms and the digital enablement that would significantly reduce the need to reinforce the electrical networks.

However, there are significant challenges in the current ways of engaging with flexibility markets with complex rules and flexibility services which are challenging to stack. Equally a single, distributed, flexibility resource would be hard to justify on a single flexibility service which may not be guaranteed for a long period of time, therefore broader incentives to instigate this technology alongside the appropriate digital integration is critical to build this underlying capability into our energy system so it can be leveraged more easily in the future.

Q2 Will a focus on CER flexibility also help enable other forms of flexibility, especially distributed flexibility?

We consider that CER flexibility has a slightly more complex rollout path as first the technology needs to be installed in consumers' homes, with the appropriate technical and commercial integration implemented, and then the route to the flexibility market itself - typically through a third party.

This means that CER will likely only be used for ESO Balancing related services. Despite their distributed nature, they would lend themselves to local DNO flexibility services, if implemented in dense enough clusters. If this coordination and integration of services and technology is more effectively implemented, the flexibility services could evolve to accommodate a broader range of services. Currently the structure of flexibility services encourages single provider, single service provision. If more providers can access more services through better cross industry interoperation, then greater benefits could be unlocked.

Focus on CER is important, however medium scale flexibility is an important part of the flexibility due to its comparative ease to deploy and easier ways to integrate with the existing systems. They are also typically much larger so can be more impactful with a fewer challenges to connect and integrate them to the wider system.

Section 2 - An approach pivot: The case for change

Q3 Is there a ‘case for change’ and a need for a common vision for distributed flexibility?

Yes, the current rollout of flexibility is fragmented and is being driven by a wide range of opportunities, but these tend to be siloed.

The need for a common digital vision and infrastructure are critical to enable this.

Digital, data, and commercial interoperability between all the flexibility participants and market providers is critical.

This needs to build on the emerging work being developed by the Virtual Energy System programme by National Grid ESO and ongoing Digital Spine Feasibility Study to ensure there is consistency and that there is already engagement with the industry to facilitate timely implementation of the changes.

Q4 What is your vision for how to accelerate the delivery of accessible, coordinated and trusted markets for distributed flexibility?

Consolidated flexibility services, which are prioritised and coordinated so any flexibility providers can access them.

This prioritisation will need to accommodate local drivers to ensure that services do not become to centralised. Participation to this service is done via an interoperable data standard which has broad compatibility across for the key technology and customer types to actively engage with the assets while allowing for the system operator(s) to optimise the available flexibility markets.

This is likely to be largely automated, but there should always be the option for proactive engagement with flexibility services to ensure trust is built.

Q5 Will certainty of an end vision help accelerate enabling work and make it cohesive?

It will, it allows the technology supply chain to develop their customer propositions, it enables system operators to align their services and facilitates the broader digital transformation to accelerate and move towards system wide digital and data interoperability.

Q6 When should a common digital energy infrastructure be in place? And therefore, when should development begin?

It should be in place as soon as possible, with accelerated development needed.

There are various programmes and industry initiatives already working on aspects of this infrastructure. Such as the Virtual Energy System, Digital Spine Feasibility Study, Open Energy, and the National Digital Twin Programme. There should be intentional efforts to build on the developments and thinking of these programmes, and encouragement for the sector to “collaborate on the rules, complete on the game”.

The Virtual Energy System has the potential to provide some of this digital energy infrastructure, and has a clear vision of its role within the energy system. With the transition of ESO into FSO, this creates a unique opportunity to immediately accelerate the infrastructure development.

Section 3 - What that future could look like

Q7 What should a common energy digital infrastructure look like, and why? Please consider the archetypes or develop your own proposition.

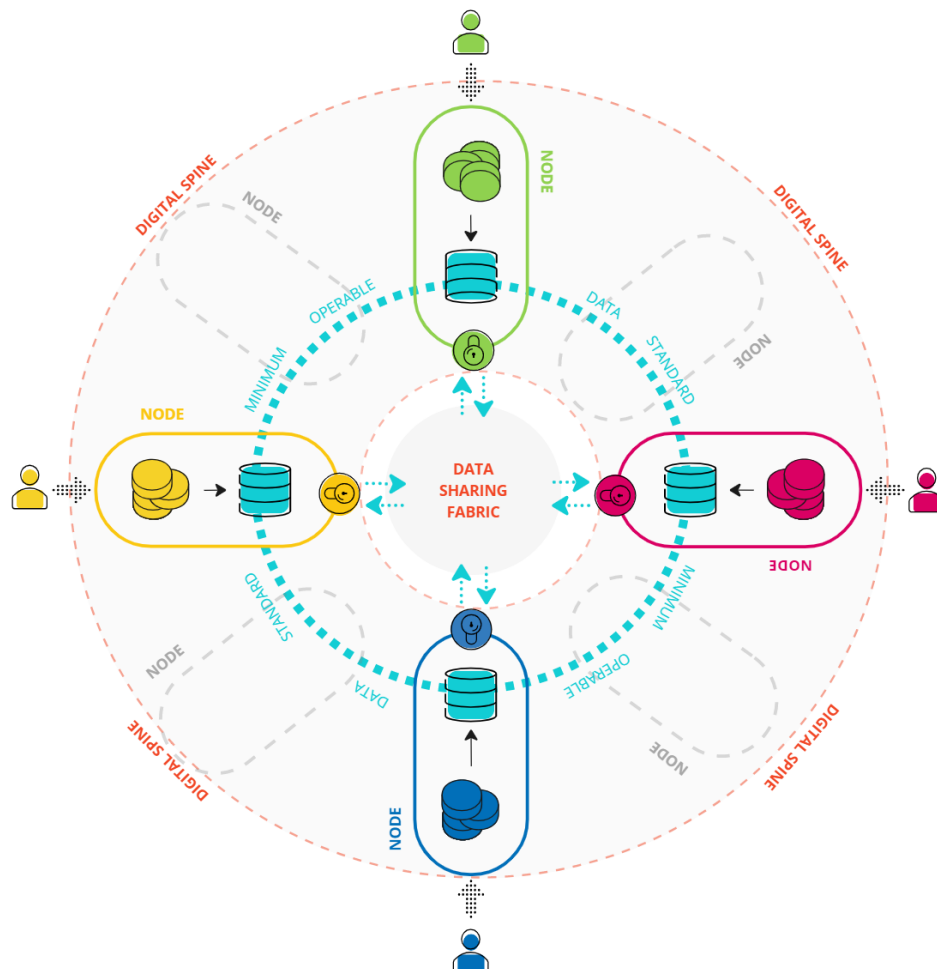
Of the provided archetypes, it would be a blend of medium, with components of thick.

We would propose an alternative proposition, which is taken from the current thinking of the ongoing digital spine feasibility study, which has been validated by industry through stakeholder engagement. We understand that Ofgem have been sighted of the outputs of this feasibility study to date. We would highlight that the study is still ongoing, and this is the current thinking.

We consider that the digital infrastructure, or more appropriately titled “data sharing infrastructure” would provide the minimum layer of digital infrastructure that allows the exchange of energy data in a secure and interoperable manner.

It consists of two core concepts (as shown in the diagram below):

- A cross-sector **data standardisation mechanism** (referred to as a Digital Spine by the Energy Digitalisation Task Force)
- A sector-wide **data sharing mechanism** (referred to as Data Sharing Fabric by the Energy Digitalisation Task Force)



Data standardisation mechanism

A data standardisation mechanism could be a commonly structured node deployed by organisations across the energy sector on their own IT infrastructure.

The nodes could allow organisations to:

- Control and specify the data they wish to share.
- Align that data to a minimum operable data standard (specific to each data type)
- Securely present the standardised data to the sector through standard APIs, access controls, and security procedures

These nodes could form a network (i.e. a cross-sector data standardisation mechanism)

Data sharing mechanism

A sector-wide data sharing mechanism could be the connectivity layer and technological implementation for the governance of access controls for data.

It could enable actors to:

- Search for data being shared by other actors
- Securely request and pull the data of interest from other actors through their data standardisation node
- Provide governance, and licencing definition and brokerage

In this setup, the flexibility market would be a node on the network. This node would be run by an entity responsible for the flexibility market. Market participants would also have nodes themselves.

The “data sharing architecture” would also have the following characteristics:

- Distributed implementation
- Open source foundation components
- Data standardisation & interoperability
- Self-serve streaming data
- Secure (including cyber security)
- Connectivity into a wider cross-sector ecosystem
- Low barrier deployment
- Reliable and performant
- Low overhead of integration

Q8 What is your view on the desirability and feasibility of the archetypes or your own alternative proposition?

Based on feedback and engagement for the ongoing digital spine feasibility study, the proposed data sharing architecture is highly desirable and feasible. The feasibility study will be considering the technical implementation as part of the next activities on the project (June->Aug 2023).

The “data sharing mechanism” could be fulfilled in part, or fully, by the Virtual Energy System.

Section 4 - Delivery considerations

Q9 Should a common digital energy infrastructure be new-build, or should it build-out from existing infrastructure?

The individual technology components to develop the data sharing infrastructure already exists in wider industry.

Developing a common data sharing infrastructure is a socio-technical challenge, and it is the socio (social) aspects that are typically more challenging to address.

The overall architecture of the data sharing infrastructure has been conceptually developed through the ongoing digital spine feasibility study, with components of it being developed already by programmes such as the Virtual Energy System.

Where possible, we should build on current developments and thinking, and encourage industry to “collaborate on the rules, compete on the game”.

Q10 What are the important areas for consideration when designing institutional delivery models for a common digital energy infrastructure?

We will be able to provide further details on the conclusion of the next activities of the digital spine feasibility study, which is assessing technical implementation, ongoing management, and market design.

Similar to the response to question Q9, developing a common data sharing infrastructure is a socio-technical challenge. The individual technology components to develop the data sharing infrastructure already exists in wider industry, and it is the socio (social) aspects that are typically more challenging to address.

Q11 What are the important areas for consideration when designing financial delivery models for a common digital energy infrastructure?

We will be able to provide further details on the conclusion of the next activities of the digital spine feasibility study, which is assessing technical implementation, ongoing management, and market design.

Arup are happy to discuss the current developing thinking of the digital spine feasibility study in more detail with your team. We understand that Ofgem have been sighted of the outputs of this feasibility study to date. We would highlight that the study is still ongoing, and this is the current thinking.

Yours sincerely



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