OBJ OBJ

1. **What do you think distributed flexibility could contribute to the energy system?**

Distributed flexibility has the potential to transform the energy system by enabling a more decentralised, flexible, and sustainable approach to energy production, consumption, and management, while bringing benefit to consumers. By leveraging the capabilities of small-scale, localised energy assets and digital technologies, distributed flexibility can contribute to a more resilient, efficient, and environmentally friendly energy system.

From the production angle, distributed flexibility can help improve the reliability and resilience of the energy grid by providing localised sources of power and reducing dependence on centralised power plants. DERs and CERs can be strategically located in areas with high energy demand or vulnerable grid infrastructure, providing backup power during outages and grid disturbances, which can help ensure continuous energy supply to critical infrastructure and communities. Besides, localised energy generation can also reduce energy losses associated with long-distance transmission, leading to improved overall system efficiency.

Additionally, energy storage systems as part of DERs can store excess renewable energy during times of high generation and release it during times of low generation, helping to balance intermittent renewable energy supply with demand. By a similar token, energy storage systems can store excess energy during off-peak periods when electricity prices are low and release it during peak periods when prices are high, resulting in cost savings for consumers.

From the consumption perspective, market-based solutions that incentivise distributed flexibility can help alleviate the grid in times of congestion. Trying to incentivise consumers to switch-off or reduce consumption at high system stress times can help alleviate the emergency and reduce the risk of outage.

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

Yes, allowing distributed flexibility resources, both DER and CER, to compete in the market and to provide as many services as they can, would incentivise an uptake of these technologies. An important obstacle for regulators and system operators in allowing this is their lack of adequate visibility over the behind-the-meter resources and the distribution grid. Only some static data, such as the location and power capacity of distributed PV systems, are collected through retail market programs and many low voltage grids are not equipped with network monitoring equipment (IEA,2022)[1]. Investing in digitalisation can improve visibility over CERs and DERs, allowing their participation in the market.

This increased visibility will give TSOs more confidence that they have capabilities to deliver and will be able to give more incentives for them to participate in markets activities.

Using optimally the capabilities of all market participants can increase the system's efficiency. Sharing detailed information through bids about the technology and their technical capabilities could allow a more efficient allocation of resources according to their capabilities. This is true for battery assets as well. An example of this is California's Energy Storage Enhancements where storage assets need to provide battery's state of charge to identify and certify which resources are available when needed and thus be able to provide an efficient dispatch.

3. Is there a 'case for change' and a need for a common vision for distributed flexibility?

We agree that a consistent united environment for distributed flexibility will not emerge neither organically nor in time, therefore there is a need to incentivise this change. Supporting CER and DER to participate in flexibility markets will promote the uptake of these technologies, as well as providing support services to the grid.

If the digital infrastructure is implemented correctly, it can help alleviate some of the existing and upcoming challenges like coordination across markets and market failures such as imperfect information and information asymmetries. However, a common infrastructure does not replace the need by the DSO to develop new capabilities such as real-time updating of forecasts, assessing the need for market services based on the real-time state of the network, monitoring of delivery, decisions between market services and other DSO or control room tools for managing constraints.

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

Providing a solution which utilises international data standards and communication protocols is imperative. While over the longer term, the growth and maturity of the controllable distributed asset industry may support the adoption of multiple standards in this space, it is vital that the electricity industry promotes interoperability between networks and projects, in order to give certainty to manufacturers, equipment vendors and operators for technology and capability development (ARENA,2021).

As discussed within the Call for Input, the core technological aspects of communicating, controlling and dispatching flexibility are globally replicable. The UK's flexibility markets will suffer by not aligning with existing and emerging standards for flexibility.

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

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[1] https://www.iea.org/reports/smart-grids

Yes. Being able to understand the nature of the digital energy infrastructure being sought will allow GE and others to understand what supporting technology is required and what functionality network operators will require in the future.

The pace of acceleration of different enabling work will vary depending on the future digital infrastructure that is pursued. For example, data standards and sharing expectations (at least in terms of flexibility markets) will be accelerated in all but the BaU archetype. This means that for that enabler the choice of 'thin', 'medium' or 'thick' archetypes may not significantly impact its development. However other enablers, for example, accelerating DER asset visibility, communications connectivity and operational metering will accelerate much quicker if the 'medium' or 'thick' archetypes are chosen, as communication with DER assets will be standardised to a greater extent.

By aiming for an ambitious digital infrastructure (i.e. the 'medium' or 'thick' archetype) then other enablers will, by necessity, be accelerated within the industry. For example, DER interoperability will be prioritised if it becomes a requirement for engaging with the flexibility markets, which in turn should support other goals, for example, LV network visibility and constraints.

It is our view that data number of integrations with flexibility providers (CERs, DERs or aggregators) will be reduced if a common approach is taken. However, there needs to be a balance between the push for standardisation, which comes with a risk that the barriers to participation within markets are too high for flexibility providers to engage with and relaxing the standards for accessibility to a point where the process becomes useless.

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

Implementation time is critical. As stated in the Call for Input, an organic solution might take 5-10 years to develop and, at that pace, there is a real risk that the underlying CER and DER are not systematically ‘useful’.

The urgent need for a fast implementation is in line with the broader picture presented by the IEA as well. To correspond with the Net Zero Emissions by 2050 Scenario, the pace of policy implementation and technology deployment needs to accelerate. The Net Zero Scenario milestone has 500 GW of demand response brought onto the market by 2030, corresponding to a tenfold increase in deployment levels in 2020. DER and CER have the potential to contribute significantly to demand response if coupled with smart meters and digital management systems that allow the aggregation and remote control of smaller and more numerous resources. (IEA,2022)[2]

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

A detailed response is provided below.

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[2] https://www.iea.org/reports/demand-response

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

The assessment of the four archetypes in sections 3.5 and 3.6 provide a good assessment of the pros and cons of each different archetype. Our view is that the 'medium' archetype strikes a good balance of addressing strategic issues and accelerating enablers for the energy transition but avoids the drawbacks in terms of time, cost and complexity of the 'thick' implementation. Furthermore, 'medium' strikes a balance in terms of enabling innovation providing standardised digital infrastructure to build upon without stifling innovation by aiming for a central 'black box' solution.

In terms of the market chronology described for each archetype, below describes our view of the optimal design:

Exploration (best archetype: medium): The benefits of the 'medium' archetype in terms of navigating markets outweigh the benefits of the simple 'thin' archetype. There are no additional benefits to moving to a 'thick' archetype in terms of market exploration.

Registration (best archetype: medium): Registration is a cumbersome process, with varying requirements across markets, but with much commonality. Having a simplified and lower friction registration process would increase the number of available DERs and CERs and bring benefits in terms of market liquidity, especially if a single registration allows an asset to engage in multiple markets.

Competition (best archetype: medium): Competition here is assessed mostly long-term, whereas short-term competition is only glossed over. Co-optimisation of day-ahead markets is complex and, in this case, the technical challenges involved in coordinating centrally across many dimensions: horizontally (multiple market commodities, different time horizons), vertically (different voltage levels) and across different products outweigh the benefits it would bring at this point. If co-optimisation approaches evolve or the goal must change with evolving grid usage patterns, this will be a slow and expensive process in order to change a centralised platform. Our view is that this kind of co-optimisation could be implemented as an add on to the 'medium' archetype.

Availability (best archetype: medium): Arguably a centralised platform (i.e. the 'thick' archetype) for understanding asset availability is most desirable solution because it allows availability across many markets to be understood, whilst maintaining a single source of truth. However, the 'medium' archetype is again deemed to be the best archetype when considering the practical implementation of the solution. It is agreed that a coordinating exchange will assist external platforms in understanding conflicts of availability across markets.Dispatch (best archetype: medium): Issuing dispatch instructions is a complex subject area, given the vast number of heterogenous assets that exist. This is especially challenging when considering CERs. The dispatch of assets is an evolving subject matter, as more loads become flexible (e.g. V2G and Heat Pump flexibility). By allowing 'off exchange' control and dispatch to take place, innovation is supported, and new dispatch and control methodologies can be created to support new markets as the energy system evolves. The 'thick' archetype with respect to dispatch has the potential to slow progress in this aspect.

Verification (best archetype: medium): Benefits of hosting ex-post data in a central and transparent way are justified, however in our view there are no additional benefits to 're-invent the wheel' in terms of moving verification and settlement processes into a new centralised platform.

Settlement (best archetype: medium): As above with respect to 'Verification'

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

In the medium archetype the 'Flexibility Exchange' would ideally be a fit-for-purpose newly build infrastructure with the latest technologies and standards. However, existing infrastructure and systems should be used to the extent possible. This might be the case of verification and settlement where existing systems and processes perform well.

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

While we should re-use as much of what is existing as possible, the danger is that current forms of distribution flexibility markets do not have significant locational information and are not designed for the scalable, dynamic market operations that a DSO may need to support in the future. Ideally any new digital energy infrastructure has some recognition for the following needs which are not well developed:

- DER visibility and location-based decision-making, even potentially down to the LV (where constraints are likely to be in the future)
- Ability to align the existing long-term competition formats to day-ahead and intraday processes currently used by NGESO markets.
- Assessing flexibility market options alongside other DSO tools such as flexible connections.
- We believe that the current consultation should consider now only the current capabilities, but what is needed by the DSO in the future, when considering the common digital energy infrastructure to avoid locking market design in based on current technology constraints.