Flux Federation's Response to Ofgem's Call for Input: The Future of Distributed Flexibility

Section 1

Question 1 - What do you think distributed flexibility could contribute to the energy system?

At Flux we strongly believe innovative distributed technologies have the potential to transform the energy system and address challenges posed by our rapid energy transition.

By leveraging the power of distributed resources, such as rooftop solar panels and battery storage systems, we can create a more resilient, sustainable, and affordable energy system that benefits everyone. With distributed flexibility, we can reduce our dependence on centralised power plants and transmission infrastructure, reducing susceptibility to disruptions and outages. We can tap into the power of local communities to generate and store their own energy, ensuring that critical services and infrastructure remain operational during emergencies.

Furthermore, distributed flexibility enables us to integrate renewable energy sources like wind and solar into the grid more efficiently, ensuring a stable and reliable supply of energy. By smoothing out the fluctuations from renewable energy output, we can ensure that the energy system can meet the demands of modern society without compromising on environmental sustainability.

Finally, distributed flexibility can also reduce the cost of energy for consumers by reducing the need for expensive centralised infrastructure. By empowering customers to generate and store their own energy, we can reduce the demand for electricity from the grid, reduce some of the grid balancing cost burden, passing these efficiencies into lower energy prices for everyone.

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

CER flexibility has the potential to enable other forms of flexibility, especially distributed flexibility, which is crucial for a resilient, sustainable, and affordable energy system.

Advanced and emerging energy markets can provide valuable insights into implementing effective CER flexibility solutions:

- **Europe and the United States** have already successfully implemented capacity markets, demand response programs, and energy storage incentives to achieve grid stability, reliability, and cost-effectiveness.
- **Australia and New Zealand** have also implemented various forms of CER flexibility, including demand response programs, energy storage incentives, and a competitive wholesale market, resulting in positive outcomes.

CER flexibility can enable distributed flexibility in many ways. For instance:

1. Capacity markets can offer a predictable revenue stream for flexible energy resources like energy storage, thereby incentivising investment in these resources and reducing risk premium associated with a less predictable returns outlook.
2. Clear, stable and consistent energy regulation signals can encourage market participants to invest and deploy flexible energy resources, making it easier to integrate them into the grid.
3. Reducing regulatory barriers and providing standardised rules for the connection and operation of distributed energy resources, through energy regulation, can foster a more favourable environment for distributed flexibility.

By incentivising investment in flexible energy resources, we can promote their integration into the grid, resulting in a more efficient and reliable energy system. This will benefit consumers and the environment alike. To this end, policymakers need to ensure policy confidence and avoid over-customising solutions, as well as leveraging knowledge and experiences from advanced markets like Australia, New Zealand and the United States.

Additional APAC content?

Australia and New Zealand have deployed rooftop solar, battery storage, hydro and geothermal energy, respectively, to provide baseload power and improve energy access in remote areas. With a focus on distributed flexibility and CER flexibility, both countries have enhanced grid stability, reliability, and cost-effectiveness; offering valuable insights for other energy markets looking to transform their systems.

Section 2

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

Yes, there is a strong case for change and a need for a common vision for distributed flexibility in the UK. With the increasing deployment of distributed energy resources, such as rooftop solar panels, electric vehicles, and energy storage systems, there is a growing need for a more flexible and responsive energy system that can accommodate these resources and manage the variability and uncertainty of renewable energy generation.

Moreover, as the UK transitions to a net-zero carbon economy, there will be a significant increase in the deployment of renewable energy resources, which will require a more flexible and dynamic energy system. Distributed flexibility can provide a cost-effective and efficient solution

to managing this transition by allowing the grid to access and manage distributed energy resources in real-time, improving grid stability and reliability.

A common vision for distributed flexibility is also needed to provide clear guidance and direction to industry stakeholders, policymakers, and regulators. This will help ensure that distributed flexibility solutions are aligned with broader policy goals and provide a coherent and coordinated approach to managing the transition to a net-zero carbon economy.

Examples can be found in Australia and New Zealand where a clear common vision has help create policies encouraging adoption of distributed energy resources and promoting price competitiveness, such as

1. Australia's Small-Scale Renewable Energy Scheme
2. Australia's National Energy Guarantee
3. New Zealand's Low Emission Vehicles Contestable Fund
4. New Zealand's Green Investment Finance

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

Accelerating delivery of accessible, coordinated, and trusted markets for distributed flexibility involves a multi-pronged approach:

- Firstly, policy confidence needs to be increased by establishing clear and consistent regulatory frameworks that incentivise investment in flexible energy resources, such as demand response programs, energy storage, and distributed energy resources. This requires collaboration between policymakers, regulators, and industry stakeholders to identify best practices, adapt them to local contexts, and develop innovative solutions that meet the unique challenges of each energy system.
- Secondly, we need to leverage the latest advances in digital technologies to enable seamless integration and interoperability of distributed energy resources into the grid. This includes developing standardised rules and protocols for the connection and operation of distributed energy resources, as well as investing in smart grid infrastructure that can monitor and manage the flow of energy in real-time.
- Thirdly, we need to innovate by knowledge-sharing and collaboration between different stakeholders in the energy system, including utilities, technology providers, and consumers. This can be achieved by not only connecting the innovation hubs, sandboxes, and other platforms that encourage experimentation and the testing of new ideas but also continuing this work as the landscape emerges, building confidence in the reliability and scale distributed flexibility can bring.
- Fourthly, we need to ensure that these markets are accessible and trusted by all stakeholders, particularly consumers. This requires a strong focus on consumer protection and education, as well as transparency in pricing and the provision of reliable and accurate information about the performance of distributed energy resources. Avoidance of complexity and ambiguity is key here.

A good example of enablers for distributed energy systems can be found in one of the Flux Operating Markets of Australia. Information on five minute settlements rolled out Australia-wide

as part of their ongoing programme of system upgrades including other things such as Distributed Energy systems and Integrated Storage systems. This information can be found here:
https://aemo.com.au/initiatives/major-programs/nem-five-minute-settlement--program-and-global-settlement

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

Yes. Having a clear end vision can help accelerate the enabling work and make it more cohesive. When key stakeholders have a shared understanding of the ultimate goal, they can better focus on their area of contribution, avoid duplication of effort and resources, and align strategies and activities toward achieving the common objective.

For instance:

- Regulators can develop policies and standards that support the deployment of distributed flexibility
- Technology providers can develop solutions that meet those standards and market needs
- Energy providers can then invest in and operate those solutions
- Consumers can participate in programs that provide incentives for flexible demand and generation.

A clear end vision can also help to build public support and trust, as it provides a transparent and accountable roadmap for achieving a more resilient, sustainable, and affordable energy system. It can help to demonstrate the benefits of distributed flexibility to consumers, communities, and businesses, and ensure that their needs and preferences are considered in the development and implementation of flexible energy solutions.

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

Considering the UK's target to reduce greenhouse gas emissions by at least 68% by 2030, it is critical to accelerate the development, and use, of distributed flexibility technologies

This will require collaboration between energy industry stakeholders and technology providers to develop and implement the necessary digital infrastructure and standards.

Given the complexity of such an undertaking and the need to ensure interoperability, development work should begin immediately to ensure that the digital infrastructure is in place well before 2030. This will also give technology providers sufficient time to develop and deploy the necessary hardware and software to support the common digital energy infrastructure.

Section 3

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

The Medium Archetype emerges as a compelling choice for its ability to bring coordination, transparency, and efficiency to the forefront. Compared to the other archetypes, it offers a balanced approach that combines the benefits of market autonomy with the advantages of a unified and governed framework.

Our reasoning for this approach as the base model for a system are:

1. The Medium Archetype provides a centralised platform that fosters coordination among multiple markets. By offering a single source of truth, it allows buyers and sellers of distributed flexibility to access a comprehensive overview of available markets and their respective assets. This ensures that market participants can make informed decisions, understand market dynamics, and gauge historic trends. Transparency in market exploration is crucial, enabling buyers and sellers to align their expectations and requirements effectively.
2. It facilitates a streamlined registration process. Sellers can qualify against requirements and register their assets, while buyers evaluate the capabilities of potential partners. A standardised pre qualification system and visibility functionality reduce friction and repetitive processes, eliminating the need for bilateral due diligence. Additionally, common contract terms and conditions established through the exchange further simplify transactions, enhancing efficiency and reducing operational complexities.
3. In terms of market competition and asset availability it empowers individual markets to retain their unique operations and digital infrastructures. This flexibility ensures that existing processes can continue seamlessly while leveraging the benefits of a coordinated environment. Furthermore, the exchange plays a pivotal role in flagging conflicts and discrepancies, proactively addressing them. By providing a transparent overview of market positions and actions, the exchange should enable timely resolutions and minimise disruptions.
4. Verification, settlement, and independent dispute resolution also find a strong foundation in the Medium Archetype. Existing systems and processes perform well in these areas, and the exchange acts as a central hub for hosting ex-post data, providing transparency to all stakeholders. Dispute resolution mechanisms should ensure fairness and trust, resolving issues related to common processes provided by the exchange.

The Medium Archetype achieves a delicate equilibrium by preserving the autonomy and distinctiveness of individual markets while providing a shared entry point, standardised interfaces, and a transparent governance framework. This approach should enable the benefits of coordination, price discovery, and liquidity to be realised without compromising the unique attributes and strengths of each market.

However, accepting the medium archetype “as is” from the documentation provided we do not believe is the correct choice. As mentioned in previous questions we hold firm to the belief that multiple participants in a digital delivery system is vital in future proofing any system and as such once answers to thai question are provided those proposals should be considered via consultation process to identify if there is an alternate view that has greater support.

We would argue that this is critical based upon the following

- **Increased competition:** This encourages innovation, efficiency, and continuous improvement of the digital infrastructure and it's design
- **Diverse expertise:** Each respondent will bring their unique expertise, experience, and perspectives to the table. In our experience this leads to a more comprehensive and robust implementation of solutions.
- **Avoiding single points of failure:**, If only one digital design is considered it could have widespread consequences on the entire process. By having multiple providers evaluate suggested solutions, the risk is distributed, ensuring a higher level of resilience and reliability in the outcomes of this consultation
- **Flexibility and customisation:** The scope of this project has brought forth a range of complex requirements, preferences, and regulations across the various markets it interacts with, including consumers, and as such specialist providers for different elements of the archetype will allow for knowledgeable customisation.
- **Innovation through collaboration:** As we know continued collaboration fosters innovation and the exchange of best practices. Providers can learn from each other's strengths, share insights, and collaborate further on such a critical consultation.

We also would like to emphasise some additions to be considered for incorporation into the Medium Archetype that have been predominantly placed within the Thick Archetype as part of the analysis.

1. **Centralised Settlement:** By including settlement within the medium archetype, the entire lifecycle of distributed flexibility, from exploration to settlement, can be handled in a coordinated and optimised manner. Centralised settlement provides efficiency, reduces complexity, and ensures accurate and transparent transaction settlement across all markets.
2. **Advanced Data Analytics:** By incorporating advanced data analytics capabilities into the medium archetype, the system can leverage data from various markets to identify patterns, trends, and opportunities for further optimization. This allows for improved decision-making, enhanced market coordination, and better overall system performance. We also believe this should be driven by findings in the OGS report - Market Standards Study
3. **Real-time Monitoring and Reporting:** Advanced data analytics enables real time monitoring and reporting. This enables stakeholders to have timely visibility into market activities, asset performance, and system conditions. Real-time monitoring facilitates proactive decision-making, effective market management, and the ability to address issues promptly.
4. **Trusted Governance and Dispute Resolution:** The thick archetype highlights the importance of trusted governance and independent dispute resolution. Including these elements in the medium archetype ensures fairness, transparency, and accountability in the operation of the digital energy infrastructure. Trusted governance provides a framework for decision-making, while independent dispute resolution mechanisms ensure fair resolution of any conflicts or issues that may arise.

This integration of improvements promotes greater efficiency, coordination, and optimisation of distributed flexibility, resulting in improved market outcomes and overall system performance.

And would have greater value and influence in changing unlocking system-wide distributed flexibility transformation.

In order to realise that future then grid management systems require real-time data, advanced analytics, and forecasting algorithms. These systems enable better monitoring, control, and optimisation of grid operations. By leveraging these technologies, grid operators can respond quickly to changes in supply and demand, integrate renewable energy sources, and maintain grid stability and flexibility. Thus delivering on the intention of this proposal and the aims of Ofgem in enhancing the future of the entirety of the UK flexibility market.

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

We agree with the desirability and feasibility study as conducted based upon the assumptions and proposals within the document "IBM Report - Digital Design Study". However there is one point of note that we believe has influenced some of the assessment and definition of the archetypes.

In the document "IBM Report - Digital Design Study" it is stated *"Data exchange between market participants is the primary goal of the SFE platform...".* However we believe this could have had an impact on the construction of the archetypes presented and the subsequent desirability and feasibility work.

There is no denying that data exchange is a critical part of the decision of the operation of the SFE however focusing solely on data sharing is not sufficient to address the challenges and market failures identified in the context of distributed flexibility. We interpret the aims of the SFE work by Ofgem in a more broader way.

. Here are some reasons this statement is not the best focus:

- **Incomplete picture:** Market failures in distributed flexibility stem from various underlying issues, such as imperfect information, market coordination, lack of trust, and contextual barriers. Merely sharing data does not address these fundamental problems or provide a holistic view of the market dynamics.
- **Decision-making complexity:** Data alone may not provide the necessary insights and analysis required for effective decision-making. It is crucial to have mechanisms in place that enable efficient coordination, access, and interpretation of data to inform decision-making processes.
- **Trust and governance:** Market participants require more than just data transparency to build trust. Clear governance structures, independent dispute resolution mechanisms, and accountability are necessary for establishing trust among market actors. Focusing solely on data sharing neglects these critical aspects and removes weight from the tick archetype in our opinion.
- **Market coordination:** Coordinating operations and access across multiple markets is essential for optimising system efficiency and maximising the value of distributed flexibility. Data sharing alone cannot achieve this level of coordination, which requires standardised processes, operational rules, and market design. Though these can be

future additions to the SFE platform any assessment done now must include this thinking if it is the long term goal.

- **Technical and market-specific barriers**: Addressing the structural barriers to entry and enabling wider participation in the market involves more than data sharing. It requires tackling burdensome legal and technical requirements, fostering competition, and creating an inclusive market environment for various types of assets and actors.

To effectively address the market challenges associated with distributed flexibility, a comprehensive approach that does not over emphasise data sharing is required. This approach should consider information provision, market coordination, trust and governance, and the removal of structural barriers to create a common digital infrastructure that supports the advancement of distributed flexibility in the energy market.

Section 4

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

When it comes to building a common digital energy infrastructure, the decision to build-out from existing infrastructure or start from scratch is not an easy one to make. While it may seem more cost-effective to build-out from existing infrastructure, it's important to consider the potential limitations and drawbacks that come with doing so.

One critical factor to consider is the need for expertise in different areas of the build. Building a digital energy infrastructure requires a range of skills, including software development, cybersecurity, data analytics, and more. We know from experience that it's unlikely that a single technology provider will possess all the necessary skills and expertise to build a comprehensive infrastructure.

Specialists in each area are critical to ensure that each aspect of the build is executed efficiently and effectively. As an example, cybersecurity experts are needed to protect the infrastructure from cyber threats and give guidance to all participants on the standards to adhere to.

Another reason why building-out from existing infrastructure may not be the best approach is that it may not be compatible with the latest technology and innovation. The energy landscape is constantly evolving, and new technologies are emerging that can enhance the efficiency and effectiveness of the infrastructure. Starting from scratch allows for the integration of the latest technology and innovation into the design.

List of pros and cons for examples to rewrite the above:

Examples for build from existing

Pros:

- Cost-effectiveness as it leverages the investments already made in the existing infrastructure.
- Familiarity making it easier for them to understand how the digital energy infrastructure operates.
- Utilising existing infrastructure can reduce the risk of unforeseen issues from initial assessments

Cons:

- The existing infrastructure may have limitations such as insufficient capacity or security features.
- It may rely on legacy technology which may not be compatible with modern digital systems.
- A fragmented system with various standards and protocols that may be challenging to integrate into a single cohesive system.
- It may be difficult to ensure the interoperability of various systems.
- Existing stakeholders may resist changes to the existing infrastructure.

Examples for build from existing

Pros:

- Customisation. The infrastructure can be designed from the ground up to meet the needs of the energy market and ensure optimal performance and functionality based on new policy and guidance rather than being retrofitted
- A new infrastructure can incorporate the latest technology advancements and can be designed to be future-proofed to adapt to changing energy market needs as work progresses
- A new infrastructure can be designed with scalability in mind, ensuring that it can handle future growth and expansion needs.
- With a new infrastructure, there is a lower risk of encountering unforeseen technical issues or limitations that may occur when building out from existing infrastructure.

Cons:

- Time-consuming
- Building a new infrastructure can be more expensive than reusing existing
- Technical challenges. Standards need to be set for all participants to be successful
- Integration challenges occur without standardised protocols

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

Overall, designing institutional delivery models for a common digital energy infrastructure requires careful consideration of a wide range of factors. By doing so the infrastructure can be developed and deployed in a way that maximises benefits to all stakeholders. We would consider the following to be critical to a design's success:

1. **Governance.** The governance must be designed to ensure accountability, transparency, and alignment of stakeholders. This includes ensuring that the interests of all stakeholders, including consumers, are represented, and that decision-making processes are inclusive and participatory.

2. **Regulation:** Regulatory frameworks must be established to ensure that the common digital energy infrastructure is deployed and operated in a safe, secure, and reliable manner. This includes ensuring that appropriate technical standards are in place, and that the necessary cybersecurity measures are implemented.
3. **Funding:** A clear and sustainable funding model must be established to support the development, deployment, and ongoing operation of the common digital energy infrastructure.
4. **Collaboration**: Collaboration and coordination among stakeholders is essential for the successful development and deployment of a common digital energy infrastructure. This includes engaging with technology providers, energy companies, regulators, and other key stakeholders to ensure that the infrastructure is designed to meet the needs of all users.
5. **Scalability**: The delivery model must be designed to be scalable and adaptable to changing technologies, market conditions, and policy frameworks. This includes ensuring that the infrastructure can be upgraded, expanded, and integrated with other systems over time.
6. **User-Centric Design**: The delivery model must be designed around the needs of the end-users. This includes ensuring that the infrastructure is intuitive, accessible, and easy to use, and that it delivers tangible benefits to users.
7. **Data Management**: The common digital energy infrastructure must have robust data management processes in place to ensure the secure and efficient collection, storage, and sharing of data. This includes complying with data protection regulations and ensuring that appropriate data privacy safeguards are in place.

Question 11 - What are the important areas for consideration when designing financial delivery models for a common digital energy infrastructure?

Delivery models ultimately need to balance consumer, facilitator and market value.

For consumers delivery models need to incentivise participation, the opportunity cost of that participation and any related personal infrastructure investment.

Facilitators need to see a balance between predictable return (or even basic income outlook) to lower the risk premia associated with their investments in innovation. This needs to be coupled with a compelling upside to encourage continued innovation, participation and competition in the GB market.

Finally, while it is accepted there are a range of non-financial benefits to rapidly scaling distributed flexibility's role, ultimately the market needs to see a lower cost (or higher value) of any services' contribution versus the counterfactual - e.g. building a localised peaking plant, installing higher capacity cables, or transmission-side interventions. Ultimately delivery models have to quickly become a more financially viable option for bill payers and tax payers to endure and evolve.