

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

Distributed flexibility will be essential for the energy system of the future. The existing power system was based on a model of large, centralised power stations which provided large amounts of generation and ancillary services. In the future model of distributed renewable generation, with increasing electrification of other systems pushing up demand, this model will not hold. Distributed flexibility will become essential for the energy system in the near future, if not already.

We believe that around 1000MW of flexibility can be delivered by net positive contribution to the system by several tens of thousands of devices be it CERs or other assets distributed in the LV network. This will strengthen the system overall, since the technical parameters of the system can be achieved in a decentralised manner with a high degree of granularity, the highest level of reliability, and a reduction of systemic risk to the energy security.

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

Yes. The current utilisation of CER flexibility is extremely poor, and focussing on improving this will have wider impacts on distributed flexibility and the efficient functioning of the system. This can also improve the efficiency of the ancillary services market and benefit the consumer by decreasing the dominance of traditional power generators in ancillary services markets, thereby increasing competition in the wholesale markets.

As an example, there are around 10,000 households with battery storage. The coordinated use of these assets would have reduced the need for a demand flexibility service, removing the need for stand by power stations and all the related costs. By designing a governance framework and platform to make use of this flexibility, the potential of all assets on the network can be fully realised, as the market becomes more transparent and friction to participation is reduced.

The current failure to take advantage of the flexibility the network itself could provide exacerbates the need for novel interventions in the system. However, existing solutions can play a role in combatting growing issues on the system. A CLASS-like service during the recent stress events could have reduced the power demand by 10-20%. This would have provided, in effect, the required operating margin.

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

Yes, the current system of providing flexibility is very concentrated and focused on large, centralised generators and large assets. It favours the traditional generate-transmit-distribute style of power system, which will not be appropriate for the future system of high, consistent demand and distributed, renewable generation. The current market set up also provides no technical routes or economic incentives for CERs to participate in the energy system.

Whilst it is possible for assets to participate in the system, a lack of transparency, confusing set-up of multiple markets, and a lack of understanding prevent consumer assets from taking part. This also closes the system off from future innovation, through which many solutions to present problems may arrive. A governance framework, or lack thereof, which does not allow for innovative players to enter the market confidently, with minimal friction, cannot hope to guarantee lowest cost decarbonisation whilst protecting energy security. A common vision, that has a commitment that CER be actively engaged in all GB energy markets through a common digital energy infrastructure, is much closer to the energy system we need, which makes best use of all assets and technologies on the system.

Current arrangements also act as a barrier for system operators (transmission and distribution alike) and do not allow them to operate the system with a “whole system” mindset which optimises for each asset. CERs are completely opaque to the system operators in both planning and operating horizon and provide no forecast ability. Therefore, Ofgem’s proposal for a common vision for distributed flexibility shows an awareness of the issues facing both market players and system operators and is an important step in addressing these. A common vision can bring in more players, including some excluded from participating in the current energy markets. There are significant risks in failing to develop a vision of the future which allows for markets accessible to all, that some future technologies may be kept out of the marketplace.

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

All three aspects will need review. In terms of accessibility, service providers should be able to trade directly with network operators in the market of their choosing. Service providers should have the freedom to participate in local, regional, national, or private marketplaces. The marketplaces’ technical requirements should be easily accessible to prospective service providers and be truly technology agnostic. In this vein, markets should have low fees and transaction costs, including fair calculation of technical losses and other costs, and should incentivise consumers to participate in the markets. Failing to achieve a market design that is technology agnostic risks locking new, potentially superior technologies out of the market, thereby increasing costs and damaging energy security.

In terms of co-ordination, all markets should allow aggregation and co-ordination of both generation and demand by private entities. This will allow the system to best harness the benefits of all assets connected to the network and make markets more accessible to smaller consumers with aggregators able to take on the role of market participant on their behalf.

Cooperation and coordination amongst CERs may be supported by using public, semi-private, and private views of the data. The public space would allow data providers to present and describe their data, together with conditions under which the data can be used. Data users could then search the catalogue for data they need for their market services. The private space would protect the local information of an individual CER, such as the smart meter data, state of charge, transfer limit, etc. The semi-private spaces are customised permission models in between the two. This interaction needs to be supported in terms of security and privacy, because as the user moves in the public space, she may generate flows of information that may compromise her own privacy.

There should also be clarity on DSOs’ roles in delivering local flexibility markets, and the FSO’s role as overall system operator and administrator of national markets. There should be a move to co-optimize across these markets, with guidance on stacking, pricing, taxation, etc. There must be clarity and transparency on the processes of bid acceptance and activation, in order to demonstrate a level playing field for each technology across markets.

Finally, there should be a recognition that trust is gained and maintained and cannot be achieved solely by the system design. This may mean that the stakeholders are open to new forms of engagements and validations. Transparency around liquidity, fairness, obligations of private parties especially private marketplaces, open access to data available in the public space etc. help in establishing and maintaining trust. There may be technology solutions such as distributed ledger that will enable a broad-based consensus mechanism. Management of sensitive information flows in a secure and private manner should be controlled at the edges of the network, where the source of the sensitive data is.

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

As mentioned above, a common vision for distributed flexibility is an important step in widening participation in the markets, and certainty of end vision allows system operators and market players to orientate their businesses in such a way as to work together efficiently. However, certainty of end vision will only bring this work together on an accelerated timeline to a certain extent.

Ofgem needs to show bias to action, conviction of mind to implement long term projects with a clear roadmap and funds to achieve the vision, direct multiple programs with the common vision, and drive the industry to the national goal without being swayed by the current status quo. The energy system is at an inflection point, and the regulator, Government, and the system operator must take decisive action. Programmes such as the Review of Electricity Market Arrangements demonstrate recognition of the issues and a willingness to address these, however there is a danger, as we have recently seen in other countries efforts to reform electricity markets, that policy makers and regulators remain invested in the status quo and make only incremental changes.

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

The thin system, as a bare minimum intervention, should be implemented immediately. It should put together the current registry of DERs and provide a broad view of CERs penetration by post code using other public datasets.

As a directory for market participants, it should list flexibility programs in place and flexibility tariffs by suppliers that already in place. In order to make markets accessible to new entrants and those who may want to participate in multiple markets, there should be information available that summarises the as-is and will-be picture of flexibility markets.

The thin archetype should complete implementation within the RIIO-ED2. We see this as absolute minimum baseline. The current business as usual will not be suitable for the future of distributed energy resources, consumer energy resources, and widespread electrification to achieve net zero.

Ofgem should therefore start planning the medium archetype immediately and, halfway through the RIIO-ED2 period, should start implementing and rolling out the capabilities to increase transparency and data sharing with market participants. This will build confidence in the system and in the commercial proposition for new entrants.

There should be a separate consultation on the thick archetype and what the stakeholders need from such a system. This should tie in with RIIO-ED3 and the energy markets reforms (REMA). This should also absorb the existing distribution flexibility (PICLO) system and build a common front-end for all future energy flexibility markets. The thick archetype should be in place by start of RIIO-ED3.

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

Ofgem should ultimately implement the thick archetype. The question should not be which one to implement. Rather, it should be why a particular design is superior and what capabilities are most important. The thin archetype should be implemented immediately, and the medium archetype is needed to start improving involvement of all participants, but the

goal should be to implement the thick archetype. Ofgem has said in the introduction that there does not seem to be a natural evolution of the industry to a common flexibility system, and we are currently on the path of divergence.

Ofgem must therefore ensure that the path of convergence is started immediately and will continue long term. This will only be guaranteed if Ofgem can consistently advocate for a strong vision, a practical, implementable architecture of that vision, and a roadmap to achieve the same.

It is very important for market participants, and to achieve the stated aims of accessibility, co-ordination, and trust, for maximum transparency and data sharing to be a feature of the infrastructure. The markets will function best with high-quality data inputs – going beyond clearing prices to also include bid information and data at a more granular level than asset aggregation.

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

In our assessment of the archetypes, we see a rolling development that could begin with the thin archetype to be implemented as soon as possible, building out to the medium and thick archetypes by the end of RIIO ED2 and into RIIO ED3 respectively. In our assessment, a thin archetype-style directory is absolutely required, and GB is already behind in timescale.

The enhanced data and information offered by the medium archetype is the required minimum to achieve moderately better utilisation of the flexibility and capability available in CER and DERs. But it is not sufficient to achieve net zero. Without attempts to solve “whole system” optimisation and widespread participation of large pools of small assets, net zero is not feasible.

The thick archetype should be the goal of Ofgem and every market participant. Whilst questions are raised over its feasibility, it is certainly possible to build such a digital infrastructure if the will is there. Without it, as we have stated, it is unlikely net zero can be achieved, and therefore Ofgem and government should commit to building this infrastructure, though the process will be more involved than other archetypes.

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

In our proposition, we see a role for existing infrastructure in the development of the early ‘thin’ archetype stop gap. As previously mentioned, such a platform could bring together publicly available datasets and accessible information on flexibility markets. Such a directory should only require a build out of existing infrastructure, and therefore can be in place reasonably quickly. For the medium and thick archetypes, the infrastructure should be new build. Given the archetypes represent a, necessary, departure from the status quo, they should not be retrofitted on to existing infrastructure, as this will only ensure they are not fulfilling their full purpose. As with the creation of Elexon to manage the Balancing and Settlement Code with the introduction of the New Electricity Trading Arrangement, significant shifts in system functioning requires new entities to manage new processes.

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

Government and Ofgem should be fully cognisant of the scale of the undertaking, especially when considering the medium and thick archetypes. It is unlikely the public sector holds the expertise in large scale systems architecture that would be required to deliver a world-class

system. In creating the new digital infrastructure for energy markets, this should be tendered out to a private company with experience building large-scale systems architecture. It is important that the UK seek to implement international best-in-class technology as it develops its digital energy infrastructure.

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

DSOs, TSOs, and the new ESO entity should be jointly incentivised to make investments that benefit the entire energy supply chain. There are some components of this in the RIIO-2 framework, such as the sharing TOTEX efficiencies between operators and consumers. However, the current regulatory finance systems are generally applied to each segment of the supply chain. A better understanding of spill over effects and how to encourage positive externalities should be a feature of future regulatory models. For example, imagine a situation where CAPEX must be installed by a DSO that has significant upstream benefits for the ESO. Although such an investment may improve the system as a whole, the DSO may not have incentives to invest if the direct efficiency gains to itself does not cover the increased CAPEX. Exploring these questions through an economics IO lens is critical to rolling out system-wide financial packages. Other finance topics, such as whether the historical beta is appropriate to capture the asset risk of a digital infrastructure, must also be carefully considered.