

Energy UK response to the Ofgem and BEIS Call for Evidence on a Smart, Flexible Energy System

12 January 2017

About Energy UK

Energy UK is the trade association for the GB energy industry with a membership of over 90 suppliers, generators, and stakeholders with a business interest in the production and supply of electricity and gas for domestic and business consumers. Our membership encompasses the truly diverse nature of the UK's energy industry from established FTSE 100 companies' right through to new, growing suppliers and generators, which now make up over half of our membership.

Our members turn renewable energy sources as well as nuclear, gas and coal into electricity for over 26 million homes and every business in Britain. Over 619,000 people in every corner of the country rely on the sector for their jobs with many of our members providing lifelong employment as well as quality apprenticeships and training for those starting their careers. The energy industry adds £83bn to the British economy, equivalent to 5% of GDP, and pays over £6bn in tax annually to HMT.

Executive Summary

Energy UK welcomes the opportunity to respond to the Call for Evidence on a Smart, Flexible Energy System. Attached we include our response to relevant key questions and also observations/suggestions regarding other areas for consideration including for example the development of an engagement plan to explain the outcome of this process, its aims and associated impacts for the consumer. Early engagement with the wider energy sector which will ultimately face many of the costs associated with this transition is highly recommended.

Key points in response to this call for evidence are noted below:

- **Whole System Approach¹** – We support the overall thrust of the Call for Evidence on a Smart, Flexible Energy System and consider that providing a long term vision for the electricity sector is important to allow market participants to invest in the technologies and infrastructure required to effectively and efficiently operate a smart and flexible electricity system. We do however consider that equal importance needs to be given to the future of the transportation, heat and the gas networks to ensure that the energy system as a whole can be developed to effectively transition to a smart, flexible, low carbon system at least cost to the consumer.
- **Direction of travel** – Clarity regarding the future structure of the energy industry is also required to support investment and deliver the right mix of technologies and infrastructure. The transition to Distribution System Operators, greater independence of the System Operator, exit from the European Union and the future design of our UK energy market all need to be understood to enable industry, government and Ofgem to manage the most economic transition to this new system.
- **Programme Delivery** – The scope of the Call for Evidence is significant with numerous policy and regulatory frameworks highlighted which extends across government, regulators, code administrators, network operators and industry participants. To ensure the proposals are implemented within the appropriate time frames it is important that the implementation process

¹ <https://www.energy-uk.org.uk/publication.html?task=file.download&id=5722>

is considered with a forward work programme being developed and an appropriate delivery vehicle established to achieve these goals. We expect industry to be fully consulted and engaged throughout this process. The costs associated with such a programme also need to be communicated to the general public by industry and Government coherently.

- **Governance** - The implementation of European Network Codes offers a genuine opportunity to rationalise the existing GB Code structure and make it more accessible to users. Users should be able to easily identify the obligations associated with their rating, connection voltage and technology without reference to multiple sources. This should coincide with work to enhance Ofgem's website to include key information on the various network codes and the work being undertaken by the Joint European Stakeholder Group (JESG) in respect of EU network code implementation.

Energy UK welcomes the opportunity to further discuss the points raised within this response. Should you require further information or clarity on the issues outlined in this paper then please contact:

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Response to call for evidence questions

Section: Removing policy and regulatory barriers

Enabling Storage

Question 1. Have we identified and correctly assessed the main policy and regulatory barriers to the development of storage? Are there any additional barriers faced by industry?

We consider that the main policy and regulatory barriers to the development of storage have been identified, however, there is also the issue around the reduced investor certainty. The ongoing lack of clarity regarding charging and potential for changes to the embedded benefits regime is affecting the broader market which includes storage developers. Currently, market arrangements do not reflect the full value to the system of services that facilitate and support the deferral or removal of network investment cost, reduced system cost of decarbonisation, reduced power prices for customers, improved energy security and improved energy system resilience. This creates additional barriers to the further development of storage.

We agree that the way in which storage and flexibility is charged for using the electricity network, the absence of a definition of storage and how final consumption levies are charged are all important issues that require urgent resolution. Clearly, a definition of storage is required in legislation however other changes could be proposed through the normal industry change regime. A level playing field between different assets providing flexibility is required across all markets to allow the most efficient deployment of technologies.

There should be a review of the derating factors for the Storage Generating Technology Class. Currently these factors are based upon asset availability which does not recognise the common feature of storage which is that it can only provide its MW capacity for a finite duration. There is a case to review the derating factors for storage to recognise the MWh/MW ratios as well as asset availability to enable appropriately scaled capacity obligations to be assigned.

2. Have we identified and correctly assessed the issues regarding network connections for storage? Have we identified the correct areas where more progress is required?

We are supportive of the work done by the Distributed Generation (DG) Distribution Network Operator (DNO) Steering Group and the Quicker and More Efficient Connections (QMEC) work stream. We are supportive of the resulting publication released by the Energy Networks Association on Milestones which is designed to make more efficient use of existing capacity on the electricity network by setting principles on which DNOs could withdraw a connection offer from a customer if developments are not progressing. In addition, Energy UK is supportive of the continuing work being done on material change to connection applications as a part of the queue management work which will promote representative and accurate applications for connection. The new Electricity Network Association (ENA) queue management guidelines, which should lead to more efficient and predictable treatment of connection applications across DNOs and minimise 'bed blocking', can also be applied to storage. We ask that Ofgem monitor whether the DNOs apply these voluntary measures and if improvements are not seen then it may be that regulatory measures become appropriate.

Although a great deal of work has been done to improve the overall connection process at distribution level there are issues that must be addressed specifically for storage. Standardisation of how storage is treated by DNOs across GB is important. This includes the definition of storage through to engineering safety standards used to deliver system security. We would highlight an issue with connections at the moment where developers are considering a solar PV and Battery solution. Currently DNOs have to agree to a connection before the assets can be installed where the combined capacity exceeds 3.6kW. This has the potential to delay connections and adversely impact the customer journey. We would urge the industry to find a workable solution based on a "fit and inform" approach so that it mirrors the approach taken for small scale PV installations.

We support introducing appropriate Upfront Assessment and Design (A&D) fees for all connections in order to deter speculative and multiple applications which can lead to delays in assessing connections and reduces the ability of the DNO to provide support to genuine projects.

Transparent network information provision is imperative to ensure that storage is developed at appropriate locations that will better facilitate utilisation of the existing network capacity. Access to network information is pivotal for unlocking investment in all forms of flexibility. This is not solely an issue for storage but for all projects that wish to connect at a distribution network level.

3. Have we identified and correctly assessed the issues regarding storage and network charging? Do you agree that flexible connection agreements could help to address issues regarding storage and network charging?

It is essential that any changes to the charging regime should be mindful of the need to develop flexibility, including electricity storage, as an essential part of the transition to a least-cost, sustainable and secure electricity system. To this end, a level playing field must be created for all technologies. Network charging arrangements should be clear regarding which tariff elements simply collect revenue (effectively a form of taxation to collect revenue from final consumption), compared with other tariff elements which provide cost reflective economic price signals with the two treated differently. With respect to the charging elements which collect revenue, storage assets are not final consumption, so storage should not pay the element of network charges which relate to collecting revenue from final consumption. However by contrast, with respect to elements of charges which provide cost reflective economic price signals, storage should be treated the same as any other network user.

The implementation of European Network Codes offers a genuine opportunity to rationalise the existing GB Code structure and make it more accessible to users. Users should be able to easily identify the obligations associated with their rating, connection voltage and technology without reference to multiple sources. This should coincide with work to enhance Ofgem's website to include key information on the various network codes. In addition to the names of the various codes and links to the relevant administrators' websites, it would be useful if Ofgem could provide an easy to follow introductory guide providing an overview of codes including, for example, which codes parties are obliged to sign up to, the code modification process, appeals process, collateral and compliance requirements, and the relevant objective(s). This would be particularly useful for new entrants.

The creation of Distribution System Operators (DSOs) could also increase the amount of regulation in the electricity sector and additional layers of complexity which must be considered before a DSO model is agreed.

Energy UK's full position regarding electricity charging arrangements can be found here: <http://www.energy-uk.org.uk/publication.html?task=file.download&id=5903>

4. Do you agree with our assessment that network operators could use storage to support their networks? Are there sufficient existing safeguards to enable the development of a competitive market for storage? Are there any circumstances in which network companies should own storage?

We consider that new technologies, such as storage, can and should be used as a way of avoiding costly network reinforcement. When determined through a cost benefit analysis that other technologies, such as storage, can provide a cheaper option to address network issues there should be a tendering process to allow the market to deliver. Tenders should be run in an open, consistent, fair and transparent manner which will maximise competition and the benefits to end consumers. If there are no responses to a network operators tender, we would question whether a solution with storage tenable or whether the tender is properly designed.

Notwithstanding the above, if it is considered allowable for Network Operators (NOs) to own storage, it should be shown by the NO that the storage investment will provide an overall benefit to consumers, and that the storage facility is being used by the NO for network purposes only. NOs should not be able to use these assets to compete for external revenue streams as this would mean customers funding revenue streams for the benefit of the NO. Where network owned storage is used to defer network asset investment, we would expect contractual, competition and operational safeguards that

prevent that intent from being undermined. This should also be consistent with the unbundling rules. Furthermore we consider that the regulatory framework needs to be strengthened further so that network companies seek out the most cost effective solutions to address local balancing and constraint issues.

5. Do you agree with our assessment of the regulatory approaches available to provide greater clarity for storage?

We agree that the assessment of regulatory approaches is useful in giving clarity to storage regarding its role in the energy system.

6. Do you agree with any of the proposed definitions of storage? If applicable, how would you amend any of these definitions?

If there is a need to define storage, the most appropriate definition will depend on the purpose, eg whether the definition is for the purpose of planning rules, licensing or network charging. Without a specific purpose in mind, it is difficult to comment on the proposed definitions, but we would note that in general it is better to start with a broad definition of storage, which can then be further qualified in particular contexts. A broader (non-prescriptive definition) will be more future proof and avoids the risk that it may inadvertently restrict certain technologies and solutions (including innovation) or create a non-level playing field.

On that basis we would support the Electricity Storage Network (ESN) definition of storage as it is sufficiently broad to meet the needs of say the planning process. Any more prescriptive requirements, eg relating to minimum efficiency, could then be introduced in the context of relevant regulations or market rules. The Capacity Market (CM) rules provide an example of this approach. Despite there being a definition of storage within the CM rules, it is becoming clear that some rules will need to be specific to particular storage technologies.

Aggregators

7. What are the impacts of the perceived barriers for aggregators and other market participants?

The inability to access the Balancing Market is a key concern for Aggregators, as it means that its resources receive no energy payments, unlike the supply-side resources against which they compete. This unbalanced treatment distorts outcomes in the CM and in the provision of balancing services. It may be appropriate to review current and potential code signatories of the Balancing and Settlement Code (BSC) to remove existing barriers to entry.

Many market participants have proposed that National Grid should reduce the number of ancillary service products and services to enable simplification as well as introducing openness and transparency around what is procured, where and at what price to allow competitive forces to reduce the overall cost to consumers via the market while also reducing the uncertainty about the future value of each product. Energy UK supports a full review of Ancillary Service procurement with a view to developing a competitive Ancillary Service market.

Cross-party impacts are a concern for the Balancing Mechanism (BM), as there must be a balance between encouraging Aggregators whilst ensuring that the supplier is not affected by the actions of a third party in terms of, for example, the Supplier's balance position. The European Clean Energy Package proposals include a restriction on requiring Aggregators to pay compensation to Suppliers. This model would cause issues for suppliers adversely affected without compensation as action taken as a result of instructions from aggregators can directly change a Supplier's outturn position in the balancing mechanism. A level playing field is required which enables new market entrants to offer up innovative products without financially penalising Suppliers who have incurred costs as a result of the actions taken by third parties.

For small customers market barriers include the inability to get real time data on usage and available of technologies such as DSR and generation is compromised due to a lack of smart meters and monitoring devices.

Barriers around consumer protection have also been addressed to some extent in the European Clean Energy Package draft proposals, with assurances being prepared for customers that wish to enter or exit a contract.

Once these mechanisms are reformed to allow effective price signals and revenue stacking to take place across markets, price signals should align to provide the right signals for flexibility. Transparency of these mechanisms is also important to allow new projects to raise finance. The priority should be to develop a more efficient procurement model that is transparent, market-wide and technology neutral with products and associated revenues/contracts which are bankable to allow technologies to access the market. This also requires other price signals to be cost reflective to ensure the value of each market is cost reflective and does not deter participation in other programs.

8. What are your views on these different approaches to dealing with the barriers set out above?

Whilst it would be positive for the UK to have a large quantity of Demand Side Response (DSR) flexibility on the system now, simultaneous load switching is not likely to be a significant issue in the immediate future and will likely only become a problem in the future as Electric Vehicles (EVs) become more common. Smart capabilities and network reinforcement are important to the development of that market, meaning that some action is likely to be necessary before EVs become common. We would welcome clarification on the timelines to implement the options in Table 5 and whether there is a trigger point based on the size of the market.

The EU Balancing Codes directly oppose the idea of the National Regulator doing nothing other than monitor the market. The regulator is required to enable market access for demand-side resources. So the “monitor” approach is not a valid solution. Although the exact solution will not be found quickly, basic protections and guidelines for Aggregators, Suppliers, and Consumers need to be put in place soon, so as to be ready for Project Trans-European Replacement Reserve Exchange (TERRE).

As DSR volumes increase it is also important to note the need for a controlled move to a DSR-enabled system to prevent problems with the ability of Low-voltage networks to cope. The system will also need new technological capabilities in order to keep up with the transfer of data that will need to take place for the system to effectively use this flexibility. This would likely take the form of a centralised system allowing the System Operator (SO) to view and control available sources of DSR as capacity grows. These changes should be supported and encouraged by Government and Ofgem. It will also need DSOs to model electricity flows to avoid conflict between national and local needs as well as constraints.

9. What are your views on the pros and cons of the options outlined in Table 5?

We anticipate that members will respond in greater detail on the pros and cons of the options outlined in Table 5.

Energy UK, however, considers that it is imperative that the chosen option ensures a level-playing field for all market participants, manages associated risks to the security/stability of the system and provides for comparable levels of consumer protection to those required of energy suppliers by the gas and electricity supply licences.

10. Do you agree with our assessment of the risks to system stability if aggregators’ systems are not robust and secure? Do you have views on the tools outlined to mitigate this risk?

We have no evidence to suggest that mass simultaneous demand response would cause system issues, however, Aggregators’ systems do need to be robust and secure to ensure that mass turn off/on events can be managed by the energy market as well as the SO and DSOs in the future. The relevant thresholds should be driven by impact on network operators and overall system operation.

Customers could lose real value if data is lost or instructions are not received. This is just as appropriate for large customers as small.

The system is already protected against largest single loss of generation on the transmission network, therefore, the reduction in potential DSR would need to be exceed this volume to impact system stability. There has also been significant work done to mitigate against significant losses for example through the work done to modify Rate of Change of Frequency (RoCoF) settings for distributed generation. There is already a significant volume of demand which participates in Triad avoidance, therefore, reviewing the impact this currently has on the system will give some indication of system stability risk. National Grid is well placed to monitor this through its annual review of system operability.

Local impacts of load switching may have impacts on how Distribution Network Operators (DNOs) manage the networks and should also be considered, while taking care not to allow DNOs/DSOs to inhibit flexibility arbitrarily. In the future when SME and domestic customers are providing DSR services it will be essential to ensure that the communications equipment utilised is compliant with EU and GB specific cyber security requirements. The move to DSOs, in principle, should facilitate the use of smarter DUoS tariffs which will support flexibility. Further work is also need to ensure that signals given by the DSO and SO are not conflicting leading to an erratic market signals. There will need to be effective and transparent communication protocols between DSO's and the SO to enable this.

A clear definition of what is covered by NG contracts and DNO/DSO contracts is required to make sure overlaps do not cause duplication within contracts or system issues as aggregators respond to a NG requirement, and un doing so destabilise the local network.

Providing price signals for flexibility

System Value Pricing

11. What types of enablers do you think could make accessing flexibility, and seeing a benefit from offering it, easier in future?

To ensure that the full value of flexibility is realised there must be reforms to electricity charging arrangements and the ancillary services market. Once these mechanisms are reformed to allow effective price signals and revenue stacking to take place across markets, price signals should align to provide the right signals for flexibility. Transparency of these mechanisms is also important to allow new projects to raise finance. The priority should be to develop a more efficient procurement model that is transparent, market-wide and technology neutral with products and associated revenues/contracts which are bankable to allow technologies to access the market. While at the TSO level there are some products already available these require revision to widen the pool of providers. In terms of the ancillary services coordinated by the SO we feel a reform to open access to all possible market participants is due. One of the biggest barriers is the procurement timetable. Procurement should be phased with some services procured ahead of time and others as close to real time as possible in order to maximise competition and opportunities for participants to help balance the system.

The move to DSOs, in principle, should facilitate the use of smarter DUoS tariffs which will support flexibility. Further work to ensure that signals given by the DSO and SO are not conflicting is required as this could lead to which could lead to inconsistent market signals. Effective and transparent communication protocols between DSO's and the SO should enable this. Arguably much greater coordination between the TO/SO is required so that actions taken by one party does not exacerbate a system issue for the other party. Furthermore, the rules and regulation governing DSOs needs to be considered to ensure that they facilitate a smart, flexible electricity system. Changes will be required to ensure that there is data transparency between DSO's and energy retailers and where possible existing or planned for data systems should be utilised rather than brand new systems being developed.

Government will need to provide reassurance to investors and banks that these market opportunities will be enduring in order to create long term confidence. By clearly setting out the future System requirements and regulating to ensure the services are procured on a rational, transparent basis.

Smart meters which are interoperable and facilitate half hourly settlement and interaction with smart appliances will also facilitate a much smarter system with aggregators and suppliers able to innovate in this area to give consumers choice with regard to dynamic tariffs. Protections must be in place for vulnerable customers who may not be able to respond to flexibility signals.

12. If you are a potential or existing provider of flexibility could you provide evidence on the extent to which you are currently able to access and combine different revenue streams? Where do you see the most attractive opportunities for combining revenues and what do you see as the main barriers preventing you from doing so?

Energy UK does not provide flexibility services. Our members consider that optimisation of all markets is important to allow different technologies to access multiple revenue streams. Timings of auctions and the ability to stack products across markets is also important to make sure these services can be procured at the least cost. As noted above, the major mechanisms we consider needing reform is the charging regime and ancillary services markets.

13. If you are a potential or existing provider of flexibility are there benefits of your technology which are not currently remunerated or are undervalued? What is preventing you from capturing the full value of these benefits?

Energy UK does not provide flexibility services. Our members note that inertia is not currently explicitly remunerated despite being an increasingly valuable commodity. The Obligatory Reactive Power Service² is remunerated based on an outdated administrative method which is unlikely to correctly value the commodity provided. It would be preferable to move entirely away from the combination mandatory provision of some services, tenders for others, and bilateral deals for yet more, towards a smaller number of simpler, open markets in the services that are needed to manage the system.

Network operators should also better manage the longer term availability of generators (e.g. outage management). There is a lack of regulation to limit the duration of outages and indeed there appears to be insufficient financial incentive to deliver the works that resolve the outage quickly.

14. Can you provide evidence to support changes to market and regulatory arrangements that would allow the efficient use of flexibility and what might be the Government's, Ofgem's, and System Operator's role in making these changes?

Reforming the market to ensure a level playing field for all technologies should be the priority. Once implemented it should be left to the market to decide which technologies can be deployed most efficiently.

Incentivising the capabilities of ancillary providers and maintaining a technology neutral approach amongst providers is important. The end goal should be to ensure that National Grid has a suite of flexibility products that allows all market participants to compete on an equal basis. This includes improving the information provided to industry and looking at how National Grid can simplify its products following input from providers where appropriate. Actions taken by the SO will also impact the distribution network and it is important that the distribution and transmission network work in harmony to ensure the best solutions are developed for both networks at least cost to the consumer.

Smart Tariffs

15. To what extent do you believe Government and Ofgem should play a role in promoting smart tariffs or enabling new business models in this area? Please provide a rationale for your answer, and, if you feel Government and Ofgem should play a role, examples of the sort of interventions which might be helpful.

² <http://www2.nationalgrid.com/uk/services/balancing-services/reactive-power-services/obligatory-reactive-power/>

Smart tariffs will be a major enabler for consumer engagement in the energy market and evidence from initiatives such as the Customer Led Network Revolution and Low Carbon London demonstrates that customers respond positively to them.

Energy UK does not, however, support Government or Ofgem interventions in the operation of the retail energy market. It is the role of Government and Ofgem to ensure there is a level playing field for market participants to compete and to ensure that there are not unnecessary regulatory or technical barriers which may limit suppliers' ability to offer smart tariffs. Once the necessary building blocks are in place (i.e. smart metering and Half-Hourly Settlement), natural market growth should deliver effective business models, innovation and smart tariffs in response to customer demand.

16. If deemed appropriate, when would it be most sensible for Government/Ofgem to take any further action to drive the market (i.e. what are the relevant trigger points for determining whether to take action)? Please provide a rationale for your answer.

Energy UK considers that competition in the retail market will deliver smart tariffs, and that policy and regulatory intervention should be limited. It is the role of BEIS and Ofgem to ensure that there is a level playing field for market participants to compete and to ensure that there are not unnecessary regulatory barriers which may limit suppliers' ability to offer smart tariffs.

We do, however, consider that importance needs to be given to the future of the transportation, heat and the gas networks to ensure that the energy system as a whole can be developed to effectively transition to a smart, flexible, low carbon system at least cost to the consumer.

17. What relevant evidence is there from other countries that we should take into account when considering how to encourage the development of smart tariffs?

Our members have highlighted the following case studies which may be of interest:

- **The Republic of Ireland** - Ireland is a country which has been exploring different ways of managing the system, including through the use of Time of Use tariffs, in part because of the considerable wind penetration already on the system.
- **Victoria, Australia** - The smart meter rollout in Victoria, Australia was nearly stopped due to the mandated introduction of Time of Use tariffs with smart meters. Some vulnerable customer groups were unable to shift their demand at peak times and so were faced with higher energy bills. A similar issue occurred in 2010 in Texas.

18. Do you recognise the reasons we have identified for why suppliers may not offer or why larger nondomestic consumers may not take up, smart tariffs? If so, please provide details, especially if you have experienced them. Have we missed any?

Smart tariffs may be available to customers, but demand will in many ways be influenced by the ability to respond to the price signals of such tariffs. Where it is feasible to shift load or find alternative ways of securing energy needs, customers may be prepared to embrace the opportunities which smart tariffs provide. However where this is not the case, customers may be more likely to rely on simple tariff structures. There is a need for the cost of smart white good (e.g. dishwashers, washing machines etc) to reduce significantly to enable mass market take up. Once smart appliances are available to the mass market the application of smart tariffs and services will become easier.

Smart Distribution Tariffs – Incremental Change

19. Are distribution charges currently acting as a barrier to the development of a more flexible system? Please provide details, including experiences/case studies where relevant.

The structure of the distribution tariffs has also been highlighted as being unclear and complex. The tariffs themselves include capacity and energy based charges and may involve additional charges such as for excess reactive capability. There is a large number of customer categories ranging from small domestic to larger demand customers connected at extra high voltage. It is therefore difficult to determine the cost reflectivity of the tariffs, how the allowed revenue is collected from embedded generation/demand and how a move to a DSO will impact the current methodology. In addition, there

are issues with DNOs having different interpretations on some aspects of the charging methodology. With no definition or agreed proposals regarding the treatment of storage this all makes it difficult to compare the tariffs across multiple DNO networks. Ofgem's plan to review charging in early 2017 is welcome, however, this must be a holistic review of charging ensuring that the review visits all areas of charging which has been identified as needing to be reviewed.

20. What are the incremental changes that could be made to distribution charges to overcome any barriers you have identified, and to better enable flexibility?

We support a holistic approach to charging being taken forward by Ofgem to ensure that charging is fit for purpose for all technologies and sizes. Ofgem should therefore ensure that its proposed targeted review of charging includes all aspects of electricity network charging, to ensure charging arrangements evolve to reflect the changing use of electricity networks. We consider that charging arrangements should facilitate a level playing field between industry parties connected to different networks. These arrangements should be predictable and transparent whilst reflecting the costs and benefits each user provides.

The EHV Distribution Charging Methodology (EDCM) was reviewed in 2015 and the Common Distribution Charging Methodology (CDCM) is currently under review by the CDCM review group. We consider that Ofgem should clearly set out its views with regards to the EDCM and CDCM reviews to ensure changes are taken forward through the Distribution Connection and Use of System Agreement (DCUSA) efficiently.

21. How problematic and urgent are any disparities between the treatment of different types of distribution connected users? An example could be that in the Common Distribution Charging Methodology generators are paid 'charges' which would suggest they add no network cost and only net demand.

See response above.

Smart Distribution Tariffs – Fundamental change

22. Do you anticipate that underlying network cost drivers are likely to substantively change as the use of the distribution network changes? If so, in what way and how should DUoS charges change as a result?

We consider that the underlying network cost drivers on the distribution networks will remain largely unchanged. Smarter networks and the move towards DSOs means that the network we have in place can be used more efficiently which is where new dynamic Distribution Use of System (DUoS) charges can make an impact in terms of the signals given to generation, supply, DSR and storage. Greater interaction between the distribution and transmission charges will also be important to ensure the most efficient results are achieved.

23. Network charges can send both short term signals to support efficient operation and flexibility needs in close to real time as well as longer term signals relating to new investments, and connections to, the distribution network. Can DUoS charges send both short term and long term signals at the same time effectively? Should they do so? And if so, how?

There is a need to simplify regulation and where possible make investment signals clear and reliable against a change process based on a long term vision of the electricity sector. This will provide the framework for change and a background against which investors can expect to see charges evolve. It's important that methodologies cover both distribution and transmission charging arrangements as these networks continue to be interlinked. Providing appropriate cost reflective charges across these networks is important to provide the right signals for the market. The best way to achieve this is to have a DSO/TSO managed through a set of principles set out in codes and agreed by users. The interfaces between the SO and DSO together with responsibilities are the first step to prevent confusion, duplication and unnecessary cost.

As demand customers and other technologies become active in the market through smart technologies they will be able to react to short term signals efficiently and provide value for money

across the system. Longer term locational and system investment signals are important, but it is difficult to respond if there is not a consistent distribution/transmission boundary; as a consistent predictable methodology will be more difficult to create. The significance of creating two totally different systems for transmission and distribution is proving difficult.

24. In the context of the DSO transition and the models set out in Chapter 5 we would be interested to understand your views of the interaction between potential distribution charges and this thinking.

We envisage DSO licence areas to emerge through competitive competition to assign the DSO function to a suitable party. DSOs would be able to procure services to aid the operation of their network areas. The impacts of individual network local balancing activity must not conflict with the operation of the transmission network.

DNO/DSOs contracting with distribution connected consumers and generators for services that enable efficient use of network resources should be considered. The cost for these could be recovered in DUoS as a 'normal' network cost, enabling continued stability and predictability of charges during the transition to something more complex at an appropriate future point.

Other Government Policies

25. Can you provide evidence to show how existing Government policies can help or hinder the transition to a smart energy future?

The existing process for entering the ancillary services market has a number of key issues preventing the entry of intermittent, renewable generation. The tendering process and the need for a long-term guarantee on availability of generation inhibits intermittent technologies from participating effectively. This makes it difficult to factor the longer term needs of the system into the design of the next generation of assets. Tendering ancillary services over different timescales (long term, medium term and spot) could help. Specifically, tendering on a spot basis could make it easier for intermittent technologies to compete for ancillary services. Enabling all technologies to participate in a smart, flexible energy system by providing these services will promote the transition to a smart electricity system at least cost to consumers.

Unintended consequences from Government policy in areas which impact on the electricity and energy market are a potential threat. Coordinating energy policy across transport, heat at all levels of the market will be important. Clarity regarding the long term future structure of the energy industry is also needed to support investment and the deliver the right technologies and infrastructure.

26. What changes to CM application/verification processes could reduce barriers to flexibility in the near term, and what longer term evolutions within/alongside the CM might be needed to enable newer forms of flexibility (such as storage and DSR) to contribute in light of future smart system developments?

We welcome the opportunity to respond to not only this call for evidence but also BEIS's consultation on Proposals to Simplify and Improve Accessibility in Future Capacity Auctions. The Department's recent efforts to remove market distortions and create a more open and transparent Capacity Market are encouraging as refining the structure, transparency and regulation of the Capacity Market will help secure its longevity and continued investability. Ensuring this complements the provision of ancillary serves (where appropriate) will also be important to extracting maximum value from different markets. As the 2016 T-4 Capacity Market auction has proven, the storage and DSR industries are already capable of successfully competing within the existing auction regime. The growth of the DSR industry and the continued reduction in costs for batteries will, we believe, enable both to make significant and valuable contributions to the future smart system although BEIS must ensure that the rules and framework remains appropriate to correctly value these technologies contribution to security of supply. Ensuring that the CM is technology agnostic is a key principle which must be retained, and that where there are potential barriers and solutions need to be brought forward.

A functioning, fair and transparent secondary trading regime would be beneficial for the CM. We appreciate the challenges associated with secondary trading such as the potential for sudden influx when margins are low, however the benefits of a functioning regime outweigh the risks. The ability to do so minimises the costs to the generator and, in turn, the cost to the consumer as the alternative to such a trade would be the use of the balancing market post gate closure, which has significant costs associated with it.

27. Do you have any evidence to support measures that would best incentivise renewable generation, but fully account for the costs and benefits of distributed generation on a smart system?

There is a clear benefit in utilising the full capability of the new, renewable generation which has been deployed across the UK at both transmission and distribution level. In supporting the system's ability to fully utilise this generation the costs of the system will be minimised. Network companies and the SO have a role to play in adapting their mechanisms to look towards alternative options beyond the conventional models currently operated. This extends to the methods used in connecting new renewable sites and reinforcing the conventional network as whilst there is an initial outlay in doing so, the cost of voltage control and controlling the system frequency can fall significantly if the capability of renewable generation in providing ancillary services is utilised.

The future treatment of distribution and transmission will be important to ensure that the synergies across the network boundaries facilitates a level playing field for all market participants. Considering the networks as a single system is important to ensure the most efficient outcomes are achieved. Increased engagement with all market participants across network codes will be important to ensure unintended consequences across network boundaries are avoided and the most efficient outcomes in network development are realised.

A system for the Consumer

Smart Appliances

28. Do you agree with the 4 principles for smart appliances set out above (interoperability, data privacy, grid security, energy consumption)?

We agree that the 4 principles set out for smart appliances in the document create a good foundation in this area, and consider data privacy and grid security to be priority principles. Further work in these areas will need to be considered as this market develops i.e. appliance abstraction (what can be controlled and how it is controlled) and how control of appliances can be shared. We have the following comments for each of the 4 principles:

Interoperability – we agree that some form of common standard would enable the ecosystem and benefits outlined within the document. The standards to be used should be optional and not forced to avoid stifling innovation at this early stage. We also believe that the standard should be selected from one of the global standards available. It would be inefficient to create bespoke standards for the UK.

Data privacy – we agree that consumer privacy should be respected and appropriate privacy safeguards should be in place for consumers, with consent sought for third party access to information. However, we suggest that the current regime may be overly burdensome, and may prevent consumers from benefiting, or realising how they can benefit, from allowing access to their data. A balance needs to be struck to ensure consumers are able to make informed choices.

Grid security – we agree that a high bar must be place for grid security, including careful co-ordination of appliances to avoid load issues. However, we believe that smart appliances, if used in the appropriate way, could help with grid security.

Energy consumption – we agree that additional energy consumption of the appliance arising from the ability to respond to signals should be negligible (unless the smart appliance is designed to respond to a turn-up service).

We also consider that customer-centric perspective ie an overriding principle that considers how the customer experience will be enhanced by smart appliances is important along with Health and Safety

also needing consideration with regarding to new smart devises (e.g. smart phone chargers and batteries and some tumble dryer models).

29. What evidence do you have in favour of or against any of the options set out to incentivise/ensure that these principles are followed?

It will be important to ensure that the policy framework within GB does not disincentivise the manufacturers of smart appliances. Where there are Europe wide initiatives that create standardisation, security and interoperability compatible with our smart metering systems should be explored.

We consider that data labelling for smart appliances is the most appropriate way forward to ensure continued development and innovation in this area, as regulation could stifle innovation in this fast moving area. Any labelling requirement should be technology or platform neutral, and should be coupled with a consumer communication plan on the benefits of smart appliances to ensure consumers are fully informed and make the most appropriate choices. For example, if customers are aware of the cost of using their washing machine they may change their behaviors in order to use it less frequently and load it more efficiently.

30. Do you have any evidence to support actions focused on any particular category of appliance?

Initially smart appliances should be quick to enable, low cost and with low impact to the consumer to ensure trust and encourage growth in this area.

The Energy Technology Institute's Smart Systems and Heat Programme provides evidence that smart control of heat pumps and electric vehicles is a prerequisite for efficient deployment of low carbon heating and transport, with smart appliances of second order. Consideration should also be given to making storage, micro-generation, heat pumps and EVs Type 1 devices with two way communications connected to the Smart Metering System to maximise their visibility to the energy system.

31. Are there any other barriers or risks to the uptake of smart appliances in addition to those already identified?

We consider that the following could create barriers or risks to the uptake of smart appliances:

- Consumers could be put off by complexity of smart systems and concern that their appliance will not be available should interconnectivity be lost
- Consumers may not have suitable reference points to be able to judge what is on offer
- Customer preference needs to be adequately considered by manufacturers of appliances

32. Are there any other options that we should be considering with regards to mitigating potential risks, in particular with relation to vulnerable consumers?

We have identified the following potential risks:

- Not having a smart appliance or not understanding how to device value from it and so being excluded from the value it creates as part of the smart, flexible energy system
- Increased cost of appliances, particularly should GB specific regulation be adopted
- Being locked into a technology or manufacturer
- Aggressive/mis-selling by unlicensed intermediaries.

Government and Local Authorities could have a key role in promoting smart appliances amongst vulnerable customers. Citizens Advice can provide a strong support network.

33. How might Government and industry best engage electric vehicle users to promote smart charging for system benefit?

Settlement reform will help to promote the use of smart tariffs for EVs, and therefore enable signals to be sent so that the battery charges during times when the impact on the network system is low. This can be complemented by the car manufacturers providing appropriate guarantees around the battery particularly when used to provide energy services so that customer concerns over the quality of the battery can be overcome. Similarly the customer needs to have the flexibility to set minimum state requirements for the battery so that it has the confidence that there will always be a minimum amount of electric miles capability that the battery can deliver.

Ultra-Low Emission Vehicles

34. What barriers are there for vehicle and electricity system participants (e.g. vehicle manufacturers, aggregators, energy suppliers, network and system operators) to develop consumer propositions.

If no changes are made to the current system to integrate distributed generation and DSR, an estimated 32% of low voltage supply cables in the UK would require intervention when EVs are adopted by between 40%-70% of customers. The cost of this reinforcement would be high, and it is important that the responsibility for these and other costs is allocated without causing a negative effect on the uptake of EVs³. This is why we believe that smart charging infrastructure is a key enabler to the deployment of EVs at scale, in particular ensuring there is appropriate smart charging both within the home and in office car parks where we expect a large proportion of charging to take place. It is important that any regulation on smart system integration be supportive but not overtly interventionist. Electric Vehicles represent a developing market with a lot of potential for growth, and should be allowed to develop without unnecessary barriers.

The role of DSR in relation to EV charging should be examined, including looking at the level of control over charging given to third parties. A high level of control over domestic chargers will act as a disincentive to the uptake of EVs. It will be important to ensure that the market and technical design enable the decarbonisation of transport to be delivered effectively.

Smart systems can remove barriers to developing consumer propositions for electric vehicle uptake. It is important that the appropriate framework is in place across aggregation, energy supply, networks and system operation to allow the full value of electric vehicles to be realised. If the right framework is established then the market should be allowed to develop with minimal intervention. Settlement reform will help to promote the use of smart tariffs for EVs, and therefore enable signals to be sent so that the battery charges during times when the impact on the network system is low. This can be complemented by the car manufacturers providing appropriate guarantees around the battery particularly when used to provide energy services so that customer concerns over the quality of the battery can be overcome. Similarly the customer needs to have the flexibility to set minimum state requirements for the battery so that it has the confidence that there will always be a minimum amount of electric miles capability that the battery can deliver.

It is also important that other technologies (such as hydrogen) are also considered when reviewing barriers to entry for Ultra Low Emission Vehicles. Ensuring that the right framework is in place will allow the market to decide which options to pursue.

35. What barriers (regulatory or otherwise) are there to the use of hydrogen water electrolysis as a renewable energy storage medium?

The cost and inability to inject hydrogen into the gas grid are currently barriers to the development of hydrogen but note that these issues are being explored through network innovation studies. Generators are currently paid to be constrained off the network, therefore, there is little incentive for them to invest in these technologies.

³ <http://myelectricavenue.info/sites/default/files/My%20Electric%20Avenue%20%28I2EV%29%20-%20Project%20Summary%20Report.pdf>

Consumer Engagement with DSR

36. Can you provide any evidence demonstrating how large non-domestic consumers currently find out about and provide DSR services?

The barriers noted regarding non-domestic DSR are all issues that are the responsibility of aggregators, third party intermediaries and suppliers to manage when engaging with potential clients. The role of BEIS and Ofgem should be to facilitate the development of a regulatory framework that facilitates DSR, including by encouraging a vigorously competitive DSR aggregation market. This should also build on National Grids power responsive programme encouraging non-domestics to understand their energy usage and potential to offer products and services

37. Do you recognise the barriers we have identified to large non-domestic customers providing DSR? Can you provide evidence of additional barriers that we have not identified?

We recognise the barriers noted in this call for evidence including cultural, regulatory, commercial and structural barriers.

38. Do you think that existing initiatives are the best way to engage large non-domestic consumers with DSR? If not, what else do you think we should be doing?

The existing initiatives are sufficient, however, a potential barrier is the lack of readily available information on how these different initiative interact. The document talks about the risk that domestic and smaller non-domestic customers will not offer flexibility to the system. A distinction needs to be made between “offering flexibility” through a demand side initiative and “responding to price signals.”

39. When does engaging/informing domestic and smaller non-domestic consumers about the transition to a smarter energy system become a top priority and why (i.e. in terms of trigger points)?

This role should fall naturally to the vendors of the technology as and when it becomes available. The primary enablers are Mandated Half-Hourly Settlements and Smart Metering Equipment Technical Specifications meters.

Consumer Protection and Cyber Security

40. Please provide views on what interventions might be necessary to ensure consumer protection.

The move to a smart, more flexible energy system will require a substantial rise in the amount of personal data held by multiple market actors in the energy industry. With this level of data in circulation comes a heightened level of risk to information security and data fraud. In order for the energy and smart system to cope with this considerable increase in the amount of data, a proportional data management system (potentially the Data Communications Company (DCC)) may be used, which would be capable of supporting the integration of DSR, storage and overall system flexibility whilst protecting consumers’ personal information. However, industry considers this to be an intervention in the market government should not rush. The system is and will continue to be complex and ever changing, with the number of stakeholders already involved (The Government Communications Headquarters (GCHQ), Communications-Electronics Security Group (CESG), UK National Computer Emergency Response Team (CERT-UK) and Cyber-security Information Sharing Partnership (CiSP)), interventions should be proportionate.

The data and privacy legislation does not create a framework for the energy industry to coordinate in order to protect consumers against cyber threats. The government should encourage the adoption of sound security practices by smart device manufacturers.

41. Can you provide evidence demonstrating how smart technologies (domestic or industrial/commercial) could compromise the energy system and how likely this is?

The extensive work on end-to-end security solution for Smart Metering means the risk is low for smart meters. However, smart appliances are already being compromised and being used in attacks e.g.

Internet of Things botnets taking down US Domain Name System (DNS) services:
<https://www.ncsc.gov.uk/report/weekly-threat-report-24-october-2016>

42. What risks would you highlight in the context of securing the energy system?

When energy is put onto the Grid, it is effectively uploaded to an IT system within which data is analysed to determine supply and demand. With this, comes an undoubtedly heightened risk of security breach as information is more readily available to hacking. This risk appears across all levels of the supply chain from Critical National Infrastructure (Supervisory Control and Data Acquisition (SCADA)/blackouts) to smart devices in homes (ransomware attack, ID fraud). As such it is essential that the breadth of this key infrastructure is suitably secure.

There are excellent standards out there that have been adopted, and kept updated, so the risk from cyber-attack for example, whilst always a threat, can be mitigated against with some level of confidence. This may need a more dedicated focus (in terms of being ahead of the cyber-attacks) such as a repository of meaningful data for users to mitigate against future attacks.

The Role of Different Parties in the System and Network Operation

43. Do you agree with the emerging system requirements we have identified.

Some elements are missing from this depiction of the emerging system requirements and drivers. Increasing interconnection and becoming further integrated into a European energy market are additional key drivers for system change that are missing. BEIS must also reflect on the changes coming in via Project TERRE.

Ensuring that the move towards a DSO model is included in the Revenue = Incentives + Innovation + Outputs Electricity Distribution (RIIO-ED) 2 framework will be key to enabling smarter distribution networks.

44. Do you have any data which illustrates: a) the current scale and cost of the system impacts described in table 7, and how these might change in the future? b) the potential efficiency savings which could be achieved, now and in the future, through a more co-ordinated approach to managing these impacts?

Whilst we would look to the DNOs, SO (through the System Operability Framework (SOF) and Network Options Assessment (NOA)) and the ENA to provide data and evidence of the current scale and cost of system impacts, we believe that there is an issue with an ongoing lack of transparency and clarity of the complex dynamics influencing different parts of the networks at different times (of the day / year) or under different weather conditions which we know can create network congestion and/or 'non-build' opportunities supportable through DG, storage or DSR flexibility.

The current opaque model and system planning activity can inhibit development of renewables and other forms of DG whereby the DNOs can seek to charge developers potentially unnecessary and sometimes prohibitive reinforcement and protection costs. This issue is as a result of some of the 'more established' (legacy) network planning models continuing to assume that all connected DG could under 'worst case scenarios' be producing power at all times, including wind and Solar PV.

A more co-ordinated, open approach to managing local and regional network dynamics should be able to produce more efficient outcomes, delivered by the market and avoid unnecessary reinforcement work (or costs being born by the marginal plant).

45. With regard to the need for immediate action:

a) Do you agree with the proposed roles of DSOs and the need for increased coordination between DSOs, the SO and TOs in delivering efficient network planning and local/system-wide use of resources?

We agree that there needs to be increased coordination between DNOs, SO and Transmission Owners (TOs) to deliver an efficient network which takes account of the changing mix of generation technologies on the system, increased flexibility through DSR and Storage as well as smarter

networks. We support the work being carried out by Ofgem through the future arrangements for the electricity SO consultation into options around greater independence of the SO within the National Grid Group to provide the SO with more scope to deliver the enablers identified. A new regulatory and incentive framework which encourages risks to be managed more optimally will also need to be adopted to ensure the enhanced SO function to function as required. Additional separation within National Grid Group will deliver benefits in the short to medium term, while retaining the option to move to a full Independent SO later should it become clear that it would better serve consumers' interests.

The future role of DSOs must be discussed in more detail particularly to provide clarity with respect to which organisations may undertake such a role and what a DSOs obligations would be. We note that the DSO function should be assigned to parties through a competitive process. Where DSOs actions directly impact end consumers there will need to be effective engagement with energy retailers.

b) How could industry best carry these activities forward? Do you agree the further progress we describe is both necessary and possible over the coming year?

We agree that further progress is both necessary and possible over the coming year, although we would note ongoing delays in the existing formal change fora and would then suggest that direct and unambiguous messaging from both BEIS and Ofgem on the importance of delivering these changes would be very helpful. National Grid should develop its approach to procurement of balancing/flexibility services. We note that Ofgem is consulting on further separation between National Grid's electricity SO and electricity TO functions which Energy UK will be responding to.

c) Are there any legal or regulatory barriers (e.g. including appropriate incentives), to the immediate actions we identify as necessary? If so, please state and prioritise them.

No comment.

46. With regard to further future changes to arrangements:

a) Do you consider that further changes to roles and arrangements are likely to be necessary? Please provide reasons. If so, when do you consider they would be needed? Why?

We consider that further changes will likely be required as more active network management is required and more opportunities for consumers to respond / provide flexibility services.

We believe a redefinition of current role and arrangements will be required to ensure there is clear accountability and governance. This should also ensure there are no conflicts of interest and a level playing field for all market participants.

It is important that government is mindful of the balance required between changes that are economically reasonable and deliverable in realistic timescales whilst recognising fundamentals which need to be addressed to future-proof system operations. The earlier regulatory and proposed policy clarity is available, the better.

We believe the prospect of greater coordination and planning of network requirements and charging in future is a further illustration of the need for Ofgem to set out how they will be taking forward a holistic review of charging arrangements.

b) What are your views on the different models, including:

i. whether the models presented illustrate the right range of potential arrangements to act as a basis for further thinking and analysis? Are there any other models/trials we should be aware of?

ii. which other changes or arrangements might be needed to support the adoption of different models?

iii. do you have any initial thoughts on the potential benefits, costs and risks of the models?

In practice, all the models have advantages and disadvantages and hence it appears that a combination is likely to deliver the best outcome. Creating market signals and platforms to allow the SO and DSOs to better coordinate access to flexible resources on a consistent basis to manage some of the local and system-wide issues would need to be combined with specific roles or responsibilities for either the SO and/or DSOs to then procure other flexible products where a greater degree of certainty from the SO was needed.

We would encourage more work on identifying the challenges and the necessary “building blocks” for the new arrangements and ensure that all options are fully impact assessed before moving to refine a model.

Innovation

47. Can you give specific examples of types of support that would be most effective in bringing forward innovation in these areas?

We believe that innovation is of vital importance to the development of efficient, flexible networks that will be required in the future. The emergence and uptake of low carbon technologies, electrification of transport and decarbonisation of heat will provide significant challenges to the UKs electricity. There is already significant experience gained through Ofgem’s Low Carbon Network Fund (LCNF)/ Distribution Price Control Review (DPCR) 5⁴. This has been fundamental to our understanding of the opportunities, risks and practicalities of utilizing and coping with flexibility.

The one common aspect of the learning of all these projects has been the rapid growth of complexity even within relatively simple implementations of elements of a DSOs operation. Interaction between communications infrastructure, customer behavior, local economics, very quickly intertwine to create unexpected outcomes. Given that these projects have been relatively simple in comparison to a full DSO implementation and have not addressed some of the more dynamic aspects such as true markets, it is critical that innovation and the structured trialing of concepts continue to grow and evolve.

There is a need to establish an underlying framework for innovations to operate, providing stability allowing these innovations to become bankable propositions. Similarly an understood market and architecture also allows innovations to converge and avoid the UK getting stuck in a perpetual cycle of trials all diverging from any common vision.

48. Do you think these are the right areas for innovation funding support?

Please see comments to question 47.

Other points

Gas

A whole systems approach must be considered with regards to the impact flexibility will have on the gas network. If large amounts of gas plant is called upon to provide flexible in response to a fall in intermittent generation then the gas network must be able to provide the necessary fuel. Although this may not be a significant issue, the flexibility of the gas network should not be taken for granted.

With higher penetration of renewable generation there may be times when this has to be constrained off but could alternatively be used to electrolyse water to produce hydrogen which is then injected into the gas grid (distribution) to help with decarbonising heat/gas supply. Storage may be required so that injection is done slowly to allow the mixing of hydrogen with natural gas.

⁴ Shetland NINES project <https://www.ninessmartgrid.co.uk/>
My Electric Avenue <http://myelectricavenue.info/>

ERIC <https://localisedenergyeric.wordpress.com>
SAVE <https://www.ssepd.co.uk/save/>

Implementation

The Call for Evidence pulls together topics across multiple policy areas which are diverse and managed by different governance structures. To ensure that the progress towards a smart, flexible energy system which is fit for purpose there needs to be consideration regarding how difference initiatives are progressed, where the ownership of changes lie, what the timetable for change is and which organisation has responsibility for managing the transition to the new system.

There is also a need to communicate these themes to the public to explain why this change is taking place and what it means to them. This should cover the benefits and possible costs associated with a move to a smarter system, the opportunities this will present to consumers and re-enforcement that privacy is not being infringed. Early engagement is a prerequisite to the success of engagement and ultimate buy-in from the sector that will shoulder much of the associated costs of this initiative.

Supporting documents

Pathways for the GB Electricity Sector to 2030 - <https://www.energy-uk.org.uk/publication.html?task=file.download&id=5722>

Energy UK Electricity Charging Arrangements Report - <http://www.energy-uk.org.uk/publication.html?task=file.download&id=5903>