

A Smart, Flexible Energy System

Energy Networks Association - Response to Call for Evidence from BEIS/Ofgem

Background

Please find below the response from Energy Networks Association to the Call for Evidence from Ofgem & BEIS “A Smart, Flexible Energy System”.

About ENA and our members

Energy Networks Association (ENA) represents the “wires and pipes” transmission and distribution network operators for gas and electricity in the UK and Ireland. Our members control and maintain the critical national infrastructure that delivers these vital services into customers’ homes and businesses.

Introduction

ENA has brought together a collective view of our members to the Call for Evidence. This response sets out some key common principles, points and areas of focus for ENA and the networks industry. The response sets out those areas where there is broad agreement between members.

The Call for Evidence asks questions of how industry will progress development activities, particularly relating to roles and responsibilities. ENA members recognise that network operator roles and responsibilities need to develop to enable customers to get the most from a smarter, more flexible energy system. Aspects of these new roles and responsibilities need to be developed in greater detail and tested so that the best models can be identified and implemented across the GB networks.

To co-ordinate the development and implementation of new network operator roles and responsibilities, ENA members have agreed to the establishment of a new TSO-DSO Project within ENA to work in a structured way through 2017 and beyond. This will build on early work carried out by ENA’s Transmission and Distribution Interface (TDI) Group and will broaden the scope of this work, increase the pace of work through 2017 and ensure that T-D work and resources are effectively deployed to progress priority areas.

ENA’s TSO-DSO Project has the commitment of the Business Leaders of all ENA members and is expected to subsume the TDI Group including the appropriate working groups.

In general, evidence of projects and data sets will be provided by individual companies and we will pick out broadly agreed points of principle in this response.

We have aligned our response below to the sections of the Call for Evidence for ease of comprehension.

Executive Summary

We have picked out the key points from our response below.

Need to Focus on the Consumer

There are various places through this response where we highlight the impact on customers and where customers can benefit from a smart, flexible energy system. We must continue to have customer interests (including vulnerable consumers) at the heart of any future developments. Through the DSO and TSO roles described in Section 5, network operators will:

- Continue to deliver safe and secure operation of distribution networks.
- Ensure efficient and timely access to the network for customer.
- Provide value for money.

DSO Transition

ENA members agree that DSOs need to play a central role in managing and operating networks and that greater co-ordination between network operators, SO and TO is required. We still need to work through some of the more challenging and detailed questions (e.g. future market structures for distribution system operator) and this will form a key workstream and priority for 2017 in ENA's TSO-DSO project.

The primary responsibility of network operators is to run a safe and reliable network, in doing so ensuring access to their network for developers and customers in a timely manner. As described in Section 5 the role of the DSO can unlock this flexibility in a way that does not compromise the safe and reliable operation of the distribution network.

Whole System View

The current regulatory framework requires development to align incentives and improve mechanisms for network operators to take a view across the system as a whole and there is a greater need to ensure that investments to support whole system are supported by the efficiency framework. This must be addressed to facilitate the market and deliver the best value for customers through efficient traditional and smart investment.

Storage

Storage has an important role to play in addressing network challenges and therefore should be available to network operators to support their networks. Our members support flexibility, including storage, being procured from the competitive market place as a commercial service. However, we do not yet know if the commercial market place can provide viable storage services in the highly location specific manner networks may need, therefore we believe that the option to allow network operators to own and operate storage in the future, where it can provide benefits to consumers but where the market place cannot provide it, should not be precluded at this stage.

Charging Arrangements

ENA members agree that current use of system and connection charging arrangements will need to develop to meet the needs of a smart, flexible energy system. Our members have identified a number of current issues that are likely to merit consideration in the near future. We will define these issues as a priority for 2017 within ENA's TSO-DSO Project so that we can better scope what changes we believe might be required and how they might be implemented mindful of other industry initiatives (e.g. Ofgem's work on charging arrangements for embedded generation).

Examples of these issues include:

- Generation connection and constraint management payments, addressing the different approaches to constraints between transmission and distribution, the impact of changes to constraints on flexible connected generators and the approach to generation connections and charges where high cost constraints are not addressed by connection charges (more than one voltage level above the point of connection).
- Intermittent generation and demand (including behind the meter generation) avoiding use of system charges.

Charging mechanisms should reflect principles of:

- Whole system cost reflectivity (rather than focusing on individual licensed parties) to deliver the best value for customers.
- Equality in charging to ensure that all flexibility providers and customers are presented with a level playing field.

Managing Diversity

A key effect of Aggregation, Smart Tariffs and Smart Appliances is to alter the basic assumptions about network diversity and network operators will have to adapt to change. Any arrangement proposed must be capable of managing the availability and volumes of these solutions to:

- Avoid short term network overload.
- Trigger direct investment where appropriate to remove constraints.
- Provide enduring demand management to mitigate constraints where no reinforcement can be justified.
- Deal with the need to retrospectively change connection terms.

Thermal ratings of equipment, levels of exceedance of voltage and security of supply all rely on network diversity being maintained. Network operators will need to understand how to react to changes to the natural diversity of customer behaviour to operate within limits.

Network operators will need visibility of data and actions on the network to achieve this while respecting the aspiration of local stakeholders and ensuring appropriate data privacy controls.

Need Regulatory Certainty to Encourage Investment

The market for storage, DSR, EVs, smart appliances and other flexibility services is dependent on investment and this requires regulatory certainty for the supply chain to de-risk investment.

As highlighted above and in the body of our response, we need a fair and consistent regulatory framework for all forms of flexibility providers.

Independent Distribution Network Operators (IDNOs)

Independent distribution network operators (IDNOs) and private wire networks must be reflected in TSO-DSO developments.

1 ENA's TSO-DSO Project

We have the commitment from Business Leaders across ENA members to initiate ENA's TSO-DSO project, which is intended to be a long-term initiative that will run over a number of years with short-term (2017), medium-term (2018) and long-term activities into RIIO ED2.

ENA is focused on prioritising activities and deliverables for 2017 and are defining a Project Initiation Document to set a framework for successful delivery for a first phase of the project in 2017.

The project activities for a first Phase in 2017 are being developed and reviewed against the following objectives that will set high level workstreams for 2017:

1. T-D Process – development of improved T-D processes around connections, planning, shared TSO/DSO services and operation.
2. Customer Experience – assessment of the gaps between the experience our customers currently receive and what they would like and identification of any further changes to close the gaps.
3. DNO to DSO Transition – development of a more detailed view of the required transition from DNO to DSO including the impacts on existing organisation capability. We will seek to deliver a clear agreed DSO/DO model with accompanying roles and responsibilities for market participants (TO, DNO, SO).

We have identified in this response where there are priorities for development (e.g. charging development issues, stacked services) and principles to adopt (e.g. whole system view). The project will consider defining change packages to take to the suitable bodies for implementation (e.g. through code modifications).

There will be some areas where it is helpful for individual network operators to work bi-laterally with National Grid (or each other) to explore different options and we recognise that different geographies have different drivers in terms of what DSO activities are required. In these cases, National Grid and the relevant network operators will share the outcomes and learning from their work through ENA's TSO-DSO project.

We will consider existing working group scope and outputs (including TDI, HV, ANM) to ensure we have coverage and expertise to deliver on the objectives above. In some areas, there will be value in utilising existing innovation funding mechanisms (e.g. NIA, NIC) to take forward elements of the work with the involvement of other industry stakeholders.

2 Section 2 Regulatory & Commercial Barriers

There is a point made below in Section 2.2 regarding system instability, which can be applied more generally to an ongoing risk of system security and resilience if the industry becomes increasingly dependent on Distributed Energy Resources (DER), flexibility, market services, ICT and comms infrastructure. Network operators need to plan for resilient network operation and control to mitigate against the risk of unavailability of distributed and complex energy resources and optimise the amount of contingency resources required.

For regulation, we should continue to monitor developments in Europe, including the Winter package.

2.1 Enabling Storage

Storage has an important role to play in addressing network challenges and therefore should be available to network operators to support their networks.

However, storage needs to be considered as one potential form of flexibility and all different forms of DER should be treated fairly to provide flexibility. In some cases, bidirectional electricity storage (e.g. batteries, but not exclusively), because of its need to charge and discharge, can increase rather than reduce network loading where other solutions (such as energy vector - heat or hydrogen) do not. We need to ensure that the market place

provides equal and fair access and charging arrangements for all types of flexibility and not artificially distorting the market to certain types.

Our members support flexibility, including storage, being procured from the competitive market place as a commercial service. However, we do not yet know if the commercial market place can provide viable storage services in the highly location specific manner networks may need, therefore we believe that the option to allow network operators to own and operate storage in the future, where it can provide benefits to consumers but where the market place cannot provide it, should not be precluded at this stage.

Storage has a large number of applications including providing balancing and ancillary services to the SO, helping network operators to defer asset investment and helping generators/suppliers to balance their positions. Storage, and flexibility more generally, must be considered as part of a whole system solution to deliver benefits to customers with closer working between the System Operator and network operators. There needs to be clarity on which services can be stacked and how to deliver whole system benefits so that certainty is provided for investment/innovation. This is likely to encompass more access to information across industry parties. This is likely to be an evolutionary development path, but there needs to be a development initiative to consider this and this is a priority for consideration in the ENA's TSO-DSO project in 2017.

Flexible connection agreements for services should be welcomed, are likely to be welcomed by storage operators and could become standard practice in the future.

The scale of applications has represented a significant challenge for network operator businesses and we believe that the current arrangements for A&D fees require change to focus on a fairer allocation of costs, so the right people pay for the designs.

ENA is currently developing an "Energy storage guide for communities and independent developers" that should be available in early 2017.

We agree that there is further development work required on the treatment of flexibility services under Engineering Recommendation P2/6 and we will continue to develop this work within ENA's TSO-DSO project.

We broadly agree with the definition of storage as provided by the Electricity Storage Network with some nuances to the definition provided by individual ENA members in their responses.

2.2 Role of Aggregators

Many of the points in section 2.1 above apply to aggregators as providers of flexibility services to different industry participants and there is a need for transparency of DER contracted by aggregators to other industry participants to allow them to efficiently, economically and securely undertake their roles in the whole system and to understand where the value of DER is derived and managed.

There are risks associated with loads behind the meter that could be switched quickly and/or simultaneously, creating system instability. This is of particular concern where there are clusters of flexible load within sections of network as simultaneous switching has the potential to overload networks that have been designed with an assumption of diversity between loads. It is therefore important that those systems be made as reliable and secure as possible. Informing network operators of planned actions in both planning and operational time scales would allow for suitable mitigation to be taken.

We believe that Ofgem should consider the merits of how network operators could work with aggregators and any party capable of providing flexibility services in a regulated environment (e.g. licencing participants in such services) to underpin 'good behaviour' and proportionate service rules.

3 Section 3 Providing price signals for flexibility

There is a general point on charging that crosses a number of areas of this call for evidence and therefore is highlighted in the Executive Summary - ENA members agree that current use of system and connection charging arrangements will need to develop to meet the needs of a smart, flexible energy system.

3.1 System Value Pricing

A market needs to be developed to provide access to large scale flexibility providers for all potential users of these services, including network operators, system operators and suppliers. As the number of active flexible DERs and services to multiple parts of the system increase, there will be a need to develop supporting market platforms. Any market platform will need to provide:

- A whole system view, including DSO-TSO interfaces.
- Transparency and information provision of flexibility resources and contracted positions.
- Non-discrimination.
- Simplicity.
- Stability for market investment.

Any work on charging and price signals must be done in parallel with the development of the DSO role and the DSO-TSO interface as the definition of roles and responsibilities is key to any market model and market platform. There is work underway at ENA under the Shared Services group and this will be continued under the auspices of the DSO-TSO project.

3.2 Smart Tariffs

We need to think of how to deliver the best outcomes for the customer through tariffs. Experience to date has shown that:

- Customers can struggle to understand and respond to complex network tariffs, therefore simplicity is key.
- Significant price signals are required to invoke behaviour change.
- Customers desire stability and therefore predictability in their charges to match other long-term investment decisions.
- Suppliers do not always pass through existing simple network tariff variations (i.e. Red, Amber, Green).

The role of Ofgem/Government should be focussed on facilitating industry to develop the right framework to meet customer needs, as above, without directing what tariffs might be. Ofgem focus can then be on reducing regulation, removing barriers and protecting consumers (including vulnerable consumers).

3.3 Smart distribution tariffs

Distribution tariffs need to be fair and evolve to recover costs fairly on a cost reflective basis (e.g. locational signals are not currently supported) and in accordance with the principles of charging set out in the Executive Summary.

In response to the question in the Call for Evidence, we do not believe that DUoS in its current form can easily support short term price signals. Initially, contracting for flexibility should provide the certainty required to promote investment in the development of flexible resources and meet network operator requirements to ensure security of supply. When flexible DERs become more widespread and many more flexibility transactions are being undertaken, there will be a need to develop the use of market platforms, as noted above, to optimise DERs with network operation and development.

3.4 Other Government policies

We would support removing barriers to support the co-location of storage and generation where this supports networks through reduced intermittency, as long as we retain the principle of a level playing field for different types of flexibility services.

Government must be mindful of the impact of certain policy (e.g. FIT connections). This links to the point made in Section 6 where we suggest that there should be “a stronger link to innovation priorities from developing Government policy thinking (e.g. industrial strategy)”. This equally applies to operational impact.

4 Section 4 A system for the consumer

It is key that we retain a focus on the end consumer as the ultimate beneficiary of a smart, flexible energy system.

It is important to ensure that we consider how vulnerable customers can access smart, flexible services as they are likely to be significant beneficiaries, but may have the most barriers (e.g. cost to invest, complexity).

Regulatory certainty is key to mobilise the supply chain and deliver value to consumers and this is highlighted as an overarching principle in the Executive Summary.

4.1 Smart Appliances

We agree with the 4 principles set out in the Call for Evidence for the development of smart appliances. We need to build customer trust in smart, flexible services and change perceptions so that customers see the value in these services and products over the potential inconvenience. The market needs to deliver suitably priced services that are attractive to consumers.

4.2 Ultra Low Emission Vehicles

Smart charging is a significant enabler to maximising the use of EVs (and storage assets more generally) and minimising the impact on the LV/HV networks therefore it is key to promote and engage customers of the benefits of smart charging. In a market where EV uptake is increasing, this is a significant and near-term challenge.

It is also important for the development of the supporting infrastructure for EVs that technology and commercial standards develop to enable visibility and control smart charging of vehicles. It will be essential that electricity networks have visibility of the location, availability and dynamic usage of charging infrastructure. Standards will also allow for safe, secure, and interoperable smart charging to be realised.

We would encourage the Government to coordinate an approach to accessing EV charging infrastructure that meets the needs of the industry and consumers. ENA members have worked collaboratively to carry out a high-level assessment of the potential impact of more widespread roll-out of electric vehicles and the associated charging smart-charging infrastructure. Part of that work included an analysis of the potential network investment cost to support charging infrastructure for EVs, which identified that under some relatively ambitious but nevertheless plausible take up scenarios there would be a need for substantial investments between now and 2040. We would be happy to discuss this work, and potentially to develop it further, as part of the ongoing dialogue with BEIS.

4.3 Consumer Engagement with Demand Side Response

The Power Responsive campaign is widely supported and provides significant learning to take into account for consumer engagement on Demand Side Response and the potential for co-ordination of DSO & SO services.

Domestic and small businesses generally need aggregation opportunities to realise DSR benefits, so there are opportunities for engagement with local energy/community schemes or through aggregators.

Half hourly settlement or smart meters can act as a trigger for consumer engagement of the transition to a smarter energy system, but there needs to be a compelling offer to the customer to gain traction and interest. Customers need clarity on what services can be offered, what is in it for them, how services might interact and how they contribute to the overall transition.

We broadly agree with the barriers in the Call for Evidence and ENA Shared Services group has been considering areas of concern, including clarification and coordination of DSO & SO led services. This work will be considered within ENA's TSO-DSO project in 2017.

There is a more generic point on the availability of flexibility in specific geographic locations where it might be required; requiring DNOs to improve engagement techniques to seek out and secure any flexibility resources that might be available.

4.4 Consumer Protection and Cyber Security

If automated DSR processes become prevalent (they are likely to be more successful than those that drive customer behaviour change), then there is a consequential requirement for scalable cyber-security for DSO operation.

ENA and ENA members are working with Government and other key stakeholders to ensure risk-based scalable approaches to cyber security (e.g. through Government liaison and ENA Cyber Security Forum) continue to develop.

5 Section 5 Roles of parties in system & network operation

5.1 Roles & Responsibilities

ENA members agree with 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. The need for a whole system view is highlighted in the Executive Summary.

Network operators need to manage an increasingly actively-managed network matching customer needs with network conditions in more real time. We need to work through some of the more challenging and detailed questions (e.g. future market structures for distribution system operator). DSO Transition will form a key workstream in ENA's TSO-DSO project.

DSOs need to play a central role in managing and operating networks and greater control over system operation for DSOs (e.g. using active network management) is required to:

- Continue to deliver safe and secure operation of distribution networks.
- Ensure efficient and timely access to the network for customers.
- Optimise the use of available distribution network capacity.
- Manage and optimise the need for or the cost of distribution reinforcement.
- Optimise the revenue in the competitive market for DER.
- Provide more efficient procurement of services for other parties (like the SO).

With the growth in Distributed Generation and other potential new demands (e.g. EVs), the lack of managed flexibility at a local grid level will inevitably lead to the traditional reinforcement approach being triggered earlier. Given the associated timelines, this traditional approach will lead to longer connection times that could otherwise be achieved via flexibility services being available at a local grid level, thereby slowing the pace of economic development of developers and frustrating customers.

The role of the DSO can unlock this flexibility in a way that does not compromise the safe and reliable operation of the distribution network.

The vision for DSO transition should be developed over the short, medium and long term with some broad timescales set out. We should consider what can be done in the 2nd half of ED1, what can be targeted for ED2 and what falls beyond that. The vision should identify commonalities and also differences between DSOs.

Significant organisational change will be required. DNOs have had to adapt to deal with the current challenges associated with connection volumes and network constraints (to a varying degree in different geographic locations) and have a proven record in delivering. There will be a requirement to upscale capability and capacity of DSO & TSO organisations to enable DSO Transition (e.g. network design, planning, commercial & contract, technology, systems & software, engineering, process and policy design).

There are several development areas that have been identified that will form part of the TSO-DSO project:

- Development and alignment of Transmission and Distribution incentives to deliver whole system benefits is key to optimising network investment, system security and delivering benefits to consumers. This includes using the mechanisms available within RIIO-T1/ED1 to deliver whole system benefits in the short- to mid-term and then subsequently RIIO-T2/ED2.
- Transparency of planned/anticipated contracted actions, which will be vital in order to facilitate markets to provide network solutions in a whole system view. This needs to include transparency to customers, market participants, DSOs and SO.
- Improved forecasting, both in terms of better longer to medium term forecasting of load and generation growth and more joined up forecasting across DSOs and the SO.
- Connection arrangements will be reviewed.
- EU codes, planning standards & LCTs are key drivers that would merit further discussion & consideration.
- How Independent Distribution Network Operators (IDNOs) and private wire networks are reflected in TSO-DSO developments.

In general, and as highlighted in the Executive Summary, it is essential that thinking on this topic is customer-centric so that changes are designed to advance the public interest, rather than being designed around technologies or existing industry processes and structures. There is a customer experience workstream envisaged in ENA's TSO-DSO project to ensure that this remains a focus.

5.2 Proposed Models & System Requirements

ENA members agree that there are a reasonable set of models set out in the Call for Evidence, but that there needs to be a further level of detail required to understand the implications and also to consider variations/hybrid options of the high-level models presented. We shouldn't constrain the models under consideration at this stage.

It is important to reflect that there is no one-size-fits-all development path. Different geographies have different requirements for DSO activities and varying appropriate timescales for implementation of DSO measures. Any future framework to move towards a DSO model needs to accommodate organic development over time and that different DNOs will need to approach DSO transition differently. Development of any DSO model needs to be evolutionary to meet any whole system approach.

We will need to consider how different models are evaluated when we consider these in ENA's DSO-TSO Project so that any evaluation is objective.

ENA members agree with the system requirements that have been set out in the Call for Evidence with the addition of the points captured in the rest of section 5 above.

6 Section 6 Innovation

We believe that the current support arrangements for network innovation are broadly fit for purpose and continue to be required. We also believe that the areas identified in the Call for Evidence for innovation funding support are broadly right.

We have identified that there could be improvements made to the schemes to:

- Support innovation that delivers value across the whole system and beyond individual network or system operator business scope.
- Introduce a stronger link to innovation priorities from developing Government policy thinking (e.g. industrial strategy).
- Support trialling of emerging commercial and market models and not just technology to be embedded into network/system operator operations.
- Facilitate cross energy vector projects (e.g. Hydrogen) and not just electricity (e.g. in NIA/NIC).
- Supporting local energy (including community energy schemes) provision to the areas that need to be supported to ensure approaches exist to support those least able to adopt smart flexibility technologies.
- Innovation projects towards the end of price control windows are driven to shorter timescales to complete in time, whereas supporting longer timeframes may allow projects time to demonstrate value.

Vehicle to Grid has also been particularly identified as a promising commercial proposition where innovation support may help UK businesses to be at the forefront of this change.