10th January 2017

SPEN DSO Vision Consultation Responses

SP ENERGY NETWORKS

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Executive Summary

This document reviews the response to the SP Energy Networks (SPEN) DSO Vision Consultation. A wide spectrum of stakeholders responded to the consultation from a broad section of industries, all commenting positively and constructively with the aim of moving the DSO debate forward. The Vision Document was seen as an important step in the transformation of the UK energy market and the leadership shown was widely welcomed and commended. In total 17 official responses were received from 8 different sectors. SPEN would like to thank all who have responded constructively to our DSO Vision Document and Consultation Questions; the outcome of which will help shape the wider UK industry debate going forward and will enable SPEN to develop a comprehensive Route-Map to adoption.
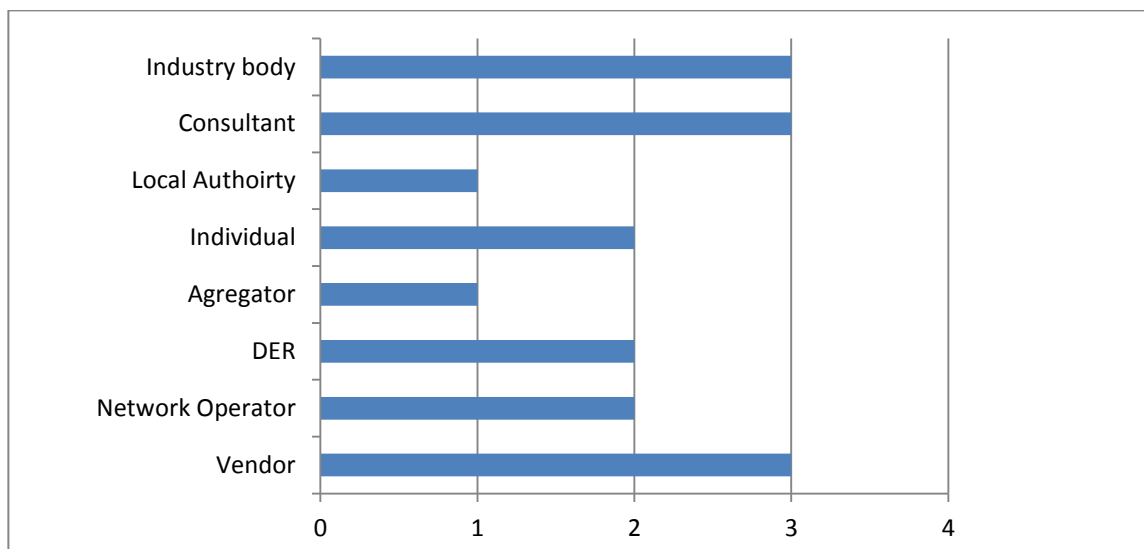
A high proportion of stakeholders felt the Vision had managed to outline the technical requirements for a DSO (65%) with a similar level agreeing with the proposed trial areas. Respondents noted the modular approach will help to *'tune'* a DSO although there was also a number of constructive views questioning whether it was wise to focus the attention on two relatively similar rural locations with limited urban network. It was suggested that trialling DSO in areas with less network constraints may allow for an increased level of alternative options to be investigated. Moreover it was further suggested that whilst a modular approach has worked well when trialling smart grid initiatives in Europe and United States caution should be taken to not end up with lots of disparate solutions, making significant investments and 'regret spend' before the full benefits can be realised.

Overall there was more of a mixed response for the commercial orientated questions, with the majority having no set position as to who should own and operate storage (47%), preferring instead to let the lowest cost, most flexible solutions drive the answer. There was closer alignment with stakeholders regarding whether a DSO should be a regulated or unregulated entity, with 53% favouring regulated and 18% an unregulated approach.

The majority responded positively with the SPEN opinion that DNOs are the right organisation to lead the transition towards a DSO (71%). The impartiality of DNOs was generally seen as a positive feature

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(71%), however a number of constructive comments suggested other organisations could offer customers similar levels of confidence.

When asked whether they agreed with SPENs DSO vision, 82% either fully agreed, or agreed but with some suggestions, stating the evolution towards DSO has the potential to deliver improved outcomes for both customers and networks operators. One respondent did not agree with this position believing DSO should be separate from DNOs to avoid regulatory confusion and further delay. A similar split responded positively to the proposed timeline, believing in general that it is a good roadmap to developing DSO technologies.

Technical requirements for DSO implementation

1. **Do you agree with the technical requirements to facilitate a DSO that we have outlined within the Vision document?**
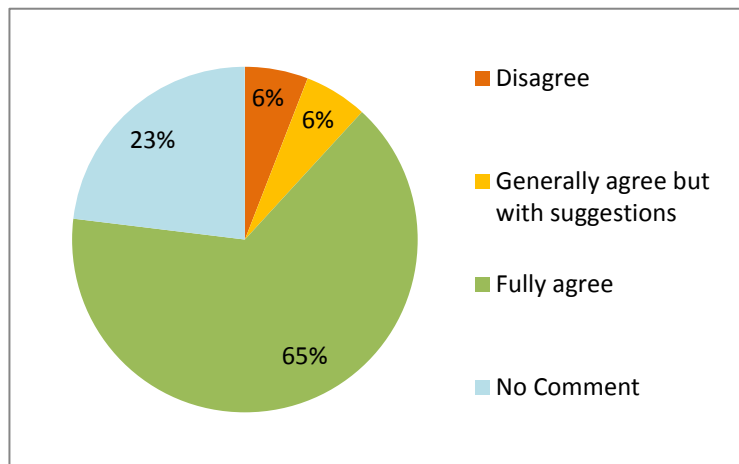
Generally positive with most commenting the technical requirements of a DSO have been clearly identified in the Vision (65%). There was general acceptance that Active Network Management (ANM) would be a key enabler, however questions were asked whether this technology could in isolation achieve this goal, as other solutions will need to be utilised such as enhanced voltage control, real time thermal rating, Data Storage and Communications. Also noted was the requirement to look at commercial innovation which may be required to deliver the overall solution, with third parties potentially best placed to provide this assistance.

The Vision was commended for showing a strong drive to deepen both understanding of networks performance, drive control of network balancing and move towards an 'actors' role – i.e. "*control of the network in preparation for predicted load variations as opposed to a more passive and slower moving 'reactor' role of the traditional DNO. There is clear evidence of a move to modernise and future proof the network here and this, we believe, is key to the success of the DSO transition*".

Other responses queried whether Virtual Power Plant (VPP) or Virtual Balance Mechanism Units (VBMU) was the most appropriate way to balance the network.

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One respondent noted the language used was too technical for them to enable a useful opinion to be given, noting that this may significantly restrict the range of stakeholder responses from a large sector of the service community.

2. Are there any technical requirements to facilitate a DSO that we have not identified?

Whilst the majority of respondents agreed with the technical requirements, the following additional areas where identified;

- Technical and commercial requirements to support VPP and auxiliary market
- IT connections to third party, in particular SCADA to SCADA connection to the TSO using secure ICCP
- Appropriate optimisation of DER which could maximise the value of the flexibility to the system, providing an attractive return to the DER owner, and avoiding the need for significant investment in infrastructure.
- Whether smart meters play a role as a means of assessing network flexibility for domestic and smaller non-domestic customers.
- Standardisation of communication protocols will be paramount – including cyber security
- Greatly improved monitoring and modelling will be important for networks operators at distribution level and also between transmission and distribution
- Cross energy vectors (e.g. variable demand into hydrogen)

It was also noted that to achieve the 'Total DSO' approach greater visibility and control will be required at all levels, from transmission boundary down to low voltage (LV). It was suggested that this is a particular challenge at LV where the amounts of data will be far greater than those previously managed. Furthermore, in order to ensure effective systems are in place there will be an increasing need for greater decentralised control through distributed intelligence, which will facilitate local control loops and decisions, rather than a highly-centralised model where all data needs to be backhauled over expensive and complex communication links to a central hub.

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3. **We have identified two areas in which to develop a technical and commercial trial of DSO enabled network areas. Do you agree with this modular approach, targeting areas with current network challenges?**
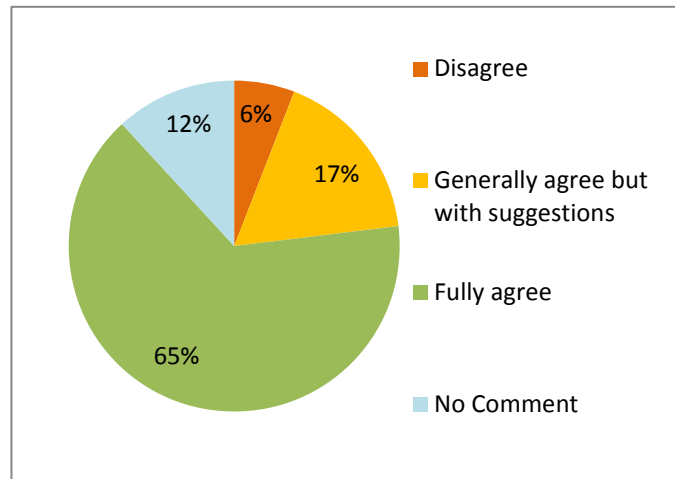
The majority of respondents agree with SPEN's proposed trial areas with several positive comments praising the modular approach as the most *"prudent"* method to trial and *"tune"* the DSO model. It was further suggested this approach would allow for particularly challenging areas of the network to be tackled first and lessons to be learned from that process; "*a modular approach will ensure the technical and commercial trial delivers the benefits to the system, adds value, and that different systems can correctly interact with one another and with end customers*".

One respondent noted the modular approach and proposed trial areas offer the richest and easiest learnings, noting this approach has been seen to work well from international smart grid trials in Europe and the United States.

Where there was agreement but with some suggestions (17%) responses include;

- *"It may be beneficial to perform the very first trials in a more resilient part of the network"*
- *"Some of the potential DSO functions are more suited to network wide implementation"*
- *"Practical and reasonable to apply a modular approach and to target areas with current network challenges. However, it could be concluded that only certain areas will be covered by the DSO approach. This may raise a question whether it would be fair that this solution should be available only to some DERs and not the others"*

Another suggested when considering the optimal DSO Vision for a 'universal service' it is important to consider the potential implications of the model to unconstrained areas. Consideration could be given to trialling the new model in lesser/unconstrained areas to help anticipate the broader impact to the system. The uniqueness of certain trial areas may make it perfect to demonstrate specific benefits but also make it more difficult to appropriately anticipate national and whole system level impacts. In turn this would make it more difficult to make justifications for change to industry or market models.

The only respondent to disagree felt the proposed trial areas were too similar, rural based, and targeted only a narrow group of stakeholders. They highlighted that domestic scale activities and consumer participation would be better addressed by a trial that was carried out in a more challenging [urban] environment.

Commercial arrangements for providing DSO services

4.   Do you expect that you will interact with a DSO either by offering services or purchasing services? If so how do you believe that commercial arrangement should work in the future?

The majority outlined they would interact with a DSO in the future whether selling services, providing DSO solutions or using the network either for renewable generation or as network operators. A number of respondents did not comment on this question and one stated no.

With regards to the question asking how commercial arrangement should work in the future, SPENs approach in the document was generally well received, with comments identifying the need to *"develop and implement a fair and cost effective remuneration mechanism for all DSO services and DER providers"* highlighted as important, as the current lack of value placed on key network support services is a leading barrier to the deployment of the most cost effective, grid-scale energy storage.

Whilst not providing a definitive answer, another respondent highlighted, "*In a world of DNOs and IDNOs, if both the DNO role and the DSO role are undertaken by the same organisation (e.g. the incumbent DNO), then consideration will need to be given to whether there should be a separation of the activities of the DNO and the DSO"* with the potential outcome, in the future, that the roles may need to be separate licence activities.

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5. What is your view of TOs, DNOs or future DSOs owning Distributed Energy Resources (DERs) e.g. Battery storage devices?
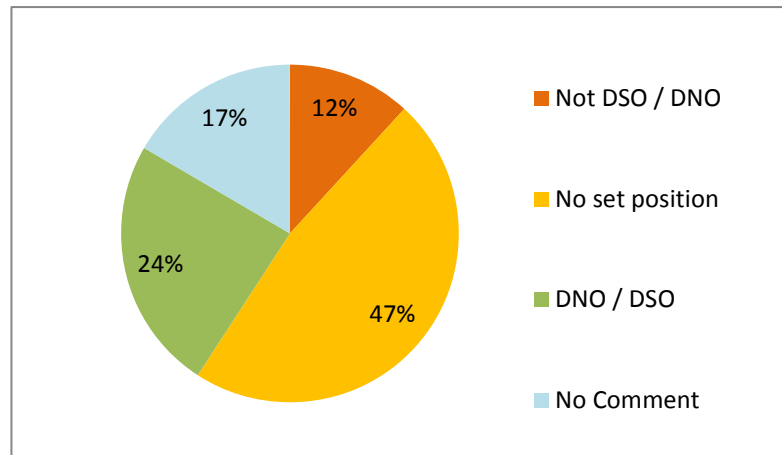
Overall, a broad spread of views, with the majority of responses suggesting that a flexible approach to ensure the lowest cost for the customer would be desirable (47%) highlighting a *"Market approach should be sufficient "* and *"is likely to deliver better overall value to the customer".* One stakeholder did not see a problem with distribution licensees owning DERs where the key focus of the asset forms part of the best value solution to delivering a system of electricity distribution; suggesting that such arrangements seem directly comparable with ownership of generation assets by distribution licensees for security of supply purposes, as is the case on some Scottish Islands.

A quarter (24%) responded they would be happy for DNO / DSO / TOs to own and operate storage, highlighting storage promises to be a valuable source of flexibility for network operators, offering an alternative solution which may be used to defer the need for traditional reinforcement or to support cheaper and faster network connections. It was also noted *"storage devices will be crucial to enable the shift towards renewable energy. However, and particularly in the case of large energy storage, capital costs are often too vast for energy storage technology developers to be able to absorb them. TOs, DNOs or DSOs have the economic and human resources and infrastructure required to handle the construction, commissioning and operation of large scale energy storage systems. Thus, allowing them to own and operate these installations could be the key for the widespread introduction of energy storage".* Another whilst acknowledging that *"DNOs should not own generation assets"* suggested that *"battery storage is an emerging technology. It would appear contradictory to aim to support innovation, and yet deny ownership of an emerging technology by a major market stakeholder – particularly one well placed to develop innovative use cases and commercial arrangements".*

A minority (12%) did not believe that DNO / DSO / TOs should own battery storage stating that a more flexible approach is required and commercial conflicts may be created.

- *"A more flexible approach is likely to be more beneficial to the end customer"*
- *"Potential conflict with the regulated role of a DSO"*

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6. Should DSO services be provided by a regulated or unregulated organisation? What are the benefits to your suggested approach?
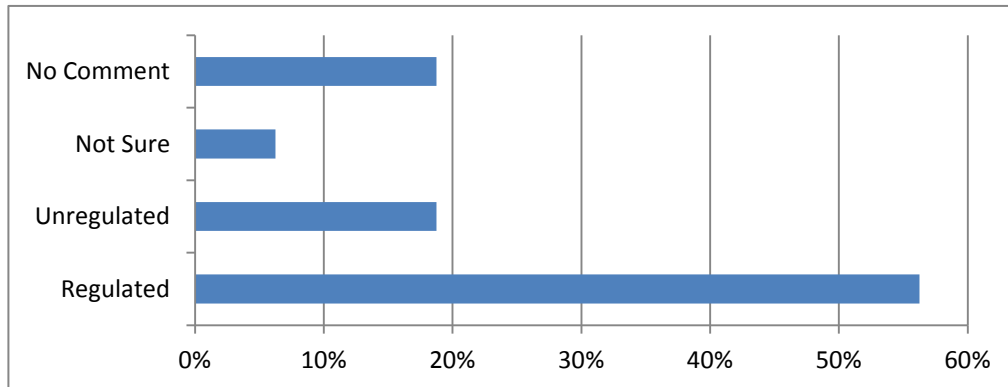
Overall the majority responded that the DSO services should be provided by a regulated organisation (53%), with one suggesting the optimum structure for DSO is likely to be for a DNO licensee to provide a platform for the market to offer services in order to reveal best value for the consumer. It was also put this approach was likely to provide certainty to the DSO role and allow transparency especially if the DSO is also an asset owner, so it cannot be accused of favouring its own assets.

Other responses in agreement also suggested;

- *"Would probably provide certainty to the DSO role"*
- *"Structure of income recovery is already there"*
- *"Activity of DSO service that relate to operation of distribution networks to remain regulated"*
- *"Regulated organisation but one with the freedom to provide trading platforms for others to participate in. Trials of potential market arrangements are required in order to explore new business models"*

A number of respondents felt that DSO services should be unregulated (20%);

- *"Providers of DSO services do not need to be regulated organisations as their risk appetite and role is very different to DNOs"*
- *"DNOs to provide a platform for the market – service providers to be unregulated / market driven"*

One respondent was unable to make a decision at this moment in time noting *"While the debate is still going on, provision of DSO services by regulated entities can interfere with the innovation"*. It was suggested it may be beneficial to have additional studies that will take into consideration particular arrangements that are put in place in the UK.

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Which organisation(s) should carry out the role of a DSO?

7. **Do you see the impartiality of DNOs as a positive feature in enabling greater access to the market for smaller players, or do you believe that other organisations could provide a similar level of impartiality and transparency?**

Overall 53% of responses saw the impartiality of DNOs as a positive feature in enabling greater access to the market for smaller players. No response disagreed with this statement and 18% generally agreed but with some suggestions. It was also clear that the majority of responses were in agreement that a DSO must be impartial, open and transparent in order to create a level playing field across service providers
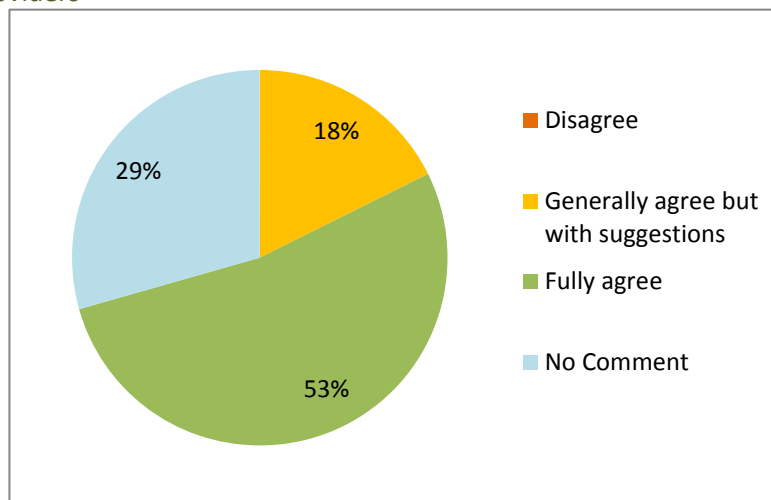
It was suggested that an existing regulated DNO who transitions to a DSO will have a unique understanding of the local network and access to the distributed customers and will no longer merely be an asset management organisation but one that operates as a neutral market facilitator ensuring that a much larger base of customers and resources can participate in a wider market. The intimate understanding of the local distribution networks was seen as a key benefit of the DNO/DSO model, it was further explained having an impartial DNO would create a transparent framework for accessing areas of the network which require support would be preferable to engaging with an additional organisation.

A number of response noted that aggregators or other market operators may be able to offer customers similar levels of market confidence. It was further outlined that although heavily regulated organisation DNOs *"….primary driver is to maximise profits for their shareholders".* Another respondent also stated *"that some DNOs are affiliated to businesses that could be perceived to undermine impartiality".*

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8.	Who is best placed to ensure that energy can be managed safely and securely in the long term? DNOs? Aggregators? The existing Transmission Operator?

The majority of respondent identified the DNO/DSO working in collaboration with the TO/SO as best placed to ensure that energy can be managed safely and securely in the long run.

- *"DNO/TO - However greater coordination required between TO & DNO. Aggregators are least well placed because of their lack of experience in operating the distribution"*
- *"Currently the TSO is best placed to manage/balance the whole system but we see an emerging, clear role for regional DSOs to work in coordination with the overall SO to manage local networks"*
- *"joint effort between DNOs (future DSOs) and the TS operator, supervised by the latter, may prove to be the best approach"*

However there were a number of views which highlighted that this could ultimately be achieved through aggregators.

- *"Network owners must remain the sole custodian of safety and security of physical supply on their systems. However, this does not necessarily mean that they must be operator of DSO based markets."*
- *"DNOs are well placed to do this but other options are available."*

Finally there was two responses which questioned whether this could be answered at this stage;

- *"The question is not clear and surely even with the emerging role of DSO, the safe management of 'energy' will require a multi-stakeholder approach including the SO, TO's, DNO/DSO as well as regulatory bodies"*
- *"..not a single answer to the question above. A collaborative approach is required with different organisations taking the lead in different issues, with appropriate signals that make viable the huge private investment required for this transition"*

9.	Do you agree with our view that DNOs are the right organisations to lead in the transition towards a DSO service?

In general it was agreed that DNOs are the right organisation to lead the transition towards a DSO service (71%). This was supported by the understanding that DNOs have of their network and the ongoing involvement in the trialling and embedding of smart grid solutions (e.g. from Monitoring to Active Network Management).
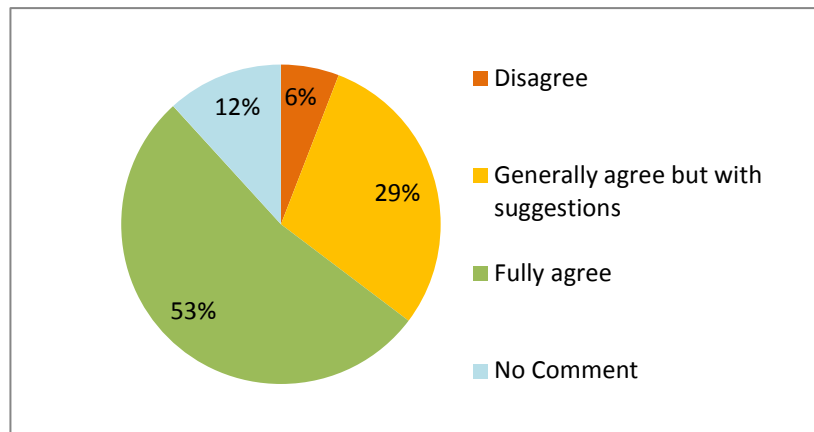
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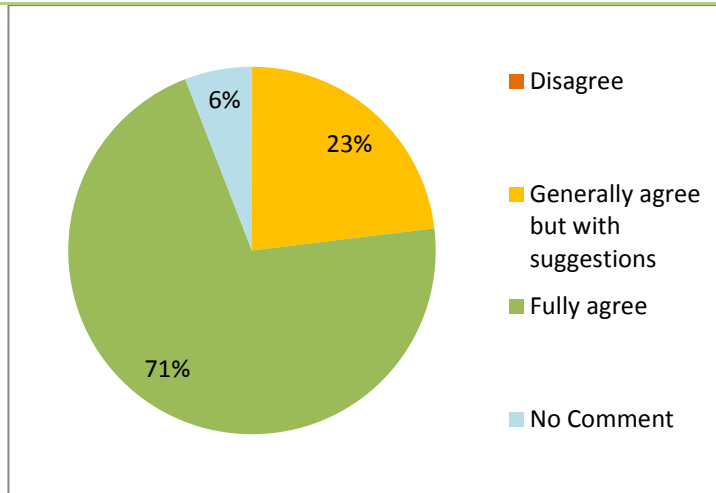
It was outlined the transition from DNOs to DSO is likely to be a lengthy and complex process involving many stakeholders across the industry therefore "*clearly, DNOs playing a leading role will be fundamental to its success*". Another agreed that DNOS are the right organisation to lead this transition as "*they have the skills, knowledge and experience*" *and* the understanding of "*network and regulatory constraints and have the remit to lead the transition*". Others in agreement with this view highlighted that this would seem sensible approach given the size of the UK electricity system.

Others expressed the view that it is not merely a question of who should lead the party, "*we need a sensible government policy that works for customers and then it can be discharged in a co-ordinated manner by the most appropriate parties. The first step is to agree what services a DSO should provide and then map out the transition pathways.*"

General Questions

10. Do you agree with our Vision for SPEN developing towards becoming a DSO?

In general a positive response was returned with the majority either fully agreeing with the document, or agreeing but with some suggestions (82%).

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It was generally praised for being forward thinking and innovative with the SPEN vision of a DSO *"adequately addressing the challenges the future electricity networks will face".* Others in agreement stated;

- *"…are in agreement and supportive that that SPEN will inevitably transition towards becoming a full DSO which will facilitate an open and inclusive balancing services market at the Transmission/Distribution interface."*
- *"Yes and we welcome the leadership role being played by SPEN to move the DSO agenda forwards"*
- *"….we feel that the SPEN approach has sufficiently addressed the spectrum of options to determine that which is most applicable for SPEN."*

A number of constructive points were raised;

- *"The need to maintain a system hierarchical approach which allows for the TSO to have certain visibility and flexibility in case of overall system emergency."*
- *"…does not include much detail of the customer or commercial aspects of DSO. Nor does it address potential requirements relating to energy, as distinct from the network over which it travels, for example the role of DSO in optimising economic efficiency e.g."*
- *"'one size fits all' approach might not deliver outcomes in the best interests of consumers".*

One respondent did not agree with the SPEN DSO vision document, stating *"a DSO should be separate from a DNO to avoid regulatory confusion and further delay".* Also highlighting a number of key requirements that would be best outsources including 1) building relationships with DER owners and contracting for flexibility and 2) a platform that can optimise the flexibility from significant numbers of DERs to deliver multiple services at one time.

11. Have we accurately identified the key enablers required to facilitate the transition to a DSO? If not what additional enablers should we consider?

Generally the list of technology enablers was praised as being comprehensive [for the level the vision has been pitched at] however it was suggested *"the next level of detail should consider the specific capabilities (People, Process, Technology, Data, Commercial, Governance and Performance Management) required delivering these".* Other enablers identified included;

- Enable the flexibility from all DERs, not just those in constrained areas.
- Optimise flexibility across all energy vectors, particularly heat networks.
- Provide visibility of all assets that can have a significant effect on the network, not just generation.
- ANM into a wider solution that delivers greater flexibility and, therefore benefit.
- Utilise optimisation of a portfolio of DERs to deliver a portfolio of services.
- Using the optimisation platform to use flexibility for all axes of operation, e.g. kW, kWh, kVAr, kVArh, V, f, £, and commercial and technical issues.
- Include commercial innovation to deliver new services that will not only benefit SPEN networks, but the entire UK system.
- Improved customer engagement / involvement / community empowerment.

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> **12. Does the timeline to transition to a DSO that is set out in our roadmap reflect industry requirements?**

Overall 59% of responses agreed with certain aspects of the timeline however with some suggestions. One respondent was in agreement with the short and medium term timelines however felt certain elements included in the long-term timeline were *"too conservative"* and should likely be moved into the medium-term, such as real-time state estimation. The primary reason highlighted for this view was that the penetration of DERs will likely to accelerate, requiring the DNO or DSO to rapidly react. This view was echoed in other responses which highlighted the rapidly changing landscape potentially requiring the DSO/DNO to react quicker, especially given the pace of technology change - *"certainly the take up of solar PV in local networks appears to have caught the industry by surprise"*. Another view suggested further input was required in relation to the wider commercial framework, including those governing all forms of distribution system user. It was also noted that although the Vision looks reasonable in its roadmap the pace looks challenging due to *"the complex nature of such a transition"*.

A number of responses were in full agreement with the roadmap (18%), with one stakeholder stating *"the DSO vision will not be achieved over the short term rather an evolutionary change will be required as increased understanding, technology advancements and commercial arrangements are developed to solve local issues on the distribution network."* This view was backed up by others that described the roadmap as *reasonable* and *proportionate*.

The single respondent that disagreed with the timeline outlined that *"an 8+ year plan and the timeline provided seems desperately slow"* going on to highlight *"SPEN risks leaving the door open for other who can drive change quicker and demonstrate to Government what is possible"*