The Distribution System Operator Model

The challenge of transformational change in the UK energy market
Executive Summary

For many years, Distribution Network Operators (DNOs) across the mainland UK have been asset owners, installing and maintaining the network infrastructure in a centre-out electricity system. But today’s model is different, with DNOs acting as both System Operator (SO) and Asset Owner (AO), the greater focus being on the latter role. This model, which involves supplying power from large central generators to the paying customer, has relied upon increasing amounts of capital investment in distribution network assets. This investment has kept the network safe and reliable and the DNOs have been rewarded for maintaining this position.

However, the power industry is changing rapidly. DNOs are transforming into embryonic Distribution System Operators (DSOs) delivering limited DSO services — a trend that will accelerate in the years ahead. Faced with this change the modern DNOs must reorganise themselves into distinct AO and SO businesses: ahead of any regulatory mandate that may compel them to do so. As a result, it is likely that the nature of the SO will change beyond all recognition in future.

The increased prevalence of Distributed Energy Resources (DER) means that power will no longer be distributed predominantly in one direction. Private households can already generate their own power and become ‘Prosumers’. Groups of households have begun sharing electricity with each other on a small scale. Microgrids could soon become commonplace. This shift in the way energy is supplied is coupled with major changes in the way it is used – for example, the rise of Electric Vehicles (EVs) – creating the pull for the DSO model and in turn driving greater operational complexity.

The future role of the network will be to support and enable the operation of the new market, rather than act as a money-earning asset for the DSO. Therefore, there is an inherent conflict of interest with a neutral market facilitator owning such a large and valuable asset. The SO and AO elements of the DSO should be separated to provide a level playing field for competition as well as to avoid a ‘neutral electricity market facilitator’ being able to make market decisions to protect its assets.
In addition, given the differing regional uptakes of available technologies, the nature of the SO will vary wildly across the country and this means that it is unlikely that SOs will be able to remain the same size as the current DNOs and still be manageable and profitable. The inflection point for this split to an AO and SO model in time to service the system will be 2027 at the latest.

Yet the very changes that are driving the need to create the new DSO business model are simultaneously ripping it apart. The ghost of the DNO that so well built and maintained its network will become a serious hangover for the new DSO. Furthermore, the DSO model is not strictly defined – it is likely to be a ‘pick and mix’ service approach depending upon the geographical, market and business model landscapes. There is also a question around whether the DNOs have the skillset needed to meet the challenges posed by these new services.

The result is that DNOs should take control now rather than have a business model imposed upon them. If the same shareholders want to gain from this new model then separation is the only way to retain an AO that can operate under a regulated market. The speed of transition will depend upon the pull of the drivers mentioned in here, so transition will be multi-track.

In addition, the regulatory periods currently set out will not be fit for purpose in the AO-SO future. There are, therefore, also huge implications for Ofgem as it seeks to establish a suitable regulatory framework for independent AOs and SOs of all shapes and sizes. The future of the electricity industry is set to be one of great upheaval and even greater challenge.

**Scope of this brochure**

In this brochure we will explore the industry and business model, and the likely timing and shape of that business model, including where responsibilities will lie after the separation. It doesn’t cover the practicalities of executing a separation, nor does it present an economic model of separation.
The mainland UK will be challenged to provide affordable, sustainable and secure electricity supplies against a background of rapid change in the way that energy is produced, moved and consumed. With these challenges, however, comes the opportunity for the industry to examine existing and assumed business models and develop an approach that delivers maximum value for consumers and society.

The push for Distributed Energy Resources (DER) and renewable generation technologies, such as solar and wind, will continue to grow. These technologies are predominantly connected to the distribution network as opposed to being centrally connected (with the exception of offshore wind). This structure has fundamental implications for how the DSO must operate to make the system work for the benefit of all. Technologies that are growing in sophistication and prevalence, such as EVs and battery storage, will also form an essential part of the transition to a low carbon energy system. The role of the DSO will be central to driving the pace of energy transition to enable greater economic and environmental good.

Some studies suggest that EVs will comprise the majority of new cars sold as early as 2027 and National Grid’s 2017 ‘Future Energy Scenarios’ report indicated that 34-40% of electricity generation will come from decentralised sources by 2025. This suggests that the technological tipping point for the new market model will be 2027 at the latest.

Throughout this paper we will be referring to the following journey and the actors as defined below:

Figure 1: Major electricity market actors through the DSO journey

This paper is primarily concerned with the distribution level entity in 2027 and will set out the case for the inevitability of a split of the DSO entity into two separate entities, working together to provide the DSO service.
The future role of the DSO

The DSO will be one of the critical parties as the country undertakes its journey towards a highly decentralised and low carbon industry model. Its overarching purpose will be to operate the electricity distribution system to benefit all stakeholders, particularly the ultimate end user…the bill payer. This can be achieved primarily by identifying and deploying the most efficient and effective solutions for maintaining and modernising the distribution network. In turn this requires a step change in investment decision-making and the need to incorporate a broader spectrum of solutions from both a technological and commercial perspective.

DSOs will find themselves at the pivot point of industry frameworks that are undergoing fundamental change, particularly methods of network charging and overall market access. As a result, they will have many more contractual relationships and interactions than the current DNO. These will involve the Great Britain System Operator (GBSO), National Grid, neighbouring DSOs and a wide range of DER generation and storage customers. Each of the arrows in the model below indicates the need for the creation and management of a new business relationship, showing how complex this new structure will become. Indeed, this complexity will be further exacerbated by suppliers owning smart charging points with generation (e.g. Ecotricity).

Ownership at both ends of the supply chain will be challenged more and more.

DSOs are evolving in an electricity industry with many new actors and stakeholders, all of which require a level playing field to be able to access the market and system. This can be likened to the mobile telephony market moving from calls to data. The change here will be a move towards providing platforms to allow services to be delivered, such as keeping your house warm or managing the EV you drive. However, this will not happen until the new DSO companies have a platform of trust upon which they can build their brand. They have little brand equity today as the public generally know their supplier better than their DNO. The DSO must understand and develop competitive models to engage with this new and emerging market.

In its role of supporting the drive for efficiency across the entire electricity system and facilitating market access, the DSO is almost unrecognisable from the DNO model it will replace. The DSO must adopt new approaches, collaborating with a wider range of partners and engaging with the public Prosumer (a household which both produces and consumes electricity).

Figure 2: Increased contractual complexity DSOs will need to manage
The emerging problem with the DSO role

Working within this model the DSO will be required to balance demand and supply in real time whilst connecting new and varying assets to the distribution network. The current DNO operating model has evolved over many years to support the safe and efficient operation of the distribution networks, but accelerating changes in the power generation mix towards higher volumes of diverse, small scale and intermittent DER will place greater strain on this network.

In addition, there will be those who choose to disconnect from the network. Some countries are already seeing large communities of residential, commercial and industrial customers choosing to migrate to ‘off-grid’ microgrid solutions, using a connection to the main network as a backup facility. California, for example, has more than 30 microgrids in operation and contains 40% of all residential PV within the USA. Germany currently has over 300MWh of residential storage and can cover 60% of peak demand with its PV capacity.

Microgrids are already a fact of life in the mainland UK, with examples such as the Shetland Islands already showing their viability. Our energy landscape is becoming a more balanced portfolio, with 17% of our electricity now generated from bioenergy/waste and 9% from wind/solar/hydro. A big shift to offshore wind is also underway and this will increase with the renewables auction this autumn.

Some countries are dealing with even greater network disruptors: by 2020 all substations in South Australia are expected to be in reverse flow due the proliferation of DER. Another example of a transformational, emerging technology is the 100MW Tesla battery in South Australia. Taken to its logical conclusion this creates an inevitable redundancy for some of the distribution assets that the DSO will be paid to own.

There is obvious tension created by the emerging DSO world. The SO function of the DSO must have an emphasis on viewing the whole electricity system/market, ensuring sufficient and appropriate stakeholder access. Under the current proposed DSO model this function is to be executed by the organisations that own the distribution network (the AO) and are paid to protect its integrity. The possible perception is that the DSO could not operate a level playing field for system connection auctions which might include a combination of demand side management, distributed generation, and storage. These solutions have potential negative effects on the existing distribution network.

It is not, therefore, too controversial to state that keeping the SO role within the same entity as the AO creates a conflict of interest. The AO could exert undue influence over the decision making of the SO to facilitate a ‘neutral’ market for energy supply. DSOs are likely to continue to earn regulated income for owning and maintaining the electricity distribution networks and may advocate more capacity to be built, then owned. Whilst in some cases this may be the correct solution, it obviously leaves the DSO open to the challenge of operating in its own interests rather than that of the wider stakeholder group. This conflict could undermine the growth of a fully flexible and low-carbon distribution system.
How can this be resolved?

As the system changes the monopoly DSOs will be forced to adapt. Liberalising the DSO structure is an important instrument to preserve the public benefit orientation of the distribution network. The system will change to adapt to the new ways the public will choose to interact with it as they segment in their activities and interaction with the network (e.g. selling in, flexibility of use, ability to go green etc.).

The market for balancing supply and demand must allow all parties to participate on a level playing field, otherwise the consumer benefit may be diluted or lost. To best make that happen three conditions must be in place and managed by the facilitator.

The figure below demonstrates that the market facilitator must put the consumer at the centre of its decision making, whilst also balancing environmental, competitive, legal, regulatory and safety factors – making for a complex mix.

The distribution network must therefore involve an element of decision making rather than it being the central factor. The SO role will therefore be separated from the AO role of the DSO as part of the DNO-DSO transition to avoid this perceived conflict of interest. It is a matter of WHEN market and technological forces drive this separation, not IF.

When separation becomes a legal requirement the DSOs will need to be ready to accept and implement it. Experience from continental Europe suggests that resistance to necessary change benefits no one. The Dutch energy companies have been obliged to separate their grid operations from energy production and supply as of 2011. The law came into effect in July 2008 but companies were given time to implement the separation. Two incumbent integrated energy companies opposed the law and took the case to the European Courts. They ultimately lost and completed legal separation early in 2017.

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**Figure 3: Market conditions necessary for successful operation of the DSO model**

**Market Structuring**

The market facilitator must be free to evolve market operations as the whole system evolves – free from ties to any other interested parties. This will be within the rules set out by the regulator.

**Market Intelligence**

The market facilitator must provide the right signals for flexibility, energy and capacity bids based upon the needs of the whole electricity system and the end consumer – rather than just the needs of the existing distribution infrastructure.

**Market Access**

Notwithstanding their method of connection or service offering, all interested parties must be capable of accessing the electricity market and physical network through the market facilitator at the time of their choosing – total market flexibility.
Separated SOs as market facilitators have the advantage of being able to consult the AO on distribution network changes, whilst remaining independent of network ownership to establish the trust of market participants. In such a model the AO is likely to hold an advisory role, with a potential veto in some circumstances.

Proposed changes to the operating model that are being mooted for the DNO-DSO journey already represent a significant step forward in the way in which distribution is managed, but separation of AO-SO brings further benefits to the wider electricity system:

- The SO can take a more proactive role in managing the system for the benefit of a wider group of stakeholders than today.
- Those wishing to invest in the industry will have confidence that the system across the country provides a level playing field for them to confidently put capital into the market for energy, capacity and services.
- The SO will be better placed to respond to and facilitate the ongoing transformation of the electricity system based upon market demands (a long journey from where we are today).
- It will allow new business models to develop which are not possible/ viable under the current industry model.
- It removes the problem of vertically integrated companies tending to hinder the entry of new competitors which is key to the efficient operation of the electricity system of tomorrow.
- The SO will be expected to actively communicate with DER providers and provide a level playing field for their market; there may be less incentive to do that if the SO is part of the body which owns the network.

There is a view that natural monopolies cause higher costs and lower capabilities and a system that promotes non-discriminatory distribution network access will challenge such inefficiencies. However, a full cost-benefit analysis will be needed to prove that AO-SO separation is the correct approach due to the potential loss of economies of scale and the potential for ‘double margins’ as more parties will exist in the new market model.
What separation will look like

There are four broad options for separation which the industry must consider:

- Accounting separation: Separate financial accounts required for the AO and SO but shared operational activities remain possible.
- Functional separation: As with accounting separation, but separate operational and management activities are required.
- Legal separation: As with functional separation, but the AO and SO become separate legal entities. Common parent company ownership would be possible, but decision making within each entity will be independent and clear ‘Chinese Walls’ must be in place.
- Ownership separation: No one legal entity can hold majority shares in both the AO and SO.

To avoid any conflict of interest, legal separation is the most likely result, albeit through the interim step of accounting and functional separation over many years. It would be impossible for an SO to be owned by an AO as the conflict between the interests of asset ownership and the purpose of the SO to operate an efficient power market agnostic of capital solutions would remain. The journey to legal separation is likely to run to the timeline below:

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Common ownership between a fully regulated and a partially regulated competitive organisation would inhibit competition, hindering new market entrants. Should the SO become a lightly regulated competitive role with external market challengers (which it is likely to become), then this further supports legal separation by 2027.
How will the separated SO-AO model operate from 2022?

A previous paper developed a conceptual model for how the SO-AO commercial/contractual relationships might look:

We now expand upon the above to set out, in more detail, how we see the interaction between the two elements working to provide the full range of DSO responsibility:
Commercial – DSO role

The DSO role must provide accurate and timely charging information to all customers and stakeholders, timely collection of revenue and payment of fees, maintenance and capital investment costs. It should be noted that a central body may own the data (in the same way as Elexon or Xoserve do), but the DSO will provide access through its platform. These responsibilities will be split between the two entities as shown below:

<table>
<thead>
<tr>
<th>Commercial – SO led activities</th>
<th>Commercial – AO led activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handling market bids for all system solutions, auctioning and coordinating proposals. Agreement of all fees and charges, recovery of income from and making payments to all market participants, including:</td>
<td>Provision of required information to the SO to enable successful commercial operation and calculation of AO use of asset payments, including:</td>
</tr>
<tr>
<td>Creation and management of all necessary contractual relationships with customers.</td>
<td>Calculating and issuing ’use of asset’ charging statement to the SO.</td>
</tr>
<tr>
<td>Auction of contracts for the delivery of required investments and services.</td>
<td>Submitting invoices for ’use of asset’ charges to the SO and collecting payment.</td>
</tr>
<tr>
<td>Calculation of all charges and fees to be levied on distribution network customers.</td>
<td>Providing relevant and accurate data to the SO to enable customer charging to be calculated.</td>
</tr>
<tr>
<td>Maintaining and communicating all necessary charging information with customers.</td>
<td>Calculating capital investment requirements and contractually engaging relevant suppliers.</td>
</tr>
<tr>
<td>Agreement of costs to be paid for services provided for maintenance, operation and balancing across the distribution network.</td>
<td></td>
</tr>
<tr>
<td>Agreement of fees to be paid to SSE/SPEN/GBSO for use of the transmission network for the purposes of distribution network balancing.</td>
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<tr>
<td>Provision of adequate systems for the collection and payment of fees and charges.</td>
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<tr>
<td>Payment of AO revenues for use of and access to distribution network assets.</td>
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</table>
## Investment – DSO role

The DSO role must provide investment in the whole system to improve value and service to customers and provide an opportunity for all parties to successfully invest alongside it. These responsibilities will be split between the two entities as shown below:

<table>
<thead>
<tr>
<th>Investment – SO led activities</th>
<th>Investment – AO led activities</th>
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</thead>
<tbody>
<tr>
<td>Providing the platform, and evaluating market offerings for generation, storage, demand management, etc. based upon stakeholder needs, including:</td>
<td>Optimising the distribution network to meet all stakeholder requirements through strategically targeted investment, including:</td>
</tr>
<tr>
<td>Identifying changes in network capability requirements based upon interactions with customers and transmitting these to the AO.</td>
<td>Managing the annual capital investment process with respect to the distribution network and its emerging load pattern.</td>
</tr>
<tr>
<td>Supporting the development of innovative non-capital-intensive solutions to meet distribution network and customer requirements.</td>
<td>Evaluating SO requirements and making investment decisions, determining what enhancements to the networks are required.</td>
</tr>
<tr>
<td>Inputting to AO investment plans based upon projections of network loading.</td>
<td>Making distribution network design changes to maintain and improve operability, including appraisals of asset build and non-build options.</td>
</tr>
<tr>
<td>Supporting the AO as it makes investments to connect customers to the distribution network.</td>
<td>Developing build and non-build network intervention options with other regional AOs.</td>
</tr>
<tr>
<td>Identifying requirements for Active Network Management (ANM).</td>
<td>Install ANM as necessary to support optimum distribution network operation.</td>
</tr>
<tr>
<td>Carrying out minor maintenance activities required to protect network performance.</td>
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</tbody>
</table>
**Connections – DSO role**

The DSO role will be to manage all applications to connect and provide offers to customers for connection onto the distribution network based on improving whole system performance.

<table>
<thead>
<tr>
<th>Connections – SO led activities</th>
<th>Connections – AO led activities</th>
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</thead>
<tbody>
<tr>
<td>Acting as the single point of contact for all customer types, facilitating all aspects of their ‘customer connection journey’, acting as neutral market facilitator in the process, including:</td>
<td>Carrying out the connections to the distribution network itself, including:</td>
</tr>
<tr>
<td>Creating and managing customer profiles for connections purposes, including security profiling.</td>
<td>Ensuring the delivery of all construction and site works relating to customer and other connections.</td>
</tr>
<tr>
<td>Managing the customer connection journey, from enquiry through connection offer, to Go-Live.</td>
<td>Carry out network diversions and asset upgrades as necessary to facilitate the connections process.</td>
</tr>
<tr>
<td>Identifying and communicating all agreed customer connections requirements to the AO.</td>
<td>Understand customer connection and load/feed requirements from the SO to enable technical support to the customer.</td>
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<td></td>
<td>Provide financial information to the SO about the work undertaken on customer connections.</td>
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</tbody>
</table>
Planning – DSO role

The DSO role will be to develop the distribution network outage plan and an agreed means of implementation of the plan.

<table>
<thead>
<tr>
<th>Planning – SO led activities</th>
<th>Planning – AO led activities</th>
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</thead>
<tbody>
<tr>
<td>Providing the AO with network access requirements/requests to manage and maintain the distribution network, including:</td>
<td>Providing distribution network structure and capacity to enable the SO to deliver required network operability, including:</td>
</tr>
<tr>
<td>Planning of minor operational maintenance activities across the distribution network.</td>
<td>Planning of all capital and major maintenance works across the distribution network.</td>
</tr>
<tr>
<td>Full customer and stakeholder system access management and ‘whole system’ planning.</td>
<td>Provide network models, including system and asset data and to the SO.</td>
</tr>
<tr>
<td>Coordination of distribution system models and data. Model/data exchange with stakeholders including the SSE/SPEN/GBSO.</td>
<td>Coordinate access plans to the distribution system with the SO (the SO having final approval).</td>
</tr>
<tr>
<td>Monitoring of whole system changes to maintain security and integrity of system access plans.</td>
<td>Optimise and prioritise distribution network upgrade and investment; based upon market and system requirements.</td>
</tr>
</tbody>
</table>

Approve and coordinate system access plans regarding efficient system security and maintenance and/or investment requirements.
Operations – DSO role

The DSO role will be to operate the distribution network and enable access to assets for third parties for capital and maintenance works.

### Operations – SO led activities

- Responsibility for determining system requirements for security of supply, and to maintain performance within parameters of carbon targets, including:
  - Providing and maintaining a reliable, secure, and safe electricity distribution network, including:

- Optimising system performance based on a holistic use of the local and neighbouring distribution networks.
  - Planning and facilitating access to the distribution network to allow capital and major maintenance works to be executed.

- Carrying out minor operations-related maintenance work.
  - Decision making and advice to the SO with respect to asset capability and availability to support network operation.

- Real time configuration of the distribution network.

- Managing integral distribution network assets such that they operate efficiently, safely and to specified capability limits.

- Consulting and communicating with all distribution network customers on major changes to network configuration.

- Calling upon flexibility services to maintain system performance and managing the risk of those interactions.

- Working with the SSE/SPEN/GBSO with regards to country-wide balancing requirements.

As can be seen from the above activity splits there is a variance between the level of responsibility of the two parties at each level. The list can be used as a rule of thumb to set out how the early DSOs should start to prepare themselves and their respective departments for the split.

However, given that the DSO model is not a strictly defined role the above tables are likely to represent a ‘pick and mix’ approach depending upon geographical, market and business model landscapes. As a simple guide, the weight of accountabilities is likely to look something like the model below:

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**Figure 6: Relative accountabilities of the SO and AO**

<table>
<thead>
<tr>
<th>SO Led</th>
<th>AO Led</th>
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<tbody>
<tr>
<td>Commercial</td>
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<tr>
<td>Planning</td>
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<tr>
<td>Operations</td>
<td></td>
</tr>
</tbody>
</table>
Implications for the regulator

The RIIO price control mechanism will need to be fully reviewed with a view to providing a supporting framework in RIIO2, with the requirement to divide it across the SO and AO elements. There will need to be clear joint and several licence obligations for both bodies – even prior to a split. In addition, Ofgem must provide an interim mechanism to enable existing DSOs to recover the costs associated with executing the legal separation to SO-AO.

Whilst the SOs will be commercial and are likely to be privately owned or PLCs, they will need to be regulated in a way that ensures public accountability. This will likely require the SOs to create their own officially recognised body, or adapt the existing Energy Networks Association (ENA) model, to negotiate an efficient and proportionate regulatory framework with Ofgem and BEIS.

Any new regulatory regime would have to address the following areas:

- Enabling the AO to make effective build/no-build decisions in response to SO needs.
- How to enable the new neutral markets, which will be the centrepiece of the SO’s day-to-day interaction with their customers, including guidance on commercial arrangements for all parties under the new model.
- A revised set of operations-focused obligations aimed at the SO that support the public good and at the same time allow the SO to operate in a competitive market.
- Revised, published KPI suites for both SO and AO operations and a mechanism for engaging both parties on those KPIs from a licensing perspective.
- Both AOs and SOs having industry level financial incentives to drive benefits for consumers, even given a competitive open-market situation for the SO.
- A customer forum to represent the broader nature of the DSO customer base to provide an understanding of customer requirements as they evolve.
- Clarification of security of supply requirements and how those obligations sit between parties acting in the SO and AO roles.

Given the rapidly changing nature of energy distribution needs and the technology surrounding it, an eight-year regulatory cycle is not the most effective way to operate in the AO-SO world. Something more agile is called for, with regulations centring on whole-system efficiency to benefit the consumer.

The above would mean that RIIO2 will not be in the same form as RIIO1. Instead a more ‘transitory’ model will bridge the gap between the end of RIIO1 and the end-state new regulatory world. This is not to abandon all the principles of RIIO, but it must be recognised that the new model will rely more upon market forces and open competition to support the overall system goals.
The new electricity system structure

In a world where there is a split of GBSO/TAO, split DSOs, storage owners and Prosumers, it is fair to ask the question of who should lead and follow in the operation and development of the market. In the previous paper, we set out the managed interdependence view of the system (4, below), which still holds true in a separated DSO world.

The GBSO will continue to coordinate balancing activities across the country, working with the SOs and AOs for the good of the whole transmission and distribution systems. The SO will be required to provide system balancing services to the GBSO, providing it does not interfere with the needs of the SO’s customers. Therefore, the SOs will need to coordinate across boundaries to assist each other in supporting the GBSO.

Beneath the level of GBSO-SO coordination, the model becomes quite different. When the DSO splits, an obvious step from government will be to put the SO role out to tender to bring new entrants into the sector, introducing fresh ideas and innovation.

The SO will therefore no longer be geographically constrained to the current DNO coverage areas. Nor, given the widely varying geographical uptake of DER (both in volume and type) and EVs, is it reasonable to assume that they could practically be so constrained. Geographical fragmentation of the SO role means that SOs can better focus on the local upward and downward market and act as a true neutral market facilitator. If we accept that geographical constraints disappear, then logically good performance could be rewarded with more, or larger SO ‘franchises’.

Figure 7: Future state for the UK power system moving from state 1 to state 4

Coordinated balancing approach
- GBSO maintains its role in coordinating generation and transmission UK wide
- Independent smaller SOs collaborating/contracting with GBSO to coordinate on a national and area basis
- MicroGrids play a large part in regional power generation/transport. MGs contract with SOs. Large power generation/transport assets are rare.

Fragmented balancing approach
- GBSO role reduces as UK-wide supply and coordination reduces, large power generation/transport assets are rare
- SOs increase in number, but reduce in size as more players enter the market. Capacity and security highly regionalised
- Microgrids play a large part in regional power generation/transport. MGs group together or contract with SOs
SOs can then readily bid for contracts against other incumbent SOs and the areas managed could flex over time dependent upon SO performance against regulatory KPIs. Effective separation of vertically integrated organisations has been used as the solution to anti-competitive behaviour in the UK and abroad. We are likely to move, post 2027, towards a model such as the one set out below.

This model is both a threat and an opportunity for the SO as it will need to defend its existing operating areas whilst simultaneously looking for expansion. Innovation will become a premium in the face of new entrants and business strategy will need to be developed to exploit the wider opportunities created through this model. In addition, contracting for SO areas opens up the possibility of setting up joint ventures with other organisations.

Given the requirement for SOs to coordinate on some solutions this would need to be carefully managed and the willingness to collaborate would have to be one of the key regulatory measures to keep the collaborative-competitive balance. This will be a complex challenge for the regulator, as to demonstrate its suitability to manage more and wider SO areas an SO would have to demonstrate its ability to collaborate with other SOs, where necessary, for the public good.

The regulator must be able to assess the effectiveness of services within the distribution network, and the relative cost and the opportunity cost of changing an SO before an area could be put out to tender. The existence of enough competitors is essential for the development of an efficient market. In the initial term the existing DSOs would provide sufficient competition, but there is no reason that new entrants couldn’t gain market share. The most efficient number of firms depends upon economies of scale: splitting into too small units leads to inefficiency of investment, so the regulator would have to review this periodically.
**The next steps to deliver change**

Given that this is an historic shift in the landscape of the distribution system, DNOs should continue to engage proactively with Ofgem and BEIS to set out their point of view, with the aim of influencing the change rather than simply having it imposed on them. As part of their DNO-DSO journey, DNOs should weave in the principles of AO-SO independence in readiness for separation.

DNOs should be examining their skill base for gaps identifiable from the activity lists above. For example, areas such as market facilitation are new to DNOs and it is likely that these will need to be addressed to ensure that they can position themselves as the natural early owners of the DSO role – and that they are best placed to maintain both AO and SO roles after the split.

Given the nature of some of the new services and activities DNOs should also be examining their risk-reward appetite. Some of the activities will not have a clear income and profit position, as they are still in early definition, and the DNO must establish where they wish to invest to protect market share and access new income streams as the market and system evolve.

Ofgem and BEIS should be issuing statements around their thinking on AO-SO separation, as the longer it remains speculative rather than a firm destination, the longer it will take to realise. At present, DNOs are working towards RIIO2 and the already nebulous DSO journey, so some clarity at an industry level would be well received. The direction of travel should be set now, be clear and explicit. However, the introduction of the AO-SO model must be an evolutionary element of the DNO-DSO journey, and the ‘future state’ shown in the model above may be reached in the late 2020s. This being the case, DSOs should be free to develop their commercial offerings and other innovations prior to any actual legal separation.

The power system in Great Britain is changing rapidly. DNOs have already started to become embryonic Distribution System Operators (DSOs), carrying out limited DSO services, and this trend will accelerate. To survive the transformational change ahead they must begin to reorganise into distinct AO and SO businesses. It is likely that the nature of the future SO will change beyond all recognition from where we are today.

It is essential that DNOs act now if they are to take control of their future.
About Capgemini

A global leader in consulting, technology services and digital transformation, Capgemini is at the forefront of innovation to address the entire breadth of clients’ opportunities in the evolving world of cloud, digital and platforms. Building on its strong 50-year heritage and deep industry-specific expertise, Capgemini enables organisations to realise their business ambitions through an array of services from strategy to operations. Capgemini is driven by the conviction that the business value of technology comes from and through people. It is a multicultural company of 200,000 team members in over 40 countries. The Group reported 2017 global revenues of EUR 12.8 billion.

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