

Position paper

Position paper on Distribution System Operation: our approach and regulatory priorities

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This position paper outlines our approach to Distribution System Operation policy development, highlighting our priorities and forward work plan. This paper is published alongside the RIIO-ED2 Open Letter Consultation. A number of the topics we cover here will support the delivery of RIIO-ED2 objectives, but the focus is on actions now, progressing tangible change prior to 2023. We are opening a dialogue on how this work will be progressed, and invite feedback on the content of this document from all stakeholders.

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Contents

Executive summary	4
Our approach to distribution system operation	4
The DSO outcomes and our work to achieve them	4
We want to hear from you	6
Introduction	7
The scope of this paper	7
Structure of this paper	7
How to respond	7
1. Energy system flexibility and distribution system operation	8
Energy system flexibility	8
Distribution system operation – our underpinning philosophies	10
Coordination with the price controls	11
2. Strategic outcomes of our DSO reform policies	13
Overview	13
Clear boundaries and effective conflict mitigation between monopolies and markets	13
Effective competition for balancing and ancillary services, and other markets	14
Neutral tendering of network management and reinforcement requirements, with a level playing field between traditional and alternative solutions	14
Strongly embedded whole electricity system outcomes	14
3. Overview of our DSO work and next steps	16
Overview	16
DNOs and new contestable services	16
Key enablers for DSO functions	17
Development of coordinated flexibility markets	18
Next steps	19
Appendix 1: Programme of work	22
DNOs and New Contestable Services	22
Context and scope of workstream	22
Workstream policy objectives	23
Analysis	23
Discussion and conclusion	25
Next steps	25
Key enablers for DSO functions	25
Context and scope of workstream	25
Data best practice	27
Workstream policy objectives	28
Analysis	28
Summary and conclusions	33
Next steps	33
Development of coordinated flexibility markets	34
Context and scope of workstream	34
Workstream policy objectives	35
Analysis	35
Summary and conclusion	37
Next steps	37
Appendix 2: Responding to this position paper	38
How to respond	38
Your response, data and confidentiality	38
Appendix 3: Privacy notice on consultations	39

Executive summary

The energy system is experiencing a fundamental transformation as decarbonisation, digitalisation and decentralisation embed themselves across the system. This opens up opportunities for the energy system to be more efficient and meet net zero greenhouse gas emission targets. But also introduces new challenges and potential risks for consumers. We believe that the interests of consumers are best protected by an energy system that can attract investment and innovation and keep costs as low as possible for consumers, while also promoting sustainability. So we need to **ensure the regulatory environment that we oversee adapts** where necessary to meet these goals.

Providers of flexible energy resources, including storage, demand-side response and aggregators are important contributors to achieving system efficiency. We want **flexibility providers to realise the value they bring to the system**; encouraging efficient levels of investments in these technologies and business models. We have a number of programmes of work to help achieve this, through enabling pricing signals to encourage efficient electricity network use, and putting in place arrangements that further encourage efficient behaviour.

Our approach to distribution system operation

System changes are particularly noticeable at the electricity distribution system level. As we progress towards a net zero greenhouse gas economy, we expect this trend to continue. This document is a position paper, written for consumer representatives, industry and other stakeholders, to inform readers about our **work priorities and ongoing policy thinking about distribution system operation (DSO)**. It particularly focusses on work that we believe needs to be delivered **in advance of the next electricity distribution price controls (RIIO-ED2)** that start in 2023. Because much of this work will facilitate or inform RIIO-ED2 as distribution network operators (DNOs) take on certain DSO roles, we are publishing this position paper alongside the RIIO-ED2 Open Letter Consultation on the forthcoming electricity distribution price control.¹

Two philosophies underpin our work on DSO. First, we consider DSO is a set of functions and services that need to happen to run a smart electricity distribution network. This **does not focus on a single party as an operator, but recognises roles for a range of parties to deliver DSO**. Second, optionality is currently valuable given the changing nature of the energy system. We believe that we should not make premature decisions that lock the energy system into path-dependent routes whilst there is still uncertainty about potential developments. Instead, we should maintain optionality where we think this could be beneficial. This means **delivering major progress to DSO now, but keeping options open for wider institutional change in future**.

The DSO outcomes and our work to achieve them

We want to achieve **four strategic outcomes** from our DSO reforms:

1. Clear boundaries and effective conflict mitigation between monopolies and markets.
2. Effective competition for balancing and ancillary services, and other markets.
3. Neutral tendering of network management and reinforcement requirements, with a level playing field between traditional and alternative solutions.
4. Strongly embedded whole electricity system outcomes.

¹ <https://ofgem.gov.uk/publications-and-updates/open-letter-consultation-riio-ed2-price-control>

We describe in this paper **three workstreams that will progress DSO policy to deliver these strategic outcomes**. These are illustrated in the figure below.

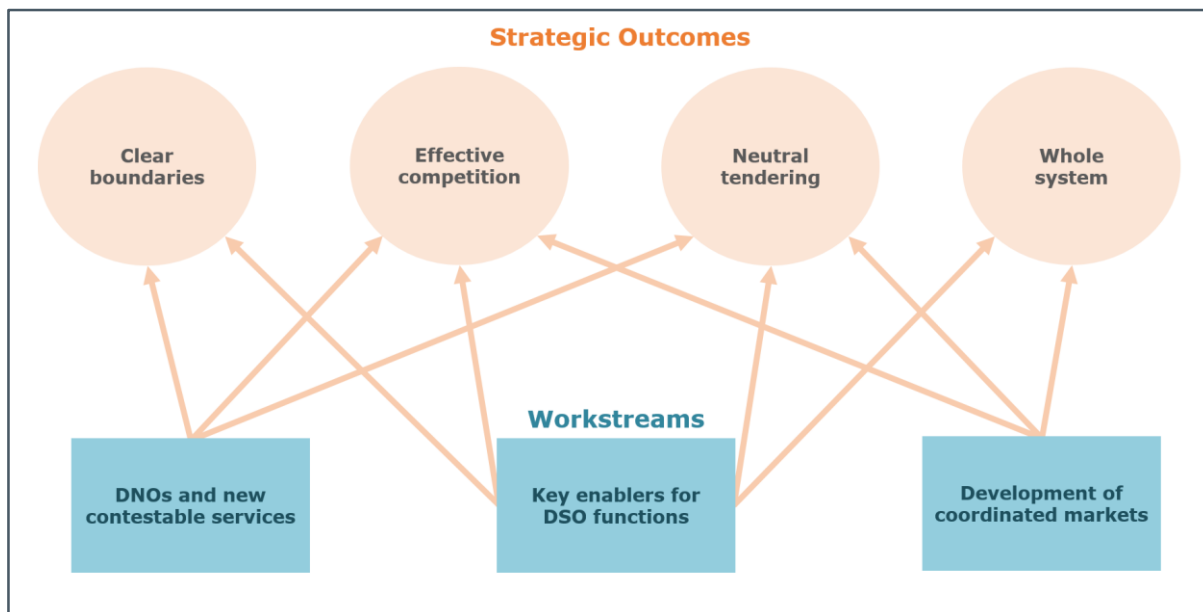


Figure 1 Relationship between our workstreams and strategic outcomes

In the *Distribution network operators (DNOs) and new contestable services* workstream, we are identifying the risks and benefits to consumers of DNOs delivering new activities in potentially contestable areas. We are developing policy positions on appropriate roles for DNOs that promote effective competition but also drive value where actions are best provided by monopolies. The analysis presented in this paper forms the basis for the decisions we will take in the coming year and going forward on **whether or not DNOs should take on specific contestable roles**.

In the *Key enablers for DSO functions* workstream, we recognise the need for technology, data and engineering competencies and capabilities to fully unlock the benefits of the developing energy system. We believe there are risks of inaction on key enablers. We see a role for ourselves to ensure that their development does not create information imbalances or otherwise unnecessarily lock-in DNOs to certain roles, for example through the use of proprietary technologies and data formats. We support best practices for data, including **interoperability, visibility and accessibility of data** across the energy industry. Whilst industry must take ownership of delivering this where they can, we will be looking at where we can improve interoperability and data transparency, including where there are existing licence requirements. We will start with a consultation later this year on revamping the Long-Term Development Statement (LTDS).² This work also aligns with the recommendations from the Energy Data Taskforce.³

Through our *Development of coordinated flexibility markets* workstream, we want to **support and steer the development of new flexibility markets**. We clarify our expectation that industry must coordinate new flexibility markets with each other and other markets, and that they must properly reflect the value of flexibility to the system. We will be holding a workshop

² The LTDS is an annual publication from every Electricity Distribution Licence holder, in accordance with the requirements Form of Statement under Standard Licence Condition 25. The LTDS is intended to provide prospective generators, demand customers and other interested parties with data on network planning and forecasting.

³ <https://es.catapult.org.uk/news/energy-data-taskforce-report/>

later this year to discuss developments in this area. This work is also closely linked to our Future charging and access programme, which includes the access arrangements reforms, forward looking charges reforms and the Targeted Charging Review (TCR).⁴ In particular, the access arrangements reforms are developing improved network pricing signals, which will complement the contracted flexibility market reforms being undertaken by the DNOs and the electricity system operator (ESO).

We expect our work to evolve over time, as developments steer where we need to direct regulatory focus. At this time, we believe it's **too early to implement institutional reform at distribution level**, as DSO functions are still developing. This is not a case for inaction now; there is progress to be made by industry and us today. In this paper, we set out expectations for DNOs to take on new roles and neutrally facilitate for network and system needs now, and describe the work we are doing to develop appropriate policy reforms to drive progress in this space. A key part of our approach is to ensure that progress today embeds the optionality to explore alternative models for institutional arrangements in future.

We recently concluded legal separation of the ESO, to better enable the ESO to take a more proactive role in managing the changing electricity system. We will be undertaking a review of the ESO arrangements in the coming year and considering whether further changes are required. As DSO functions evolve, we will consider whether there may be a case for greater separation of certain DSO functions from the 'traditional' DNO functions, or any wider reforms to institutional arrangements at distribution level. This includes considering the effectiveness of DNOs in managing conflicts of interests and neutrally facilitating markets.

We want to hear from you

Our three workstreams are all interlinked with each other and with other changes we are making to the regulatory landscape. We will continue to ensure we coordinate across topics, taking account of developments more widely, and clearly signpost our direction of travel. On an ongoing basis, we want to hear from stakeholders, to both identify priorities and to track progress. We **invite comments from stakeholders on the DSO work we set out in this document**. Please do send us any comments by the **15 October 2019**. We look forward to hearing from you.

⁴ In May 2019, we published letter providing an update on the timelines and key next steps for the Future charging and access programme. See [here: https://www.ofgem.gov.uk/publications-and-updates/update-timing-and-next-steps-future-charging-and-access-reforms](https://www.ofgem.gov.uk/publications-and-updates/update-timing-and-next-steps-future-charging-and-access-reforms).

Introduction

The scope of this paper

This position paper outlines our approach to DSO policy development, highlighting our priorities and forward work plan. This paper is published alongside the RIIO-ED2 Open Letter Consultation.⁵ A number of the topics we cover here will support the delivery of RIIO-ED2 objectives, but the focus is on actions now, progressing tangible change prior to 2023. We are opening a dialogue on how this work will be progressed, and invite feedback on the content of this document.

Structure of this paper

This paper is formed of a main body of three sections: our view on energy system flexibility and DSO, our strategic outcomes, and our workstreams to develop the policy that will drive delivery of those outcomes. The appendix describes and explains our workstreams in more detail.

How to respond

1. We are seeking feedback on this document, guided by three broad questions:
2. Do you agree with our strategic outcomes?
3. Do you agree that our work programme will help to deliver the strategic outcomes?
4. Do you have anything to add to the thinking and analysis that informs how we propose to deliver our programme of work?

Please return feedback to flexibility@ofgem.gov.uk by 15th October 2019. If you wish us to keep all or part of your response confidential, please clearly mark as appropriate.

⁵ <https://ofgem.gov.uk/publications-and-updates/open-letter-consultation-riio-ed2-price-control>

1. Energy system flexibility and distribution system operation

Energy system flexibility

- 1.1. The processes of decarbonisation, digitalisation and decentralisation are progressively embedding themselves across the energy system. This opens up a number of opportunities, including more efficient network use, new ways for consumers to manage their energy and earn new revenue streams, and realising a low carbon economy.
- 1.2. But of course, with opportunities come risks. If the wrong price signals are sent, there could be costly inefficiencies in our networks. If there isn't coordination across the system, we can't reap the benefit of the new opportunities and could add more complexity and delays to necessary changes. If we don't get our regulation of this new system right, there could be unnecessary risks to consumers, barriers to market developments and higher costs. So we need to ensure that the way we protect consumers and regulate the markets and network companies adapts accordingly.
- 1.3. Our Smart system and flexibility plan,⁶ published jointly with the Department for Business, Energy & Industrial Strategy (BEIS) in 2017, set in motion some key reforms to remove regulatory and system barriers to a smarter energy system. Since this was published, we have seen progress towards this goal, including via industry forums, like the Energy Network Association (ENA) Open Networks project, and by individual companies. But there is more to do. The coming years will be crucial for Ofgem, government, industry and other stakeholders to build on the progress made so far, to help deliver an energy market – and system – which works for all consumers whilst meeting our country's long term climate targets.⁷
- 1.4. While the energy system continues to evolve, we know that consumers will still seek a safe, reliable, and affordable supply of energy. Ofgem's core purpose is to protect the interests of consumers now and in the future. We believe that these interests are best protected by an energy system that can attract investment and innovation and keep costs as low as possible, while also promoting sustainability. In this context, we want flexibility providers to realise the value they bring to the system. We know that this is vital to achieve an efficient system and deliver decarbonisation at least cost to consumers. There are two aspects to realising this goal:
 - i. Enabling effective signals to encourage efficient use of networks and systems
 - ii. Having arrangements that encourage efficient behaviour.
- 1.5. We have a number of work programmes to achieve these aims.
- 1.6. To enable effective signals, we are focussing on improving price signal flexibility (where actions are taken in response to the price of energy or network use) and

⁶ <https://www.gov.uk/government/publications/upgrading-our-energy-system-smart-systems-and-flexibility-plan>

⁷ <https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-net-zero-emissions-law>

contracted flexibility (where parties trade and directly contract with one another to procure short or longer term network and system needs).

1.7. Work to deliver price signal flexibility includes:

- Our reform of electricity network access and forward-looking charging. This will improve the price signals that indicate where and when it is most efficient to use the network whilst reducing non-cost reflective distortions in existing charging arrangements.⁸ More cost-reflective and locationally granular signals for network use will minimise the need for network reinforcement to an efficient level. Better network price signals can indicate when it is efficient to shift demand or generation.
- Continuing to embed the building blocks for sending signals to consumers. This includes investigating market-wide half-hourly settlement, continuing to support the smart metering programme and working closely with government on issues relating to electric vehicles.

1.8. To improve contracted flexibility, our work includes:

- Continuing to incentivise the ESO to complete their balancing and ancillary service reforms.
- Working with network companies to ensure they explore both long and short-term flexibility tenders as part of their business as usual network management.
- Working with industry to ensure the above contracted flexibility markets are sufficiently coordinated, with each other and with other markets that flexibility providers engage in.

1.9. In terms of arrangements to encourage efficient behaviour, our work includes:

- The Future Energy Retail Market Review,⁹ which is considering how the regulatory framework could better enable a wider range of new business models, products and services to come to market, while also ensuring appropriate safeguards are in place for all consumers.
- Reforming the industry codes and governance of them jointly with BEIS, to make sure they deliver more efficiently for a smarter energy system.¹⁰
- Supporting BEIS on the review of engineering standards related to networks, to consider if these need updating to meet the changing system needs.¹¹
- Our RII0-2 package of price controls that starts in 2021 for most monopoly companies and 2023 for electricity distribution companies. These seek to sharpen incentives on network companies, through greater efficiency and whole system incentives, increased competition and continued support for innovation.
- Work we are delivering in advance of the start of RII02, as set out in this document, including ensuring network companies manage any real and perceived conflicts of interest, improve whole system coordination, and embed the key enablers needed in the evolving system - a core part of which is gathering and sharing data.

⁸ More information on the reform of network access and forward-looking charges can be found here: <https://www.ofgem.gov.uk/electricity/transmission-networks/charging/reform-network-access-and-forward-looking-charges>

⁹ <https://www.gov.uk/government/consultations/flexible-and-responsive-energy-retail-markets>

¹⁰ <https://www.ofgem.gov.uk/publications-and-updates/consultation-reforming-energy-industry-codes>

¹¹ <https://www.gov.uk/government/publications/electrical-engineering-standards-independent-review>

- 1.10. We welcome the recent report from the independent Energy System Data task force (EDTF),¹² jointly commissioned by Ofgem and BEIS, and are taking steps to help realise their recommendations across a number of work areas, including some of the work described in this document. We believe data plays a crucial role in enabling competition and innovation to drive down prices for consumers and provide them with new products and services.

Distribution system operation – our underpinning philosophies

- 1.11. This paper focusses on the building blocks and framework needed to support the development of DSO. We think of DSO as the effective delivery of multiple functions and processes in the distribution network to manage the system and network. Given the change in the energy system, this will require the delivery of new functions and better coordination and efficient provision of existing functions.
- 1.12. Effective delivery of DSO functions will require significant progress from DNOs, and also the many other parties involved in the delivery of DSO functions. Our approach is to focus on the effective delivery of functions now while maintaining institutional optionality for the future.
- 1.13. Figure 2 presents a range of simplified DSO functions, indicative of the processes and activities that must be undertaken for effective DSO. This is the product of a review and synthesis of literature and analyses on the requirements of a smart and flexible electricity network.¹³ There are multiple services associated with the delivery of each function, and there may be numerous parties involved in their delivery. Therefore, we do not consider that individual parties should necessarily be the sole provider of a given function.

¹² <https://es.catapult.org.uk/news/energy-data-taskforce-report/>

¹³ This included the Open Networks Project: <http://www.energynetworks.org/electricity/futures/open-networks-project/>; the Future Power Systems Architecture Project: <https://www.theiet.org/impact-society/sectors/energy/energy-news/fpsa3-fast-track-to-britain-s-future-power-system/>; The Helm Cost of Energy Review: <https://www.gov.uk/government/publications/cost-of-energy-independent-review>; the IGov project: <https://projects.exeter.ac.uk/igov/>; , NY-REV: <https://rev.ny.gov/>; CEER documentation; international examples; wider academic literature and a Cambridge Economic Policy Associates consultancy report.

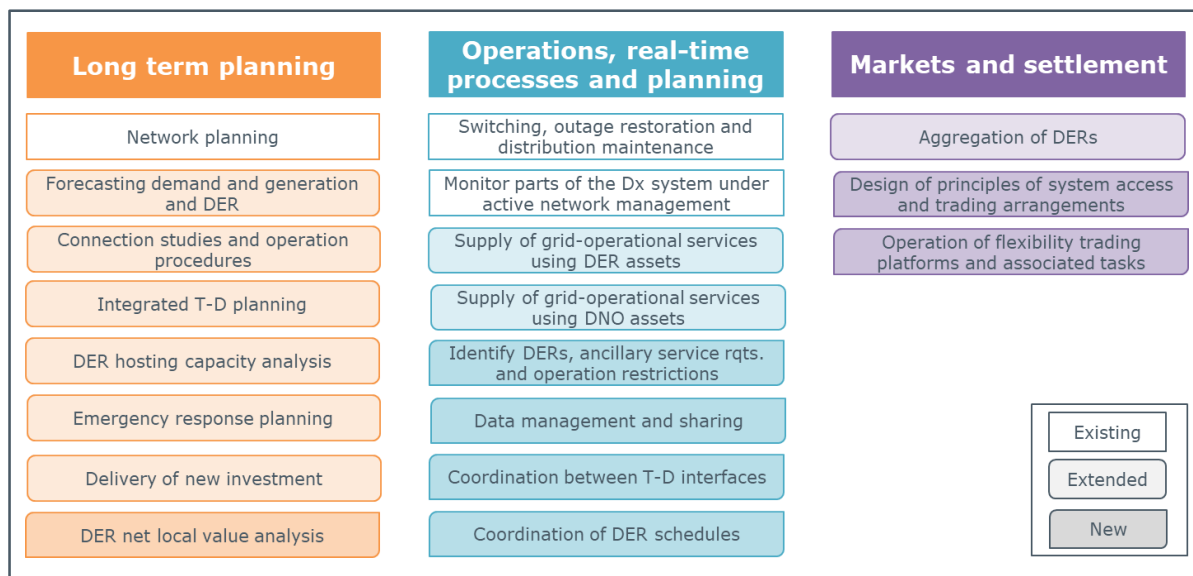


Figure 2. Functional breakdown of DSO, informed by industry literature. It includes interrelated functions and is not exhaustive or definitive.

- 1.14. DSO functions continue to evolve. We recognise this, and believe it is in the interest of energy consumers to maintain policy optionality in this area for different institutional arrangements in future. This mitigates risk that suboptimal solutions are adopted now that are then difficult to change later once the changing system is more mature. We will work with existing and new institutions to ensure that they do not absorb new DSO functions to the degree that they cannot be unbundled in future. Interoperability of system architecture and ring-fencing of functions help to ensure future optionality is not lost.
- 1.15. So we are encouraging the development of DSO functions now with optionality embedded, rather than defining a hypothetical future world of institutional arrangements based on assumptions and working backwards. This agile approach is coherent with Ofgem’s Strategic Narrative: 2019-2023.¹⁴

Coordination with the price controls

- 1.16. This position paper is published alongside the RIIO-ED2 Open Letter Consultation on the forthcoming electricity distribution price control.¹⁵ We recognise the importance of the price control on DSO functions. The next price control will further incentivise and fund the DNOs to support, enable and deliver well managed flexible and active networks.
- 1.17. As set out in the RIIO-ED2 Open Letter Consultation, our starting position is to extend the use of competition models to meet network and system needs where it is appropriate and likely to deliver value to consumers. We also expect DNOs to coordinate with other network companies and the ESO to facilitate new and emerging markets outside their immediate network and system needs, where it is not to the

¹⁴ <https://www.ofgem.gov.uk/publications-and-updates/ofgem-strategic-narrative-2019-23>

¹⁵ <https://ofgem.gov.uk/publications-and-updates/open-letter-consultation-riio-ed2-price-control>

detriment of their consumers. Similar to our RIIO-2 business plan guidance for other network sectors,¹⁶ we expect innovation learnings to be integrated into business as usual, both now and during RIIO-ED2.

- 1.18. At this time, we believe it is too early to implement institutional reform at distribution level as DSO functions are still developing. But we will be carefully monitoring developments and will consider whether over time there may be a case for greater separation of certain DSO functions from the DNOs. Should separation of certain DSO functions from the incumbent DNO take place, then we will consider the funding model for the separated DSO functions.
- 1.19. Throughout this document, we emphasise that there are least regrets actions to be taken now to progress DSO, in advance of RIIO-ED2.

¹⁶ <https://www.ofgem.gov.uk/publications-and-updates/riio-2-business-plans-draft-guidance-document>

2. Strategic outcomes of our DSO reform policies

Overview

We have built our policy development on four strategic outcomes for our DSO reform packages. They are:

- Clear boundaries and effective conflict mitigation between monopolies and markets.
- Effective competition for balancing and ancillary services, and other markets.
- Neutral tendering of network management and reinforcement requirements, with level playing field between traditional and alternative solution.
- Strongly embedded whole systems outcomes.

Section two of this paper expands on these strategic outcomes, explaining why we believe they are important for DSO reform, and describing their scope.

Questions

Question 1: Do you agree with our strategic outcomes?

Clear boundaries and effective conflict mitigation between monopolies and markets

- 2.1. Roles and responsibilities of parties are evolving in order to develop existing and new DSO functions. DNOs are increasingly active managers of their networks, with responsibility for coordination across boundaries. At the same time, suppliers, generators and other parties are increasingly able to provide services that deliver DSO functions. For example, generators can provide flexibility services that substitute for traditional network reinforcement, and tech companies could establish platforms for trading energy flexibility that support optimisation of resource use across the whole system. In some cases, the DNO may be well suited to provide certain services, for example due to economies of scale or scope with its existing monopoly functions. In other cases, delivery of services should be left to the market where we expect competitive forces will drive the best outcomes for consumers and DNO participation could cause negative distortions. There may, however, be cases where best outcomes could be achieved by DNOs competing with one another and other parties to deliver services. Where the DNO is participating in a market, real or perceived conflicts of interest must be managed to promote a level playing field across service providers and lower barriers to entry for new participants.
- 2.2. Clarity around whether DNOs should participate in certain services and the regulatory arrangements in which they should participate is important. The right boundaries of responsibilities, and being clearer up-front about where those boundaries are, should provide confidence to both DNOs and market participants around their roles and allow them to better plan and invest in their businesses accordingly.

Effective competition for balancing and ancillary services, and other markets

- 2.3. Enabling competitive markets is an Ofgem core regulatory stance,¹⁷ and is clear in our strategic narrative 2019-2023.¹⁴ We want to see effective competition between flexibility providers for network and system needs, with limited barriers and low transaction costs to market entry. This will require network and system products that are well designed to enable all relevant providers to engage. Flexibility providers should have improved access to information about network and system needs, which better allows them to offer the right services. DNOs must fully support coordinated markets, ensuring conflicts are minimised and synergies are maximised across procurement. Coordination should extend across markets where DNOs are not the counterparty, including the ESO's balancing and ancillary markets, local energy markets and peer-to-peer markets. Where flexibility providers are easily able to sell to multiple markets and stack value, they are better able to receive the true value their flexibility can offer.
- 2.4. Effective competition can offer significant benefits for consumers. It will put downward pressure on prices, promote innovative business models, widen customer choice and ways for consumers to engage with the market, and more efficiently and effectively facilitate the integration of renewable technologies.

Neutral tendering of network management and reinforcement requirements, with a level playing field between traditional and alternative solutions

- 2.5. When DNOs tender network and system needs, they must do so as neutral market facilitators. We expect sound decision making on the best value solution to address network and system needs in the interests of consumer. This means flexibility, smart use of existing network assets and network reinforcement are valued on a level basis, ensuring the best value solution is implemented.
- 2.6. Cost-benefit analyses for network and system needs must reflect the value of flexibility, including considering its differences from traditional reinforcement. Flexibility can provide option value that traditional reinforcement cannot. Where load growth is lower than anticipated or not sustained, flexibility can avoid the need for long-term reinforcement and avoid sunk costs. In addition, the downward trajectory in flexible technology costs can mean cheaper options may be available in future to manage a network or system need. These considerations should be appropriately taken into account in DNOs' cost-benefit analyses so that they make more efficient investment decisions. There must be confidence in these decisions. Predictability and transparency gives flexibility providers more confidence, facilitating efficient investments and market behaviour.

Strongly embedded whole electricity system outcomes

- 2.7. As the energy system changes, it is becoming increasingly interlinked. The best interests of energy consumers do not necessarily align with solutions limited to a single

¹⁷ <https://www.ofgem.gov.uk/publications-and-updates/ofgems-regulatory-stances>

electricity network boundary, and better value options may be delivered by considering solutions across multiple electricity networks and assets. Furthermore, the important role of the energy sector in an interconnected economy means that policy focus will need to be directed to the contribution DSO development can make to other energy consumers and society more broadly.

- 2.8. We are currently in the process of clarifying, through our licence requirements on network companies, that we expect electricity networks to cooperate and consider opportunities for best value outcomes outside of their own boundaries where it is not to the detriment of their own consumers. We will be publishing further work on our whole systems licence clarifications later this summer.
- 2.9. We have set out our wider whole systems expectations in RIIO-2 for transmission and gas distribution companies, and we will similarly be setting out our approach in RIIO-ED2.

3. Overview of our DSO work and next steps

Overview

To deliver Ofgem’s strategic policy outcomes for DSO, we outline three of our ongoing workstreams, all of which are highly interlinked. These are:

- DNOs and new contestable services
- Key enablers for DSO functions
- Development of coordinated flexibility markets

The appendix of this paper provides more detail on individual workstreams and next steps.

Questions

Question 2: Do you agree that our work programme will help to deliver the strategic outcomes?

Question 3: Do you have anything to add to the thinking and analysis that informs how we propose to deliver our programme of work?

DNOs and new contestable services

3.1. We are seeking to understand the appropriate role of DNOs in contestable services. By contestable services, we mean activities that the DNO can do, but for which a market substitute exists. As new and evolving DSO functions require DNOs and other parties to offer new services, clarity around the respective responsibilities of monopolies and markets is important. We will need to make some decisions on certain services soon. This year, we are due to make a decision around whether DNOs should have the capability to modulate EV chargers to resolve network and system needs that could also be met through market-based mechanisms.¹⁸ Next year, we will consult on the regulatory treatment of Customer Load Active System Services (CLASS) for RII0-ED2, considering DNOs’ provision of voltage control and network management services to the ESO.¹⁹ Currently, DNOs are able to bid these services to the ESO alongside connected flexibility providers. There will be questions to resolve around DNOs’ roles in

¹⁸ <https://smartenergycodecompany.co.uk/modifications/allow-dnos-to-control-electric-vehicle-chargers-connected-to-smart-meter-infrastructure/>

¹⁹ CLASS was an innovation project that developed voltage management control abilities to reduce effective demand. In 2016, the Authority issued a direction that DNOs could use voltage control using capabilities developed in project CLASS to sell services to the ESO ancillary services market, with remuneration under Directly Remunerated Services 8 (DRS8), meaning that revenues are shared with consumers. This was based on the anticipated overall benefit to consumers: through contributing to the efficient procurement of system balancing and by providing consumers a share in any net revenue generated. The direction is in force only to the end of ED1, and can be withdrawn after consultation. If we get evidence that the functions allowed under the Direction are not in the interests of consumers then we do have the option to revoke the Direction in advance of ED2, following consultation and after giving reasonable Notice to the Licensee. This could mean consultation earlier than the planned one next year. Closedown report: <https://www.ofgem.gov.uk/publications-and-updates/electricity-northwest-limited-customer-load-active-system-services-close-down-report> and direction: https://www.ofgem.gov.uk/system/files/docs/2016/04/dno_voltage_control_drs8_direction.pdf

undertaking functions associated with operating platforms for trading energy flexibility, as outlined in our forthcoming Future Insights Series research publication on this topic.

- 3.2. In this workstream we are developing our policy positions around DNOs' participation in the contestable services described above, and others yet to emerge. This means considering what DNOs should be allowed to do, in what circumstances, with what risk mitigations in place, and with what regulatory treatment. Our policy positions will be developed to meet consumer interests around value (including considering effects on competition), decarbonisation, reliability and quality of service. At the same time, we aim to demonstrate how these decisions are consistent and coherent with one another. We think that improved clarity will drive stakeholder confidence in their roles and the regulatory environment, better enabling planning and investment decisions.
- 3.3. We have considered how some high level characteristics of DNOs delivering new contestable services may affect competition and consumer outcomes. We describe these in appendix in pages 23 to 25. The analysis provided around these characteristics will potentially be relevant to our future decisions on DNOs offering services, though we recognise that developing firm policy positions will require due consideration of the specific, relevant characteristics. We think that making this broader thinking public is helpful to allow stakeholders to engage with our arguments and provide challenging and supporting evidence so that ultimately our decisions will be more robust. Using feedback to this document, wider stakeholder engagement and additional analysis, we will develop our policy positions on specific services including CLASS and electric vehicle charger modulation. Meanwhile we will consider how broader and more principles based policy positions can provide clarity around appropriate DNO activity.
- 3.4. Outputs from this workstream will be key for effectively meeting our strategic outcomes. Clear policy positions around DNOs' participation in contestable services will indicate our expectations for the boundaries of DNOs and markets. In turn clearer boundaries, avoided competition distortions and mitigated conflicts will drive competition that is more effective.

Key enablers for DSO functions

- 3.5. Through the *Key enablers for DSO functions* workstream, we seek to ensure the technology, data and engineering competencies and capabilities are available and accessible, to deliver DSO functions. We will continue to provide a policy environment and regulatory framework that supports the rollout of key enablers for DSO functions. The delivery of enablers is the responsibility of industry, for example through technology deployment, systems updates, and through raising and progressing grid code modifications and other related changes.
- 3.6. We are working on *Key enablers for DSO functions* for two main reasons: (1) to ensure that progress is made now; and (2) to maintain policy optionality for contesting functions or wider institutional reform. To mitigate the risk of DSO function institutional lock-in, we regard embedding interoperability as a principal objective of our policy work.
- 3.7. Key enablers for DSO functions policy will contribute towards our stated strategic outcomes. Introducing interoperability requirements will allow DSO functions and services to be contested on a more level playing field. It will also facilitate the opening of data to the market, helping to enable competitive markets by presenting network visibility and requirements clearly, in an accessible way. Enablers will drive whole

system coordination by ensuring information is captured, stored and shared appropriately.

3.8. We categorise key enablers for DSO functions into five groups:

- Forecasting and planning enablers
- Network monitoring and visibility enablers
- Flexibility trading enablers
- Flexibility dispatch and control enablers
- Data exchange enablers

3.9. A key enabler for DSO across these categories is data. We want network companies to make network data visible and share this in an open, interoperable way, to better support the emerging and existing markets and to embed whole system outcomes.

3.10. This year, we will consult on updating the LTDS to start to embed improvements in forecasting and planning enablers. This is likely to cover data usability, inclusions such as distribution future energy scenarios, and greater and more accessible information on network headroom. We will also be exploring whether we need to take action in other areas, to progress the other types of enablers we have identified. Findings in our forthcoming Future Insights paper on platforms for trading energy flexibility will also feed into our prioritisation.

Development of coordinated flexibility markets

3.11. The energy system is witnessing the growth of new DNO flexibility markets. Procurers, providers and intermediaries, like platforms for trading energy flexibility and aggregators, seek to secure roles in these new markets and stack their value with other markets. Through our *Development of coordinated flexibility markets* workstream, we are actively monitoring and steering the development of these markets.

3.12. We want to see DNOs improve flexibility procurement and market facilitation processes. We continue to push industry to consider flexibility services for all new network and system needs on a business as usual basis and address conflicts of interest, to build market confidence to invest in competitive flexibility.

3.13. To date, we have engaged with industry through the ENA Open Networks project, and through regular bilateral meetings with DNOs and flexibility providers and have actively reviewed procurement processes. We have urged industry to further develop flexibility markets through better coordination and greater transparency in our recent joint Ofgem-BEIS Open Letter to the ENA Open Networks project and continue to do so in this publication.²⁰ We will be hosting a workshop this autumn to discuss developments in DNO flexibility tenders with academics and industry stakeholders.

3.14. We expect procurement processes to converge. This includes having coordinated product definitions, transparent decision-making processes and cost-benefit analyses

²⁰ <https://www.ofgem.gov.uk/publications-and-updates/open-letter-ena-open-networks-project-ofgem-and-beis>

that include the option-value of flexibility.²¹ In addition, DNOs should make tender information available and share data on network planning and network needs analysis in an easily accessible format. We expect DNOs to explain clearly how flexibility tenders and other alternatives to network management interact, including active network management schemes, and how they choose between them.

- 3.15. As these markets develop, both for short and longer term network management and reinforcement, we will consider the strength of the signals they send, and take this into consideration as we review our future access and charging arrangements. This work on flexibility markets will also feed into the RIIO-ED2 framework, where we will consider how best to incentivise companies to manage their networks efficiently.

Next steps

- 3.16. The work presented in this document will be initiated, and in specific cases delivered, in advance of the next price control, RIIO-ED2.
- 3.17. Our timelines presented below show the broad progress we expect for some of the key work areas we identify in this document that industry should deliver and the work we set out for ourselves, between now and RIIO-ED2. The deliverables are not exhaustive and may change over time; our workstreams are evolving, responding to system change, new evidence and analysis.

²¹ Using flexibility can allow DNOs to defer or avoid sunk costs in traditional reinforcement. For example, where lower than anticipated load growth negates the need, or where a more cost efficient alternative solution emerges.

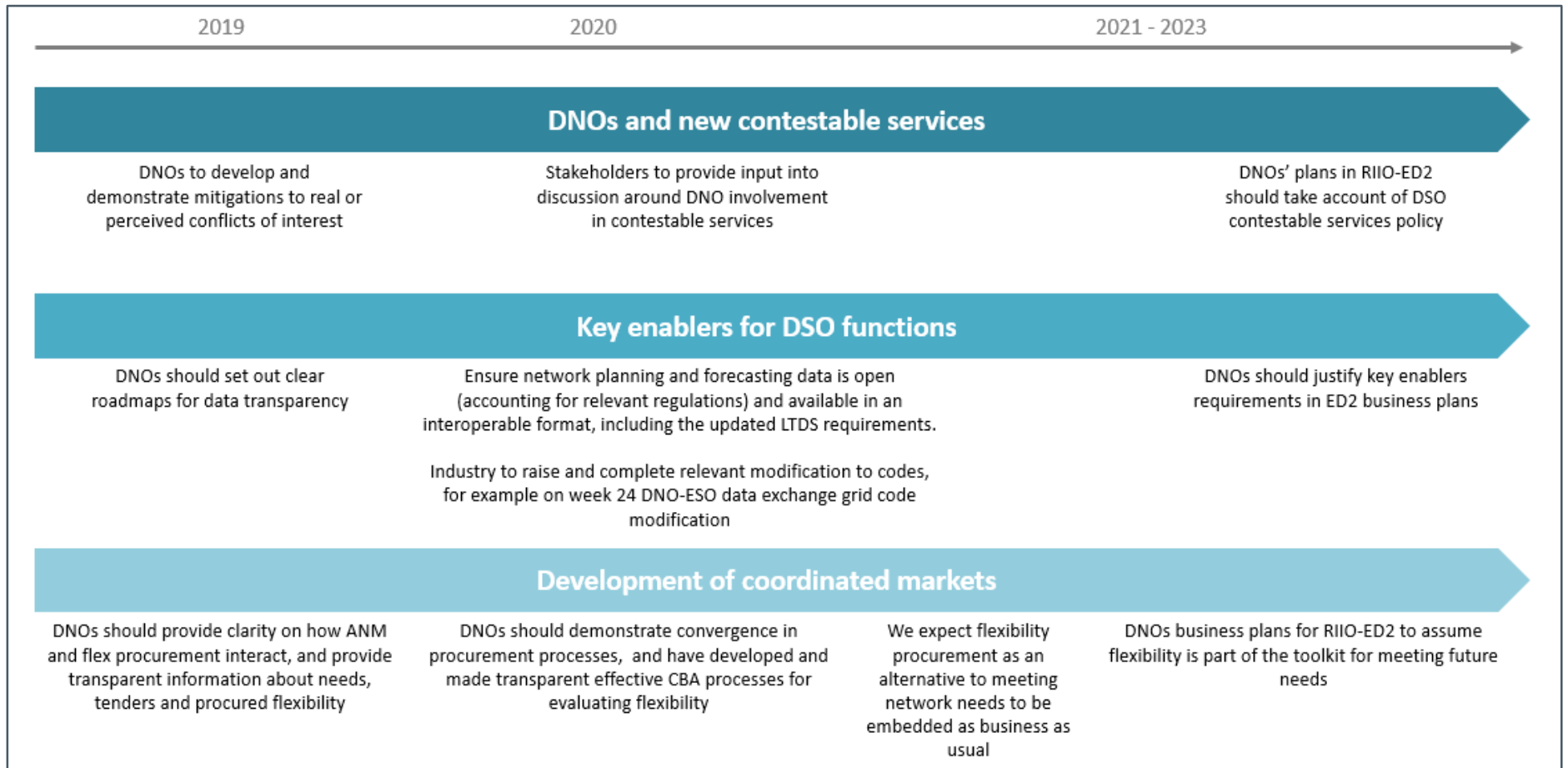


Figure 3. Extract of milestones we expect industry to have delivered between now and RIIO-ED2

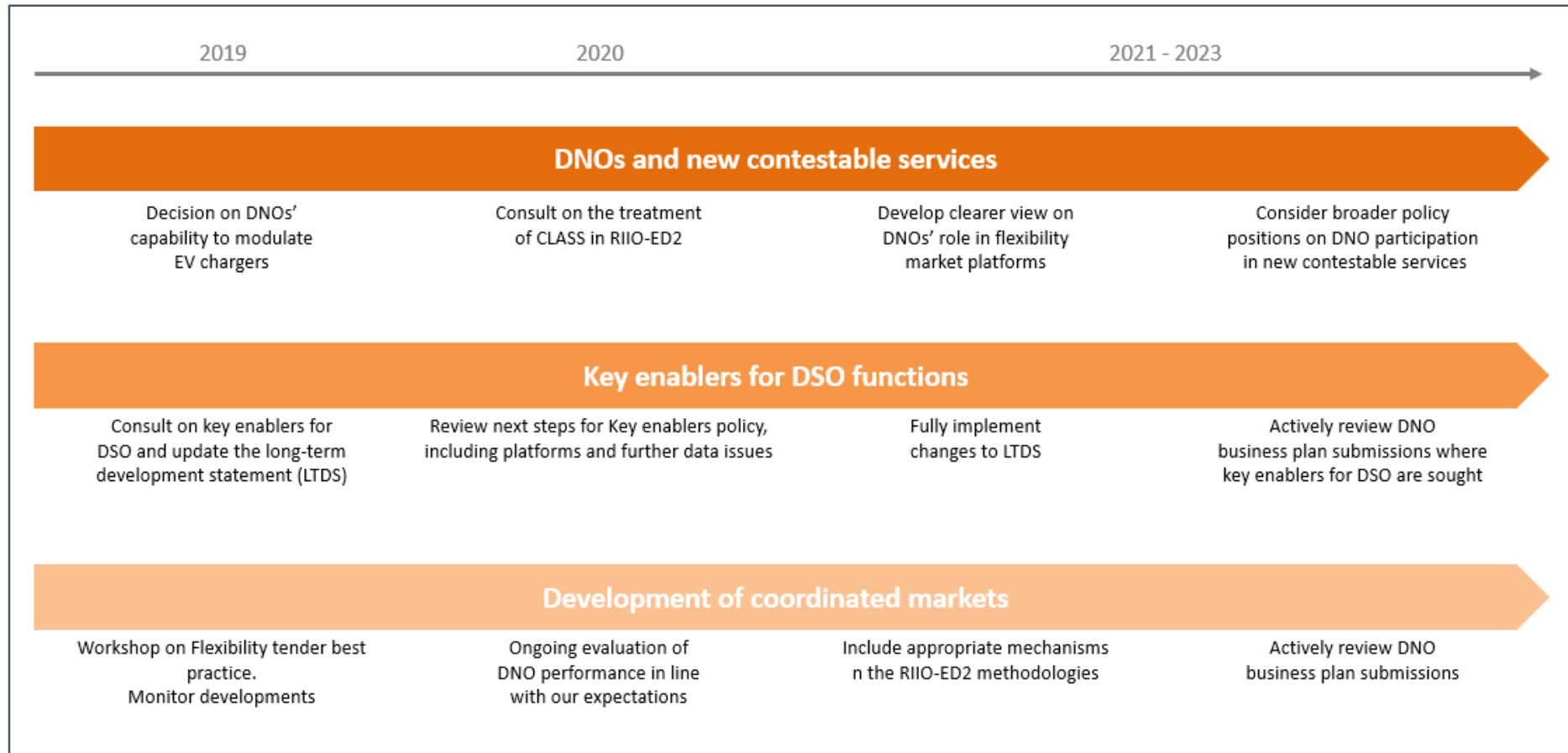


Figure 4. Extract of milestones for the work set out in this document, between now and RIIO- ED2

Appendix 1: Programme of work

DNOs and New Contestable Services

Context and scope of workstream

- 1.1. As described above in Energy system flexibility and distribution system operation there are a range of services and processes associated with the delivery of DSO functions, and multiple parties that can be involved in the provision of those services. For example, the function of supplying grid operational services using distributed energy resources (DER) can involve multiple parties including the DNO, DER asset owners and operators, and intermediaries. It can include different technologies, and multiple procurement processes and stages.
- 1.2. There has traditionally been a relatively clear separation between services provided by DNOs and services provided by markets. This is being challenged by technological developments and new business models. Flexibility is increasingly substitutable for traditional network solutions, and new parties such as aggregators and providers of platforms for trading energy flexibility can contribute towards network and system resilience. At the same time, DNOs have access to smarter tools to manage their networks and growing capability to coordinate for an efficient wider electricity system. This is leading to an increasing number of grey areas: services that DNOs could provide, and at the same time can be provided by markets. In this workstream we will consider how we can efficiently and effectively deliver our policy positions on DNOs' role in delivering these contestable services.
- 1.3. DNOs can be uniquely well placed to undertake certain new services, even where others have the capability to do so, for example due to economies of scope with their core monopoly role. At the same time, there is a risk of DNOs unduly monopolising or otherwise harmfully distorting the competitive delivery of services that could be provided more efficiently or effectively by the markets. In the interest of promoting competition and effective delivery of monopoly services in the interest of consumers, we want to provide clarity around what new services the DNO should be allowed to provide, in what circumstances, with what risk mitigations in place and with what regulatory treatment. This issue has also been explored by the Council of European Energy Regulators (CEER) with reference to some case studies.²²
- 1.4. We have already set out our policy positions on some similar services. In some cases, this has been a firm decision with prescriptive licence conditions, and in other cases an expectation or other indication of our position. Examples where we have set out positions have included DNOs' role in operating storage,²³ participation in commercial aggregation,²⁴ and network voltage control and management services procured by the ESO (CLASS).¹⁹ Looking ahead, there are some decisions that we know we will need to take. We will be reviewing our decision on CLASS's treatment for RIIO-ED2; we are due to make a decision around whether DNOs should have the capability to modulate electric vehicle chargers to resolve constraints;²⁵ and there are emerging questions to resolve

²² <https://www.ceer.eu/ceer-conclusions-paper-on-new-services-and-dso-involvement>

²³ <https://www.ofgem.gov.uk/publications-and-updates/decision-enabling-competitive-deployment-storage-flexible-energy-system-changes-electricity-distribution-licence>

²⁴ <https://www.ofgem.gov.uk/publications-and-updates/enabling-competitive-deployment-storage-flexible-energy-system-changes-electricity-distribution-licence>

²⁵ <https://smartenergycodecompany.co.uk/modifications/allow-dnos-to-control-electric-vehicle-chargers-connected-to-smart-meter-infrastructure/>

around DNOs' roles in undertaking functions associated with operating platforms for trading energy flexibility, as outlined in our forthcoming Future Insights Series research publication on this topic.

1.5. We will deliver policy positions on these grey areas as they emerge. We seek to do so in an efficient and effective way, including by demonstrating the common relevant criteria, characteristics, and benefits and risks of DNO participation that are considered across our decisions. This is to provide further clarity around consistency and coherence across decisions we have made, and signal indicative positions on services where we are yet to make an explicit decision. In this section, we set out some high level risks and benefits of DNOs participating in contestable services, that will be relevant as part of our policy development for upcoming decisions. At the same time, we recognise the need for decisions reflect case-by-case factors relevant to the specific service.

Workstream policy objectives

1.6. Our objectives in this workstream are to:

- Develop proportionate policy positions around the role of DNOs participating in new services that could be delivered by markets.
 - These will always be made in order to drive a net benefit to consumers including considering outcomes around lower bills, reliability and safety, and better quality service.
- Provide further clarity on how our policy positions on contestable services sit together consistently and coherently.
 - We want to provide a more holistic understanding of respective roles for DNOs and markets, better enabling confident planning and investment even for services where we have not made explicit decisions.

Analysis

1.7. In this section, we are not setting out firm policy positions around what services DNOs should or should not do. Rather, we are presenting three high-level characteristics associated with DNOs participating in contestable services. We describe some risks and benefits associated with these characteristics that may be relevant in the development of specific policy positions. When we consider an individual service, the characteristics and associated risks and benefits described below may not be relevant and there will be additional case-by-case factors that we need to consider. Therefore, the emergence of a characteristic does not point to a single policy response. However, we want to provide insight into some relevant considerations for our policy development on emerging services going forward.

1.8. The three characteristics we consider here are (1) vertical integration, (2) unique monopoly position conferring competitive advantage, and (3) conflict between competitive role and neutral monopoly role. We use example services to illustrate where these characteristics might emerge, but these should not be considered as our formal view on risks and benefits of these services. Any policy positions for a specific service require analysis that is more detailed. Note that existing protections and incentives can offer us tools to address these characteristics in some cases, but below we describe risks and benefits without reference to existing policy and regulation.

Characteristic 1: Vertical integration

1.9. This characteristic describes where the DNO requires a service that can be provided by third parties and it is also able to provide that service itself. For example, a DNO may invest in voltage control technology to unlock additional capacity on their network rather than procure flexibility from the market. Another example could be the DNO building its

own platform for trading energy flexibility rather than using one provided by a third party.

- 1.10. This can be considered a make or buy decision. There is a risk that the DNO is, or is perceived to be, biased towards 'make' (or buying from itself or affiliated party) even where this would not be the most efficient solution for consumers. Two causes can drive this risk, or perception thereof: first, there may be some real or perceived financial incentive not to buy from the market; second, there may be an incorrect valuation of services provided by market. This could be the result of cultural biases, information asymmetry, or inadequate risk assessment. This could introduce barriers to entry and distort competition, reducing potential benefits that could be delivered by effective competition.
- 1.11. At the same time, vertically integrated solutions can, in some cases, provide lower bills for consumers or may otherwise better meet objectives around reliability or quality of service. The DNO providing in-house solutions can lower transaction costs, allow them to invest in more highly specialised assets, and increase certainty of quality of service.
- 1.12. All solutions, regardless of provider, should be correctly valued and treated on a level basis. It is important that perceived conflicts of interest are managed too, as a perception of discrimination can have real effects on market confidence, providing a barrier to entry and distorting behaviour.

Characteristic 2: Unique position confers competitive advantage

- 1.13. We describe this characteristic as where a DNO undertakes a service for which its position as a network operator affords it a competitive advantage unavailable to other market participants. The DNO may have exclusive or privileged access to information about electricity networks such as constraints and forecasts; it may be able to use unique network assets funded by consumers through distribution use of system charges; and has access to cheap capital due to the regulated nature of its activities. For example, using network infrastructure, that is (at least in part) paid for by consumers, to provide the ESO with ancillary services may contribute to the DNO facing lower marginal costs than other flexibility providers.
- 1.14. This unique advantage can create an uneven playing field, or the perception thereof. This can reduce confidence for other parties, deterring investment and participation in the market in which the DNO is participating. In the longer term, this could lead to the loss of potential benefits that could have been accrued in a competitive market. This risk could be particularly pertinent in nascent markets.
- 1.15. That said, where assets, information or knowledge is valuable in the provision of a service, there is a case to unlock that value, with potential to lower bills for consumers.
- 1.16. There can be a trade-off between on the one hand maximising the value of assets, resources and the financial position rewarded to the DNO through its monopoly role, and on the other hand maximising competitive delivery of a service and realising the benefits of that in the short and long term. DNO participation in a market may not always be detrimental to effective competition. Where there are potentially effects on competition, it will be an important consideration as we develop policy positions around DNOs' roles in competitive markets.

Characteristic 3: Conflict between commercial role and neutral monopoly role

- 1.17. This characteristic arises when the DNO participates in a market selling services to another party, and its competitors in that market also interact with the DNO's monopoly network or system services.
- 1.18. There is a risk that commercial interests could give an incentive for the DNO to discriminate against its competitors or otherwise not effectively facilitate markets so that the DNO's own commercial offering is more likely to perform well. This incentive is coupled with the ability to discriminate, afforded by the DNO's monopoly interactions with its competitors. For example, offering longer connection times for potential competitors, and making useful network information public more slowly could improve the DNO's relative performance in a competitive market. In addition, the DNO has an increasing role as a neutral buyer of services to meet network and system needs. If the DNO competes against flexibility providers in the ESO's ancillary services markets, and the same flexibility providers could be providing flexibility to that same DNO, the DNO may have privileged information about competitors' bidding strategies and also be able to discriminate in its procurement process.
- 1.19. We should be aware of how a potential conflict between commercial and monopoly roles could compromise, or be perceived to compromise, the neutrality of the DNO, and ensure appropriate mitigations are in place.

Discussion and conclusion

- 1.20. Practically, we see a continued need for policy positions targeted at specific services at least in the near term. For each individual service, the appropriate regulatory tools will be considered. However, we do think that through developing and making public broad high-level analysis, we can support a common understanding of the risks and benefits of DNOs participating in contestable services. Doing so provides more transparency around our decision-making process, better enabling DNOs and market participants to anticipate the regulatory environment and plan and invest with more confidence. In future, we may be able to develop this type of analysis further, and deliver broader policies that can be applied to a wider range of services. Doing so would provide clearer boundaries for DNO's roles, but we would need to do so in a way that is proportionate and flexible to case-by-case considerations.

Next steps

- 1.21. In the near term, we will develop policy positions for specific services. Later this year we are due to make a decision on the capability for DNOs to control EV load. In the first half of 2020 we expect to consult on the regulatory treatment of CLASS in RIIO-ED2. As we make those decisions, we will consider the extent to which the characteristics we have described above are relevant and seek to show the link between narrower decisions and higher-level considerations to demonstrate consistency and coherence.
- 1.22. At the same time, we will keep under review the potential for us to develop and provide broader views that indicate our policy position across multiple services.

Key enablers for DSO functions

Context and scope of workstream

- 1.23. DSO function delivery will be underpinned by new and extended technology, data and engineering capabilities, and associated advancements. The absence of these capabilities would, in the best case, hinder or limit the effectiveness of DSO functions,

and in the worst case, would render DSO functions effectively non-functional. As an example, consider the procurement of flexibility services by a DNO: this requires the technical ability to know where, when and to what degree flexibility is required. This knowledge is based on network modelling and analysis, whilst the processes of procurement and provision includes technical data capture, exchange, information technology use, telecoms, safety analyses, and integration with existing network systems. Clearly, enabling technology, data and engineering are required across these activities. A summary explanation of key enablers for DSO are shown below in Figure 5.

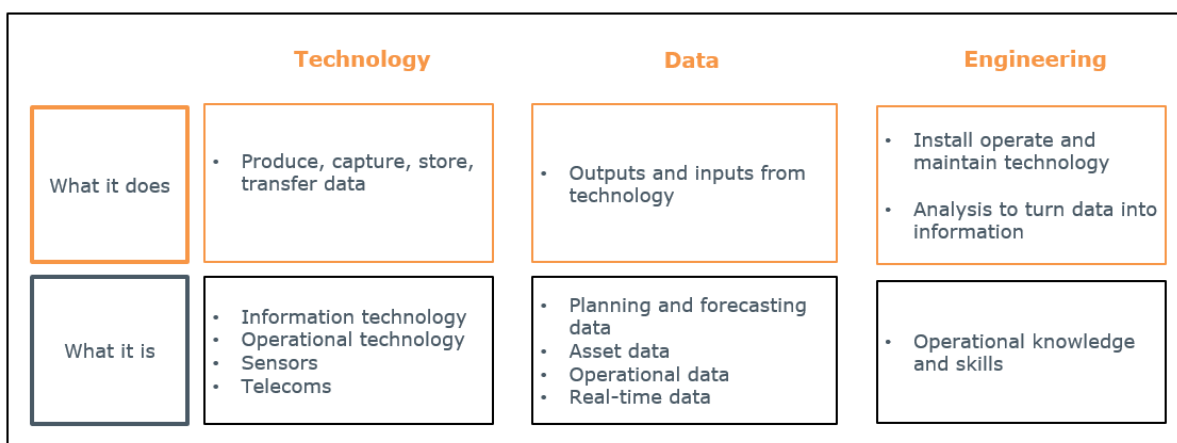


Figure 5. Key enablers for DSO across technology, data and engineering, showing what the key enablers do and what they include.

1.24. Industry’s work, such as within the ENA’s Open Networks project,²⁶ has shown that the application of key enablers for DSO functions are maturing, and rollout should be adopted. Decisions that are made now on these enablers have the potential to cause policy repercussions for the future. For example, if poorly applied they could narrow policy options by locking-in a DSO function to a party so that it cannot be contested, potentially raising the cost and time required to transition to a smart energy system. Therefore, there is an important role for Ofgem to ensure policies support the most appropriate roll out of key enablers for DSO.

1.25. To be clear, the development of enablers is for industry; our role is to create a policy environment in which enablers can be progressed and DSO delivered in line with our strategic outcomes.

1.26. Key enablers for DSO functions will also support improved arrangements for access and forward-looking charges which we currently are considering as part of a Significant Code Review with a view to implementation of changes in 2023. To introduce more locational or cost reflective price signals, more granular network data is required across the GB energy system. Therefore, a common understanding of network visibility and knowledge will be essential. We will publish a working paper setting out our preliminary considerations on the different options we are considering later this summer.

²⁶ ENA Open Networks Project 2018; workstream 3; Product 6: Key Enablers for DSO: <http://www.energynetworks.org/electricity/futures/open-networks-project/open-networks-project-workstream-products.html/ws3-dso-transistion.html>

1.27. The following sections outlines our wider vision and analysis on key enablers for DSO functions, before explaining our prioritisation and immediate steps to improve static planning data.

The Energy Data Taskforce and data best practice

1.28. The EDTF has developed an industry vision for how we can all make the best use of data and digitise the energy system, supporting the energy transition. We welcome the report and its recommendations.^{27,28} Our work takes some of the EDTF recommendations forward, driving specific policy advancements that align with the ideals of data visibility, presumed open data and digitalisation of the energy system to drive forwards DSO. We expect that many of the taskforce recommendations may be effective approaches to working with other relevant data for DSO, such as assets that interface with the energy system. We are considering how to take this forwards.

Data best practice

Some of the key enablers for DSO include, or are associated with, data. Data based enablers should meet data best practice. The EDTF considered many of these practices, and Ofgem is further progressing this work. As part of this, we are developing our view on what would form 'data best practice'. The list below captures some of our emerging thinking about what this is likely to include. We will continue to review this list in consultation with stakeholders:

- Apply Data Best Practice to metadata just as you do to any other data
- Understand user needs
- Identify the types of roles played by stakeholders of the data
- Data relating to common assets is presumed open
- Presumed Open data should go through an "openness triage" conducted by the data controller
- Data should be interoperable with other data and digital services
- Ensure data quality is sufficient to meet the needs of its users
- Make data you control easy to use, linkable and portable
- Make data you control easy to discover, search and understand
- Protect data in accordance with Security, Privacy and Resilience (SPaR) best practice

This ongoing work, including explanations of the above, will be updated on our website.²⁸ Correspondence directly relating to the data best practice themes should be directed to ofgemdataservices@ofgem.gov.uk

Industry initiatives

1.29. We interact with initiatives such as the Prospering from the Energy Revolution programme, and the Digital Framework Task Group.^{29,30} We are harnessing industry

²⁷ <https://es.catapult.org.uk/news/energy-data-taskforce-report/>

²⁸ <https://www.ofgem.gov.uk/about-us/ofgem-data-and-cyber-security>

²⁹ <https://www.cdbb.cam.ac.uk/DFTG>

³⁰ <https://www.gov.uk/government/news/prospering-from-the-energy-revolution-full-programme-details>

work, such as the ENA's Open Networks Project, innovation projects, academic research and other industry groups, to feed into our policy development.^{31,32}

Workstream policy objectives

1.30. Our objectives in this workstream are to:

- Use existing and new regulatory measures to provide clarity on how technology, data, and engineering for DSO key enablers should be delivered to ensure progress now.
- Drive the visibility and the interoperability of data across the energy industry, using regulatory means to do so, in order to maintain policy optionality.

Analysis

Engineering analysis of DSO functions

1.31. We undertook an engineering analysis of the key enablers to deliver DSO functions for the purposes of prioritisation against our strategic outcomes.³³ Forecasting and planning data, and network monitoring and visibility were ranked as the foremost key enablers to deliver DSO.

1.32. As a result of large scale funding and support for innovation, significant learnings have already been made across the DSO functions, which inform our policy development. From our analysis, we can see a significant gap between trialled and current business as usual practices. This discrepancy highlights the need for us to steer the adoption of key enablers for DSO functions. We encourage the network operators to develop roadmaps to implement these enablers and manage the transition of innovation to business as usual practice.

Policy risk analysis and solutions

1.33. There is a risk of DNO-led path dependence if DNOs seek to secure new DSO functions and services, and in doing so inadvertently or otherwise remove the possibility for another party to undertake these.

1.34. We encourage the network companies to focus on interoperable technologies, making their metadata visible, pursuing a presumed open approach to data, and using open data formats and software protocols, to minimise information imbalances between industry parties. We expect care to be taken in the development of DSO functions so that this does not lead to inadvertent or deliberate foreclosure of new markets for DSO function delivery. Interoperable data and technologies will help embed whole systems outcomes and mitigate path dependency risks.

User needs

1.35. Exchanges of data take place across multiple axes. The users of data will have varying requirements. We seek to ensure that policies appropriately meet users' needs, and are

³¹ <http://www.energynetworks.org/electricity/futures/open-networks-project/>

³² <https://www.smarternetworks.org/>

³³ Analysis reviewed the state of current delivery through industry initiatives: trials, including to a large degree Ofgem funded Network Innovation Allowance and Network Innovation Competition projects, as well as international progress, research and demonstration projects, and academic studies.

resilient and flexible to continue to do so as they evolve. Figure 6 shows different DNO data users, and gives examples of their exchanges.

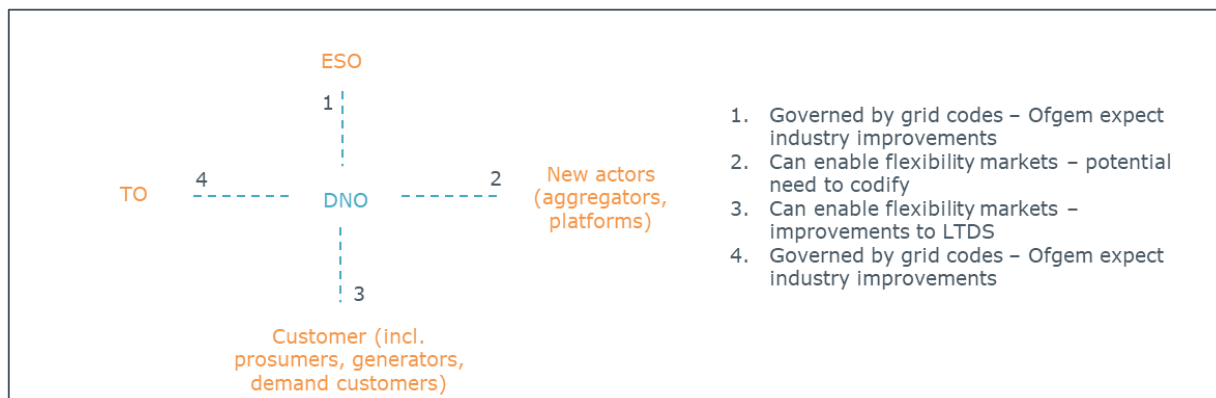


Figure 6. Example of DNO data users and exchanges.

1.36. The current means of DNO data exchange are in many cases inadequate, often featuring limited accessibility to non-specialist users, and barriers to operability with non-specialist software. We are aware of two primary drivers for improvements in data exchanges to meet user needs: increased volumes and frequency of data exchanges as the industry digitalises; the need to reduce barriers to non-technical users by providing improved experiences when finding and accessing data.

Key enablers for DSO functions – groupings, content and regulatory measures

1.37. In the tables below, we categorise key enablers for DSO functions into groups, allowing targeted policy development.

Forecasting & Planning enablers	
These enablers enhance the forward view of network needs. Currently, this includes processes and outputs such as the LTDS, and week 24 and 42 data exchanges between DNOs and the ESO. Today, these exchanges are built on flat data using spreadsheets, making them difficult to access and use, restricting their use. These enablers will help build flexibility markets.	
Content	Regulatory measures
<p>Data</p> <p><u>Network data</u> - reinforcement planning, long-term load development, flexibility requirements on years ahead timescales, load flow modelling, fault level data, network headroom and direct hosting capacity, smart forecasting tools (D-FES)</p> <p><u>Asset data</u> -GIS and static network topology data, network single line drawings.</p>	<p>We will review the licence condition for the LTDS, considering inclusions, format and applicability to meet user needs.</p> <p>Data exchanges between licence holders are governed by grid codes. We expect industry to progress the necessary changes to existing grid codes to improve these data exchanges.</p>
<p>IT, OT & sensors, and telecoms</p> <p>IT – data historians, network models</p>	

<i>Network monitoring & visibility enablers</i>	
<p>These enablers enhance knowledge and understanding of energy flows across the network. Network visibility will facilitate better use of network assets, and facilitate new flexibility markets. For example, currently, maximum demand at the 11kV/LV interface is based on after diversity maximum demand (ADMD) assumptions and then used for network planning. More accurate and precise measurements from network monitoring will allow better use of existing network assets and give clarity on where energy flexibility would be valuable.</p>	
Content	Regulatory measures
<p>Data <u>Asset data</u> – locational monitoring data, interoperable data format <u>Operational data</u> – dynamic network topology, network configuration data, outage data <u>Real-time data</u> – geographically specific data required for operations of specific schemes, such as active network management and real-time curtailment of generation.</p>	<p>We continue to observe and review deployment of monitoring and visibility enablers on the network. We expect networks to make improvements under the current price control, and in RIIO-ED2. Networks should ensure that associated data is open; we will consider regulatory measures where necessary.</p>
<p>IT, OT & sensors, and telecoms <u>IT</u> – asset management software, GIS packages <u>OT & sensors</u> – substation hardware and integrations to remote terminal units (RTUs), substation monitors <u>Telecoms</u> – telemetry systems, fibre optics, narrow band comms infrastructure</p>	

<i>Flexibility trading enablers</i>	
<p>These enablers enhance the ability to trade energy flexibility. This includes operational use of data to facilitate flexibility trading. Access to these enablers is critical to grow flexibility market liquidity.</p>	
Content	Regulatory measures
<p>Data <u>Network data</u> - reinforcement planning, long-term load development, flexibility requirements on multiple timescales, load flow modelling, fault level data, network headroom and direct hosting capacity, smart forecasting tools (D-FES) <u>Asset data</u> – the physical GIS and static network topology data that act as parameters for network modelling and analysis <u>Operational data</u> – the dynamic network topology and information on network configuration and outage planning on weeks to months ahead timescales, constraint and conflict data <u>Real-time data</u> – geographically specific data required for operation of specific schemes, such as active network management and real-time curtailment of generation.</p>	<p>We are considering how licence holders interact with and develop new flexibility markets. This includes making sure licence holders publish information which they hold to enable market participants to make efficient operational and investment decisions, and ensuring that the technical requirements of flexibility services do not unduly restrict new and existing participants from competing in these markets.</p> <p>Alongside this, we are considering how best to implement the EDTF recommendations not already covered, to ensure better access to data and information.</p> <p>In the near-term, we expect DNOs to adopt data interoperability formats, publish network data wherever possible, and set out the clear steps they will take to achieve this. This information will lower barriers to entry for flexibility market participants and unlock new opportunities that are as yet unknown.</p>
<p>IT, OT & sensors, and telecoms <u>IT</u> – asset management software, GIS packages, Supervisory Control and Data Acquisition (SCADA) systems <u>OT & sensors</u> – substation monitors <u>Telecoms</u> – telemetry systems, fibre optics, narrow band comms infrastructure</p>	

<i>Flexibility dispatch and control enablers</i>	
<p>These enablers enhance the deployment of flexibility services. Multiple digital and data services are likely to be required to undertake this. We seek data interoperability so that this does not present a risk to contesting DSO functions in the future.</p>	
Content	Regulatory measures
<p>Data <u>Operational data</u> –flexibility asset resource availability, constraint data, conflict management data <u>Real-time data</u> –operations of schemes, such as active network management and real-time curtailment of generation.</p>	<p>We seek to ensure that technology, data and engineering competencies and capabilities are not 'hardwired' into DNOs' operating systems.</p> <p>We will monitor developments and will consider regulatory measures where necessary, in the interest of present and future energy consumers.</p>
<p>IT, OT & sensors, and telecoms <u>IT</u> –Supervisory Control and Data Acquisition (SCADA) systems integrations, bespoke dispatch management software <u>OT & sensors</u> – substation and asset monitors <u>Telecoms</u> – telemetry systems, fibre optics, narrow band comms infrastructure</p>	

<i>Data exchange architecture enablers</i>	
<p>These enablers enhance the exchange of data, facilitating efficient and transparent transfers. This could mean new data exchange functions, managing increases in the volumes and frequency of data flows across the energy system. We are working on the EDTF's recommendations, and considering how data transfer may develop. The adoption of interoperability for data ensures future policy optionality, should changes in data exchange architecture be required.</p>	
Content	Regulatory measures
<p>Data <u>Network data</u> – all data <u>Asset data</u> – all data <u>Operational data</u> – all data <u>Real-time data</u> – all data</p>	<p>The adoption of data visibility and interoperability for data ensures future policy optionality, should changes in data exchange architecture be required in the future. We will consider regulatory measures where necessary to ensure data is visible and interoperable.</p>
<p>IT, OT & sensors, and telecoms <u>IT</u> – integrations with all relevant IT packages <u>OT & sensors</u> – integrations with all relevant IT packages <u>Telecoms</u> – integrations with telecoms</p>	

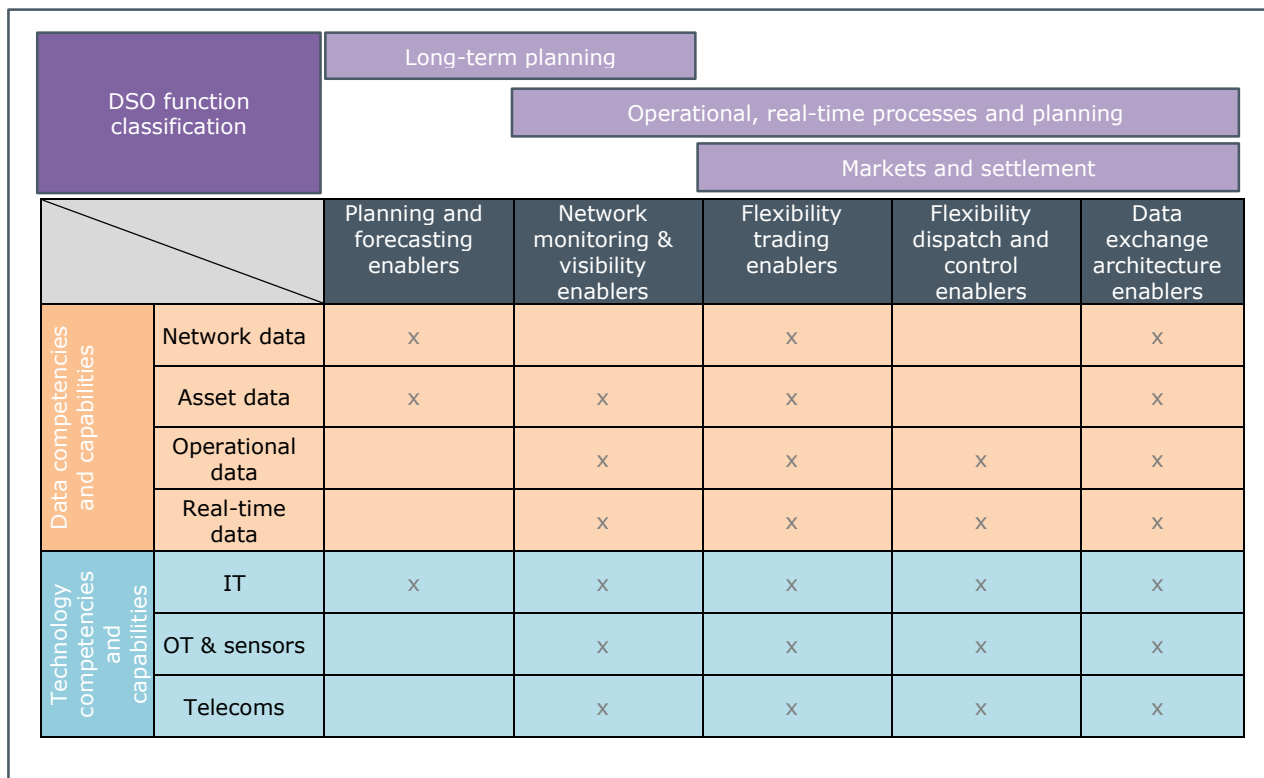


Figure 7. Schematic of DSO functions, Key Enablers groupings, and data and technology competencies and capabilities

Prioritising our policy and regulatory measures

1.38. There are policy and regulatory options across all five groupings of key enablers for DSO functions. We see an opportunity to progress forecasting and planning grouped key enablers in the near-term, starting with updating the LTDS, as detailed below. We believe this will provide a large energy consumer benefit in the short-term, and so is prioritised as the first policy change we will implement as part of our enduring role to support key enablers for DSO. We will seek feedback on this approach in consultation with stakeholders.

1.39. The work on forecasting and planning enablers coordinates closely with our work on whole system outcomes. In the responses to our informal consultation on the proposed Whole Electricity System licence condition, a significant number of industry stakeholders identified data about the physical characteristics of the network to be a priority for information sharing and improved whole system outcomes.

The Long-term development statement (LTDS)

1.40. Pursuant to SLC25 of the distribution licence, distribution licensees must publish the LTDS for the purposes of providing information, including the provision of network planning data, to assist consumers to assess opportunities for making use of the networks. We believe we can make significant improvements to the format of the data, the tools the data includes and the assessment of network headroom through updating the LTDS.

- 1.41. Consistent with the Energy Data Taskforce,³⁴ conclusions from the Open Networks Project,³⁵ NIA innovation projects,³⁶ and Horizon 2020 projects, we are considering the implementation of a standard interoperability data format consistent across networks to enable data sharing. The initiatives listed above point to the common information model (CIM) as a promising format for distribution energy system data interoperability; CIM is adopted by European TSOs under ENTSO-E based on an International Electrotechnical Commission standard 61970,^{37, 38} and projects are underway to develop distribution level standards.³⁹ We will consult later this year to seek views on whether such a format change is an appropriate step for the LTDS.
- 1.42. Enhancements in smart distribution network forecasting, such as probabilistic modelling and distribution future energy scenarios, have been well-established; we will also seek views on including these in the LTDS.
- 1.43. Network needs and headroom analysis includes data valuable to flexibility providers, aggregators and flexibility trading platform providers, amongst others, and will likely improve flexibility liquidity. We will consult on updating how this data is made available.
- 1.44. Updates to the LTDS may require working groups and coordination; we will seek views on how to improve the LTDS before establishing changes. In accordance with SLC25, we will carry out a consultation before implementing any changes to the form of the LTDS.

Summary and conclusions

- 1.45. We have analysed the engineering and technical requirements for the delivery of DSO functions, recognising that there is much available learning to enhance DSO function delivery. We consider that currently the most important key enablers for DSO functions are forecasting and planning data, and enhanced network visibility. We expect companies to be taking ownership of making improvements in this area. Beyond this, we see ourselves as having a role to ensure that enablers are rolled out and EDTF recommendations are taken forwards.
- 1.46. We note that there are risks associated with inaction, and seek instead to maintain policy optionality by limiting DSO function lock-in. We consider interoperability of DSO functions critical to enabling policy optionality.

Next steps

- 1.47. This year, we will consult on key enablers for DSO functions and specifically on updates to the LTDS. This consultation will be formed of two parts. The first will seek stakeholder views on enablers; the second part of the consultation will focus on the LTDS, tangible changes to the associated form of statement, and the means to deliver these changes.

³⁴ <https://es.catapult.org.uk/news/energy-data-taskforce-report/>

³⁵ Open Networks Project, 2019, Workstream 1B product 4, interim report: <http://www.energynetworks.org/assets/files/WS1B%20P4%20-%20Interim%20Report%201%20-%2022May19%20verF1.1.pdf>

³⁶ https://www.smarternetworks.org/project/nia_wpd_016

³⁷ <https://www.iec.ch/smartgrid/standards/>

³⁸ <https://www.entsoe.eu/digital/cim/>

³⁹ <http://tdx-assist.eu/>

Development of coordinated flexibility markets

Context and scope of workstream

- 1.48. As set out in section 1 of this document, we are working on a number of reforms to better enable effective signals that encourage efficient use of the system and improve arrangements to encourage efficient behaviour. This includes our electricity network access and forward-looking charges programme that seeks to improve the effectiveness of network signals, driving users to respond to them in a way that will improve the efficiency and use of the electricity system.
- 1.49. Alongside this, BEIS, supported by Ofgem, have launched an independent review of engineering standards.⁴⁰ The objective of the review is to consider how the engineering standards that govern the planning, design and operation of our electricity networks should be updated in the face of a changing energy system and the zero carbon target. Implementation of any recommendations from this review may impact the decisions network companies take when deciding between network reinforcement, technological solutions and contracted flexibility to develop and manage their networks efficiently.
- 1.50. The network and system needs that are not met by network price signal flexibility will then be met through the most efficient mix of the competing solutions DNOs can draw on to manage their networks: (1) solutions met by smarter use of existing network assets, (2) contracted flexibility, or (3) traditional reinforcement. This section outlines the work we will do to support and steer the development of contracted flexibility, especially the flexibility tenders being run by DNOs.
- 1.51. Since we published our Smart System and Flexibility Plan, all DNOs have issued flexibility tenders for their areas or run expressions of interest.⁴¹ More broadly, the GB energy system is witnessing the growth of new markets as many procurers, providers and intermediaries such as flexibility trading platforms and aggregators seek to secure roles in new flexibility markets.
- 1.52. We actively monitor the development of new flexibility markets. Volumes of flexibility procured are likely to be currently restricted by low understanding and confidence in the markets by flexibility providers, limited product standardisation, low price transparency and inconsistent valuation. We want industry to take action in these areas to facilitate the development of coordinated flexibility markets.
- 1.53. Our work covers three principal areas:
- Valuation and decision making – this is to ensure that flexibility operates on a level playing field with the use of network assets and traditional reinforcement, and that the decision-making processes are transparent.
 - Consistent competition processes and products for procurement – this lowers barriers to entry for market participants and can increase liquidity.
 - Coordinated flexibility actions across markets – this helps manage conflicts over flexibility actions, and allows stacking across markets.

⁴⁰ <https://www.gov.uk/government/publications/electrical-engineering-standards-independent-review>

⁴¹ Details about these and further links can be found on the ENA website:
<http://www.energynetworks.org/electricity/futures/flexibility-in-great-britain.html>

Workstream policy objectives

1.54. Our policy objective of this workstream is:

- To influence industry to complete the reforms needed to open up new and existing flexibility markets, at pace and in a coordinated manner, that properly values flexibility.

Analysis

1.55. We will continue to meet regularly with the network companies, review their tender progress, question what they are doing, and push them to share their learnings with each other. In addition to these bilateral meetings, we are actively engaging with the ENA Open Networks Project. We will also continue to meet with flexibility providers to hear their views. Alongside this, we will be reviewing best practice, looking at international examples and consulting with academics. We actively engage with the European Commission and with European regulators, including through CEER,⁴² on developing flexibility markets. We will be hosting a workshop this autumn to discuss developments in DNO flexibility tenders with stakeholders, to provide a further steer for companies. We will consider how we embed implementation into RIIO-ED2, alongside our future charging and access reforms.

Valuation and decision making

1.56. Flexibility solutions to address network and system needs are not yet consistently valued. Whilst this market is developing, and feedback on tenders are being used to inform future tenders, different approaches can be useful, especially when these take account of participant feedback and the learnings of others. But these should ultimately converge to improve participant engagement and confidence in the market, and enable more effective pricing signals to the market. Publishing the result of flexibility tenders can also help with this. We want to see convergence and transparency in the aspects included in the cost-benefit analyses (CBA) DNOs use to determine the most cost effective solution for network and system needs.

1.57. We expect DNOs to be transparent about the processes they follow when choosing between alternative solutions to manage their networks. These include network reinforcement, smarter use of existing network assets and flexibility. Transparency will drive predictable and justified outcomes, improving market confidence.

1.58. We expect DNOs to take account of factors such as uncertainty in changes in load and future technology costs, which might affect the business case of different solutions through time. The optionality that flexibility can provide has value, especially when there is a high degree of uncertainty in future system needs, for example related to EV uptake. In addition, the costs of flexible technology may come down over time, whilst traditional reinforcement costs are sunk. These aspects need to be part of the CBA to properly compare the value of flexible solutions against the option of traditional reinforcement.

⁴² CEER has produced a number of related papers. See for example the New Services and DSO involvement paper <https://www.ceer.eu/documents/104400/-/-/ef4d6e46-e0a5-f4a4-7b74-a6d43e74dde8>

Consistent competition processes and products for flexibility procurement

- 1.59. In June 2019, all DNOs, TOs, the ESO and GTC renewed their commitment to flexibility, pledging to openly test the market to compare relevant grid reinforcement and market flexibility solutions for all new projects of significant value.⁴³ We welcome this renewed commitment, and we continue to push for delivery.
- 1.60. As distribution level flexibility markets have developed, competition formats, for example running auctions or offering set prices, have varied between DNOs. This has yielded valuable innovation and learning. But again, these approaches to market structures, products and processes need to ultimately converge, to lower the transaction costs of taking part. Take the example of a national supermarket chain seeking to engage in distribution level flexibility markets across the country. Without coordination, they could face six different sets of DNO counterparties pursuing different approaches with varying requirements and processes - seven counterparties if they also wish to sell into the ESO's balancing and ancillary markets. This raises complexity and artificial barriers to market entry.
- 1.61. We want to see barriers to entry lowered and market liquidity increased and believe that enhanced market compatibility, with consistent product requirements, contract types, and processes between DNOs and the ESO, where possible, will enable this. Clear information about future needs is also important. These elements will also enable flexibility trading platforms to better support these markets and better enable flexibility providers to move between markets to secure revenue.
- 1.62. DNOs are using flexibility trading platforms to support their flexibility tenders, which also helps improve visibility of offers. There is an emergence of platforms themselves, and as this area matures, it will be important that the information provided by the network companies can be easily accessed by multiple parties.
- 1.63. Some progress has been made to coordinate markets at the ENA's Open Networks Project;⁴⁴ this must be acted on and incorporated into business as usual. As they work on this, the network companies should engage with flexibility providers and other stakeholders, such as flexibility trading platform providers, to inform the development of both short and longer term flexibility markets.

Coordinated flexibility actions across markets

- 1.64. Efficient procurement of flexibility requires coordination across markets. The absence of good coordination can lead to conflicts whereby the actions of one party create a new cost for a different party. For example, the ESO procuring from a provider connected to the distribution network could exacerbate a distribution constraint. At the same time, there can be synergies; activation of one flexibility resource may be able to resolve multiple requirements of network and system operators, and stack value for the flexibility provider.
- 1.65. The Regional Development Programmes and other innovation trials are delivering learnings around conflict resolution and synergy identification. Developing good practice

⁴³<http://www.energynetworks.org/assets/files/ENA%20Flexibility%20Commitment%20Our%20Six%20Steps%20for%20Delivering%20Flexibility%20Services.pdf>

⁴⁴ ENA Open Networks Project Workstream 1A, product 2 procurement processes and product 4 commercial arrangements: <http://www.energynetworks.org/electricity/futures/open-networks-project/workstream-products/ws1a-flexibility-services.html>

for this coordination across network boundaries is in scope of the Open Networks project for 2019.⁴⁵ Network companies and the ESO are reviewing their exclusivity terms to not unreasonably prevent flexibility providers from accessing value from other revenue streams.

- 1.66. We want to see good practice put into action across DNOs and the ESO. We want the impacts of actions across markets to be understood and the stacking of flexibility products and services enabled, exposing flexibility providers to the true value of their flexibility. This will require coordination across national balancing and network service markets. This includes active network management schemes; we expect DNOs to deliver more efficient and transparent processes for curtailment at distribution, including coordination and clarity on the interaction between active network management and flexibility markets. Without effective coordination across active network management and flexibility markets, we risk reducing liquidity and not appropriately valuing flexibility.
- 1.67. Where coordination is inhibited by policy or regulation, we would like to see specific details of what those barriers are, and recommendations for policy-makers (including Ofgem and BEIS) to resolve them.

Summary and conclusion

- 1.68. We are actively monitoring the development of flexible markets on the distribution network. We welcome industry's efforts to date. There remains much work to be done to open up both short and longer term flexibility markets, so that flexibility providers can rely on accessing value from these markets; and DNOs can rely on flexibility providers to meet their network management and reinforcement requirements. Properly valuing the flexibility provided and ensuring the decision making between competing network management options is clear can bolster provider confidence. Achieving consistency in how flexible competitions are run, the product framework and contracting requirements, together with clear signposting of needs, can lower the transaction costs of taking part, ensure coordination across markets and reduce wider system costs.

Next steps

- 1.69. We will continue to meet regularly with flexibility providers and the network companies, reviewing flexibility tender progress, questioning what they are doing, and pushing them to share their learnings with each other. Alongside this, we will be reviewing best practice, looking at international examples and consulting with academics. We will hold a workshop this autumn to discuss best practice for flexibility tenders with wider stakeholders and network companies, to provide a further steer for companies. We will then be considering how we embed implementation into RIIO-ED2, alongside the decisions we will be taking on future charging and access reforms.

⁴⁵ ENA Open Networks Project workstream 1A product 5 Conflict management and Co-optimisation: <http://www.energynetworks.org/electricity/futures/open-networks-project/workstream-products/ws1a-flexibility-services.html>

Appendix 2: Responding to this position paper

How to respond

1. We want to hear from anyone interested in this consultation. Please send your response to the person or team named on this document's front page.
2. We've asked for your feedback in each of the questions throughout. Please respond to each one as fully as you can.
3. We will publish non-confidential responses on our website.

Your response, data and confidentiality

4. You can ask us to keep your response, or parts of your response, confidential. We'll respect this, subject to obligations to disclose information, for example, under the Freedom of Information Act 2000, the Environmental Information Regulations 2004, statutory directions, court orders, government regulations or where you give us explicit permission to disclose. If you do want us to keep your response confidential, please clearly mark this on your response and explain why.
5. If you wish us to keep part of your response confidential, please clearly mark those parts of your response that you *do* wish to be kept confidential and those that you *do not* wish to be kept confidential. Please put the confidential material in a separate appendix to your response. If necessary, we'll get in touch with you to discuss which parts of the information in your response should be kept confidential, and which can be published. We might ask for reasons why.
6. If the information you give in your response contains personal data under the General Data Protection Regulation 2016/379 (GDPR) and domestic legislation on data protection, the Gas and Electricity Markets Authority will be the data controller for the purposes of GDPR. Ofgem uses the information in responses in performing its statutory functions and in accordance with section 105 of the Utilities Act 2000. Please refer to our Privacy Notice on consultations, see Appendix 4.
7. If you wish to respond confidentially, we'll keep your response itself confidential, but we will publish the number (but not the names) of confidential responses we receive. We won't link responses to respondents if we publish a summary of responses, and we will evaluate each response on its own merits without undermining your right to confidentiality.

Appendix 3: Privacy notice on consultations

Personal data

The following explains your rights and gives you the information you are entitled to under the General Data Protection Regulation (GDPR).

Note that this section only refers to your personal data (your name address and anything that could be used to identify you personally) not the content of your response to the consultation.

1. The identity of the controller and contact details of our Data Protection Officer

The Gas and Electricity Markets Authority is the controller, (for ease of reference, "Ofgem"). The Data Protection Officer can be contacted at dpo@ofgem.gov.uk

2. Why we are collecting your personal data

Your personal data is being collected as an essential part of the consultation process, so that we can contact you regarding your response and for statistical purposes. We may also use it to contact you about related matters.

3. Our legal basis for processing your personal data

As a public authority, the GDPR makes provision for Ofgem to process personal data as necessary for the effective performance of a task carried out in the public interest. i.e. a consultation.

3. With whom we will be sharing your personal data

None

4. For how long we will keep your personal data, or criteria used to determine the retention period.

Your personal data will be held for an appropriate duration.

5. Your rights

The data we are collecting is your personal data, and you have considerable say over what happens to it. You have the right to:

- know how we use your personal data
- access your personal data
- have personal data corrected if it is inaccurate or incomplete
- ask us to delete personal data when we no longer need it
- ask us to restrict how we process your data
- get your data from us and re-use it across other services
- object to certain ways we use your data
- be safeguarded against risks where decisions based on your data are taken entirely automatically
- tell us if we can share your information with 3rd parties
- tell us your preferred frequency, content and format of our communications with you
- to lodge a complaint with the independent Information Commissioner (ICO) if you think we are not handling your data fairly or in accordance with the law. You can contact the ICO at <https://ico.org.uk/>, or telephone 0303 123 1113.

6. Your personal data will not be sent overseas (Note that this cannot be claimed if using Survey Monkey for the consultation as their servers are in the US. In that case use "the Data you provide directly will be stored by Survey Monkey on their servers in the United States. We have taken all necessary precautions to ensure that your rights in term of data protection will not be compromised by this".

7. Your personal data will not be used for any automated decision making.

8. Your personal data will be stored in a secure government IT system. (If using a third party system such as Survey Monkey to gather the data, you will need to state clearly at which point the data will be moved from there to our internal systems.)

9. More information For more information on how Ofgem processes your data, click on the link to our "[Ofgem privacy promise](#)".