

RIIO-ED2 Methodology Consultation: Overview

Publication date	30 July 2020	Contact:	James Veaney
		Team:	Network Price Controls
Response deadline	1 October 2020	Tel:	0207 901 1861
		Email:	RIIO2@ofgem.gov.uk

The next electricity distribution price control (RIIO-ED2) will start in April 2023. We are consulting on the methodology we will use to set this price control. We invite views from people with an interest in how the electricity distribution networks are operated and developed.

In this Overview document, we outline the purpose of the consultation and we discuss some of the key issues that need to be addressed in RIIO-ED2. We also set out the questions we are seeking views on and how you can respond to the consultation.

Once the consultation has closed, we will consider all responses we receive before making our decision on the methodology we will use for RIIO-ED2. We want the consultation to be transparent and we will publish all non-confidential responses we receive on our website, [Ofgem.gov.uk/consultations](https://www.ofgem.gov.uk/consultations), together with our decision on the methodology.

© Crown copyright 2020

The text of this document may be reproduced (excluding logos) under and in accordance with the terms of the [Open Government Licence](#).

Without prejudice to the generality of the terms of the Open Government Licence the material that is reproduced must be acknowledged as Crown copyright and the document title of this document must be specified in that acknowledgement.

Any enquiries related to the text of this publication should be sent to Ofgem at:

10 South Colonnade, Canary Wharf, London, E14 4PU. Alternatively, please call Ofgem on 0207 901 7000.

This publication is available at www.ofgem.gov.uk. Any enquiries regarding the use and re-use of this information resource should be sent to:

psi@nationalarchives.gsi.gov.uk

Contents

Foreword	4
1. RIIO-ED2 Methodology Consultation at a Glance	5
2. Context for RIIO-ED2	9
3. The RIIO-ED2 process	16
4. Net Zero and Innovation	24
Net Zero re-opener	25
Strategic Investment for Net Zero	28
Innovation	39
5. Modernising Energy Data	47
6. DSO transition	51
7. A whole system approach	65
8. Access Significant Code Review and impact on RIIO-ED2	71
9. Impact of COVID-19 on the price controls	75
Appendices	77
Appendix 1 - RIIO-ED2 Framework Decisions	78
Appendix 2 - Net Zero Re-opener	79
Appendix 3 – Uncertainty mechanisms and incentives for Strategic Investment Models	82
Appendix 4 - Innovation	89
Appendix 5 - DSO roles and principles in RIIO-ED2, and work during RIIO-ED1	97
Appendix 6 - Consultation Questions	111
Appendix 7 - Consultation responses, data and confidentiality, and general feedback	121
Appendix 8 - Glossary	123

Foreword

As the regulator of the electricity networks in Great Britain, our focus is on protecting the consumers of today alongside the need to build the energy system of the future.

The UK has made significant progress in reducing carbon emissions, with almost half our electricity coming from renewable or low carbon sources last year. However, we need to go further given targets for decarbonisation and Net Zero.¹ In particular, we will need cleaner forms of transport and heat.

The next electricity distribution price control (RIIO-ED2), covering the five-year period to April 2028, will be fundamental to helping this change happen; rewiring Great Britain to support a rapid rollout of electric vehicles, providing the electricity to power more heat pumps and enabling renewable generation to connect to the grid. Our design of RIIO-ED2 will provide a clear path to facilitate this change, providing the right incentives for investment for the future.

A transition to a cleaner, more flexible energy system will require investment in the short term to meet future requirements. We will continue to protect the interests of all consumers but we recognise that setting a price control that facilitates Net Zero may require us to re-evaluate the balance between the interests of current consumers and future consumers. We are using this consultation to explore alternative methodologies that can allow different pathways to Net Zero.

As we make progress towards Net Zero, we will continue to need a reliable energy system, which can supply energy when consumers need it. New technologies, better use of data and much greater flexibility in how the system operates will be critical to ensuring this can be achieved in the most efficient manner.

As well as being essential to the economic and environmental future of Great Britain, local electricity grids are also critical to the welfare of people today. COVID-19 has had a significant impact on the way we work and the wider economic environment, particularly for lower income and vulnerable consumers, and the effects of it are likely to be felt for some time. This makes it even more important that our approach to RIIO-ED2 supports decarbonisation and delivers the high quality, reliable services that consumers expect at the same time as keeping bills low.

¹ The UK Government has passed legislation enshrining in law the target of Net Zero greenhouse gas emissions by 2050. Scotland have a target of Net Zero by 2045, and Wales has a target of 95% reduction by 2050.

1. RIIO-ED2 Methodology Consultation at a Glance

1.1 The electricity distribution networks will be at the forefront of the changes needed to support Net Zero. Our RIIO-ED2 methodology must enable the investment needed to support decarbonisation while delivering world-class levels of reliability and ensuring that costs for consumers are as low as possible. We summarise our proposals regarding the methodology for RIIO-ED2 below.

Net Zero and Innovation

1.2 The electricity distribution network operators (DNOs) must enable the transition to a smart, flexible, low cost, and low carbon energy system for all consumers and network users.

1.3 Net Zero will mean an increased demand for electricity as people switch to a cleaner source of energy. DNOs will need to make strategic investment to increase the capacity of their networks to meet this demand. How we tackle this will be one of the most important aspects to get right. Underinvesting in the network now could put Net Zero targets at risk. However, not applying the necessary control on how investment is made could be costly for consumers.

1.4 We will continue Ofgem's engagement with key stakeholders, including through the recently formed Net Zero Advisory Group. The Group is intended to increase strategic coordination and to help us better understand how emerging government policy could impact upon our economic regulation, including for the price controls, and whether the actions taken by network companies are sufficient to support Net Zero targets. We propose to introduce a suite of Net-Zero related investment and innovation mechanisms, including a Net Zero re-opener, to ensure that RIIO-ED2 is adaptable and can keep pace with changes in the wider policy and technological environment

1.5 We are consulting on four alternative models for managing strategic investment. Each enables more flexibility within the price control to allow DNOs to adapt their investment plans to keep pace with Net Zero.

1.6 We propose to provide support for innovation that DNOs would not otherwise undertake, where this addresses the key strategic challenges that are raised by the decarbonisation agenda or provides support for vulnerable consumers. We will

seek to maximise the impact of our innovation support by seeking more strategic alignment with other forms of public innovation funding.

A smart and flexible energy system

- 1.7 The use of flexibility as an alternative to network investment has the potential to deliver huge value to consumers, but it requires a change in how the distribution system is operated. We are proposing to introduce a suite of reforms to define and regulate the distribution system operation. In the first instance, those reforms will apply to DNOs. We are considering if and how we can allocate those functions to other parties in the future, including identifying arrangements that will unlock the benefits to the whole system of better coordination and planning, and proposing arrangements that enable a separation pathway should that be required.
- 1.8 The use of data lies at the heart of the energy system transition. A shared understanding of what is happening to energy flows and the status of network infrastructure allows the exciting prospect of innovators spotting creative opportunities to address energy issues, as well as potentially to use energy data to benefit consumers in the economy more widely. Building on the recommendations of the Energy Data Task Force², electricity networks need to be digitalised and their data has to be modernised and made available in a transparent and open manner.
- 1.9 DNOs should operate in a way that takes into account the impact of their actions across the whole energy system and we propose to have arrangements in RIIO-ED2 that will facilitate the delivery of whole system solutions.

Delivering value for money services for consumers

- 1.10 Outputs and incentives are a key feature of the RIIO-ED2 framework. They are designed to drive companies to focus on delivering the objectives that matter to current and future consumers, and for the environment during the 2023-2028 period and beyond.
- 1.11 When customers are looking to connect to the network, or are seeking information, particularly during a power cut, we expect DNOs to deliver a high quality and reliable service.

² <https://es.catapult.org.uk/reports/energy-data-taskforce-report/>

- 1.12 The range of services DNOs should offer needs to adapt to reflect changing consumer needs, and DNOs should give particular attention to the needs of those who may be most vulnerable or in need of assistance.
- 1.13 Increased uptake of low carbon technologies such as electric vehicles and heat pumps will be likely to place an even greater dependency on the electricity networks. It is, therefore, vital that the DNOs continue to focus on ensuring their networks remain safe and reliable, and that they behave as responsible long-term guardians of critical infrastructure.
- 1.14 For RIIO-2, we propose to use Licence Obligations (LOs), Output Delivery Incentives (ODIs) and Price Control Deliverables (PCDs) to specify:
- the services that customers should receive
 - the levels of performance that the companies need to achieve
 - the financial and reputational consequences for companies that out- or under-perform against these outputs
 - the safeguards to protect customers if specific investments are not delivered as planned.
- 1.15 We will be using performance improvements in RIIO-ED1 as the starting-off point for the targets we set in RIIO-ED2 and these will remain challenging throughout. DNOs that can excel and surpass these targets will be rewarded, but those that do not meet our expectations should expect to be penalised.

Keeping consumer bills as low as possible

- 1.16 The cost of financing DNOs needs to remain attractive to investors while protecting consumers from paying for returns that are higher than they need to be. Getting this balance right is essential to supporting additional investment for decarbonisation while keeping consumer bills low.
- 1.17 For this consultation, we are not setting out working assumptions for the cost of equity or the cost of debt. In our December 2019 Framework Decision for RIIO-ED2, we confirmed our intention to retain full debt indexation and to set baseline allowed returns using the same methodology as applied to the other RIIO sectors. At this stage of the process, however, no conclusions have been reached on the specific application of these approaches and therefore no working assumptions have been set out. Through this consultation, we welcome views on the specific

finance-related consultation questions asked and the extent to which our Draft Determination proposals, including distinguishing between expected and allowed returns, should also be applied to RIIO-ED2.

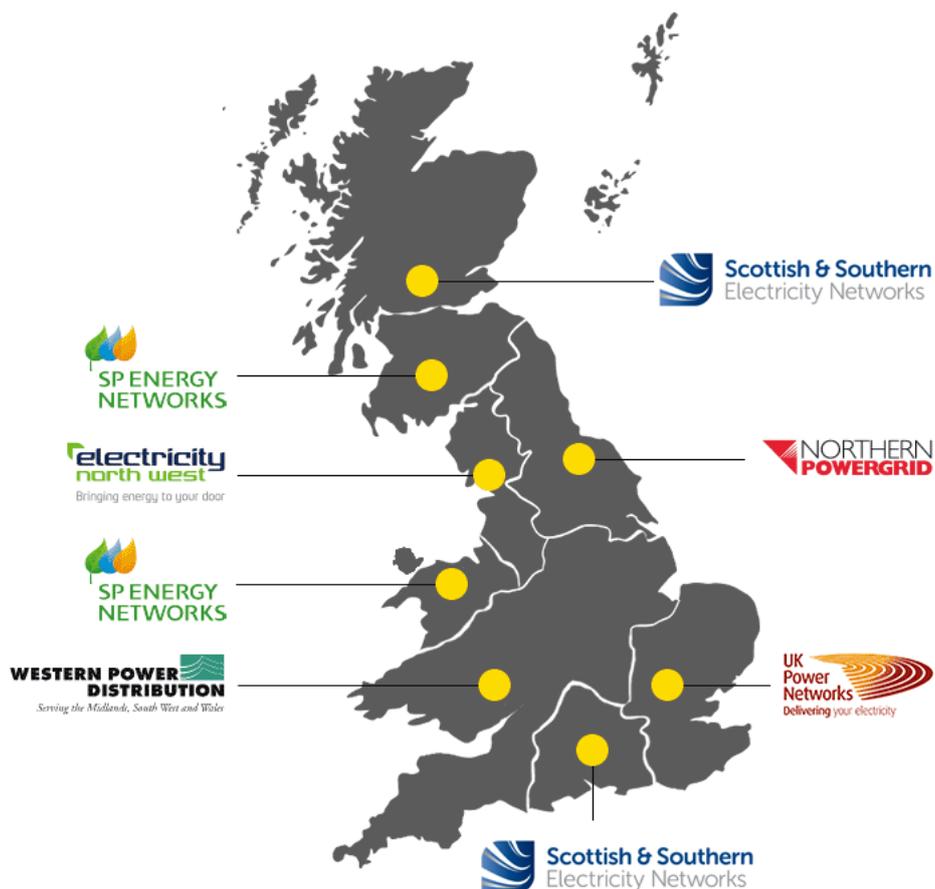
- 1.18 We propose to use our cost assessment toolkit to set allowances that reflect the efficient cost of delivering network services. Where appropriate, we propose to use uncertainty mechanisms to minimise the impact of forecast uncertainty and competition to set prices, where it is feasible to do so and is in the consumer interest. We are also proposing to use a business plan incentive to drive high quality and ambitious plans as the basis of the RIIO-ED2 price control.
- 1.19 When a network company out- or under-performs against its cost allowance, the Totex Incentive Mechanism (or 'sharing factor') apportions between its customers and investors the cost saved or incurred, versus the allowance that Ofgem sets. This provides a strong incentive for companies to operate efficiently that we intend to maintain but we expect network companies to share a greater proportion of costs saved with consumers in RIIO-ED2.

2. Context for RIIO-ED2

Electricity distribution networks

- 2.1 A network of cables and wires spans Great Britain (GB) transporting energy from its place of generation to our homes and businesses. Private companies own and operate these networks, and consumers pay for them through their energy bills.
- 2.2 The electricity distribution network carries electricity from the high voltage transmission network to industrial, commercial, and domestic users, as well as distributing an increasing quantity of power from generation sources that are connected directly to the distribution networks. There are fourteen electricity DNOs operating in GB, which are managed by six companies. These are shown in Figure 1 below.

Figure 1: Map showing DNOs



- 2.3 We use the RIIO (Revenue = Incentives + Innovation + Outputs) framework to set price controls for the gas and electricity networks. This performance-based

framework seeks to put consumers at the heart of network companies' plans for the future and to encourage longer-term thinking, greater innovation and more efficient delivery.

- 2.4 The first RIIO price control for the electricity distribution networks (RIIO-ED1) runs from 2015-2023. RIIO-ED2 will run from 2023-2028. DNO price controls run two years behind those we set for the operators of the gas distribution networks and the gas and electricity transmission networks. The five-year RIIO-2 price controls for these companies and for the Electricity System Operator (ESO) will start in April 2021.³ Developing these other RIIO-2 price controls has involved extensive stakeholder engagement and reflection on the effectiveness of the RIIO-1 methodologies. We have been clear that RIIO-ED2 is a separate process, however in the design of our proposals for RIIO-ED2, we have taken into account the lessons learnt and the feedback we have received from the other sectors. We have reflected this in our proposals where this is the case. We are now consulting on those proposals for RIIO-ED2.
- 2.5 In approaching our design of RIIO-ED2, we have also taken into account legislation introduced to enshrine Net Zero targets, along with policy and engineering recommendations to improve the stability of the energy system.

Embedding lessons from the RIIO-1 price controls

- 2.6 Responding to RIIO-1 incentives, companies have beaten targets for expenditure in delivering services to consumers. This improved efficiency in expenditure results from network companies rephasing or retiming their work profiles relative to their original plans, as well as some other external factors (such as different volume of low carbon technologies connecting to the networks than was anticipated at the beginning of RIIO-1). Network companies have undertaken considerable development to respond to changes in how the networks are used, and innovation and R&D have increased.
- 2.7 However, despite these successes, the overall costs of the networks to consumers in RIIO-1 to date have turned out to be higher than they needed to be. In practice, while there is a greater spread in performance in electricity distribution than in gas distribution and electricity and gas transmission, the majority of

³ The ESO price control will cover the five-year period to 31 March 2026 but for elements, such as costs and outputs, our Draft Determination proposals apply for the ESO's two-year business plan period to 31 March 2023.

network companies across all sectors are earning returns towards the higher end of our expectations when the price controls were set.

- 2.8 In the electricity distribution sector, outperformance at the sectoral level has been driven largely by underspend against allowances as well as rewards from incentives, particularly against the Interruptions Incentive Scheme (IIS) which has supported high levels of network reliability.
- 2.9 The recent National Audit Office (NAO) report⁴ on electricity networks sets out their assessment of the performance under RIIO-1 in particular. We welcomed the NAO's findings that Ofgem's regulation has delivered consumers a good service, increasing customer satisfaction and sharply reducing power cuts to half the European average, whilst attracting £70 billion investment to connect record levels of renewable power.
- 2.10 We acknowledge however, that the overall costs to consumers to date under RIIO-1 have been too high and the lessons on how we set these previous price controls must be embedded into the design of RIIO-2. We accept the recommendations set out for Ofgem and incorporating these as appropriate, including through these proposals and the Draft Determinations proposals for the transmission and gas distribution sectors and ESO.⁵

Supporting Net Zero legislation

- 2.11 In 2019, the UK Government passed legislation enshrining in law the target of Net Zero greenhouse gas emissions by 2050. The Scottish Government also legislated to set a Net Zero target for 2045 and the Welsh Government intends to introduce legislation to amend its existing 2050 target for the achievement of Net Zero emissions. In February this year, we published our Decarbonisation Action Plan⁶, which sets out the actions we will take within 18 months, beginning our next steps on an urgent, but decades-long journey towards Net Zero.
- 2.12 In our Action Plan, we committed to take steps to make the network price control regulatory regime more adaptive to deliver the most effective transition to Net Zero at lowest cost to consumers. These included a review of the design of the electricity distribution network price control to facilitate the transition to Net Zero.

⁴ <https://www.nao.org.uk/wp-content/uploads/2020/01/Electricity-networks.pdf>

⁵ <https://www.ofgem.gov.uk/publications-and-updates/riio-2-draft-determinations-transmission-gas-distribution-and-electricity-system-operator>

⁶ <https://www.ofgem.gov.uk/publications-and-updates/ofgem-s-decarbonisation-action-plan>

To encourage further long-term planning, leadership and innovation in networks, we committed to providing guidance on anticipatory investment to aid the development of investment proposals where there is significant uncertainty.

- 2.13 As the growth in electric vehicles accelerates and more homes and businesses source their heat and power from cleaner energy sources, a core responsibility of the electricity distribution networks will be to facilitate these changes. This means responding to the demands for low carbon connections in a timely way, finding efficient ways to respond to new sources of demand and to create flexibility on the networks, and supporting innovation that could expand the range of possibilities for the decarbonisation of heat, power and transport as well as providing better support for vulnerable consumers.
- 2.14 In electricity distribution, enabling the connection of low carbon technologies across the country is an increasingly important element of the outputs that the DNOs are expected to achieve. The DNOs facilitated the connection of over 14,000 electric vehicle chargepoints in 2018/19, with over 50,000 connected in total since the start of RIIO-ED1 in 2015.⁷
- 2.15 Growth in low carbon and distributed energy continues. Last year, 1,051 MW of smaller scale, renewable distributed generation has been connected to the distribution network, bringing the total amount under RIIO-ED1 to over 10 GW connected over the last four years.
- 2.16 The key focus of our methodology for RIIO-ED2 is ensuring networks can attract the investment needed to support Net Zero and a green economic recovery, whilst also protecting the interests of consumers by keeping bills low. This will require us to ensure that the networks are sufficiently flexible and responsive to major developments in policy for power, heat and transport.

Policy and engineering recommendations for system stability

- 2.17 GB's electricity networks deliver safe and reliable energy with power cuts reduced during successive price control periods and are now at around half the European average levels. The number of interruptions has fallen by around 50% since 1990, whilst the length of those interruptions has fallen by around 60%.⁸

⁷ 2018-19 RIIO-ED1 Regulatory Reporting Packs and Ofgem historical data

⁸ An interruption is defined as a loss of supply for three minutes or longer. A loss of supply for less than three minutes is termed a 'short interruption'. Short interruptions are not included within these performance figures.

- 2.18 In terms of recent performance, network reliability for local electricity grids has remained high at around 99.99%. Since 2015, customer interruptions in electricity distribution have fallen by 14%, and the duration of interruptions has fallen by around 10%.⁹
- 2.19 On 9 August 2019, 1.1 million electricity customers were disconnected following a lightning strike on a transmission circuit. This resulted in the loss of two transmission-connected generators and many distributed generators. Following this, we conducted an investigation to establish what lessons can be drawn to ensure that steps can be taken to further improve the resilience of Britain's energy network.¹⁰
- 2.20 Among the lessons learnt was the need for more visibility of the generation that is now connected to distribution networks, and this means that DNOs must have better systems in place to monitor what is happening on their networks.
- 2.21 The power cut also reinforced the need for DNOs to look after their customers during a power cut, in particular those who might be most vulnerable. We have reflected this in our proposals for RIIO-ED2.
- 2.22 In 2019, Government and Ofgem jointly commissioned an independent panel to undertake a review of electrical engineering standards¹¹. This panel will make recommendations to government on next steps to ensure that:
- electrical engineering standards are not creating undue costs on the electricity system and consumers
 - the standards are ready for a smart and flexible electricity system.
- 2.23 This work is due to conclude in the coming months and we will need to consider the impact on RIIO-ED2 associated with the implementation of any recommendations. This includes the potential impacts of any new requirements for the quality, security and resilience of electricity supplied by these networks, for connecting to and using these networks, for enhancing the interoperability of these networks with smart appliances and low carbon technologies, and how distributed energy resources and smart technology could supplement the need for

⁹ Based on data from the RIIO-ED1 Regulatory Reporting Packs and Ofgem historical data. The latest performance information is available in the 2018-19 Annual Report: <https://www.ofgem.gov.uk/publications-and-updates/riio-1-electricity-distribution-annual-report-2018-19>.

¹⁰ <https://www.ofgem.gov.uk/publications-and-updates/investigation-9-august-2019-power-outage>

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

traditional network reinforcement. The implementation of recommendations will involve further consultation with stakeholders.

Access and Forward-looking charges Significant Code Review (SCR)

- 2.24 RIIO-ED2 is part of a wider programme of work that will enable the energy system to become increasingly decentralised, decarbonised and digitalised, while ensuring that the interests of consumers continue to be protected.
- 2.25 This work includes our Access and Forward-looking charges Significant Code Review ('Access SCR'), where we are reviewing the arrangements for access to and charging for use of the electricity networks. The objective of the review is to ensure electricity networks are used efficiently and flexibly, reflecting users' needs and allowing consumers to benefit from new technologies and services while avoiding unnecessary costs on energy bills in general.
- 2.26 This could impact on RIIO-ED2 in a number of different ways. We are coordinating our work across these projects so that decisions and recommendations are made to a timescale that aligns with the development of the RIIO-ED2 sector methodology and the preparation of DNO business plans. For instance, we plan to consult on our minded-to decision on access and forward- looking charges later this year with a final decision in spring 2021¹². We provide more detail on this in Chapter 8.
- 2.27 We recognise that should our final decision on access and forward-looking charges significantly change from our minded-to consultation then it may be challenging for DNOs to reflect these changes in their draft business plan. We are therefore proposing that:
- Draft business plan submissions (due in July 2021) should use Access SCR Minded-to Consultation as a baseline.
 - Final business plan submissions (due in December 2021) should use Access SCR Final Decision as a baseline.
- 2.28 It would be helpful for DNOs to identify within their draft business plan submission which specific parts of their business plan could be impacted by our Access SCR

¹² The implementation of our Access SCR is likely to result in subsequent code modifications and there may be licence modifications (depending on our decision). These will come into effect from 1 April 2023

proposals (eg costs or volumes of connections). This includes any cost increases linked to the implementation of the Access SCR proposals.

3. The RIIO-ED2 process

RIIO-ED2 Framework

- 3.1 We began this process in August 2019 when we published an Open Letter Consultation.¹³ The letter set out the context for RIIO-ED2 and invited views from stakeholders on the Framework. We followed this with our RIIO-2 Framework Decision in December 2019.¹⁴
- 3.2 In our Framework Decision, we decided that our overarching objective for RIIO-ED2 would be to ensure that DNOs deliver services that meet consumers' needs at the lowest possible cost to consumers. This will involve the delivery of the following outcomes while keeping consumer bills as low as possible:
- Meet the needs of consumers and network users: Network companies must deliver a high quality and reliable service to all network users and consumers, including those who are in vulnerable situations.
 - Maintain a safe and resilient network: Network companies must deliver a safe and resilient network that is efficient and responsive to change.
 - Deliver an environmentally sustainable network: Network companies must enable the transition to a smart, flexible, low cost, and low carbon energy system for all consumers and network users.
- 3.3 We are now developing the methodology we will use to apply the Framework.

Putting the consumer voice at the heart of RIIO-ED2

- 3.4 To ensure DNOs adapt and respond to changing consumer requirements, we are strengthening the voice of the consumer so that consumer advocates can challenge company spending plans and how they are delivered, and make sure they reflect what consumers need and value. In our RIIO-ED2 Framework Decision, we confirmed that we would apply the enhanced engagement arrangements for RIIO-ED2, as we did for the other RIIO sectors¹⁵. These arrangements involve structured challenge to the company Business Plans by Customer Engagement Groups (CEGs), consisting of expert consumer advocates and network users.

¹³ <https://www.ofgem.gov.uk/publications-and-updates/open-letter-consultation-riio-ed2-price-control>

¹⁴ <https://www.ofgem.gov.uk/publications-and-updates/riio-ed2-framework-decision>

¹⁵ RIIO-ED2 Framework Decision, December 2019, Chapter 2

- 3.5 The CEGs are company-specific groups, which are established by each of the companies and independently chaired. They will provide us with a public report with their views on the companies' Business Plans for RIIO-ED2. We have also established a RIIO-ED2 Challenge Group, which is also independently chaired. The Challenge Group will provide us with a public report on each of the companies' Business Plans.
- 3.6 These Enhanced Engagement arrangements have been an important part of the development of the RIIO-2 price controls for the transmission and gas distribution sectors as well as the ESO. We intend to learn from the experience of running this process in other sectors to date and to adapt the approach where appropriate in RIIO-ED2. This is reflected in our change to the timetable requiring only a single submission of each company's draft business plans in 2021.
- 3.7 At this stage, we expect to hold Open Hearings prior to our draft determinations for RIIO-ED2 in 2022. These hearings will provide the opportunity to focus on areas of disagreement raised by the various groups, and to invite any other evidence in support of, or against, company Business Plans. We had intended to run a series of Open Hearings for the other RIIO-2 sectors during spring 2020 but this was not possible due to COVID-19 restrictions.¹⁶ We will keep the programme for RIIO-ED2 under review.
- 3.8 Having set up the new enhanced stakeholder engagement framework for RIIO-ED2, we now expect companies to engage fully with the process. We expect DNOs to follow the RIIO-ED2 Enhanced Engagement guidance, which has been published alongside this consultation, and which may be periodically updated. We expect DNOs to provide timely information to these groups to enable them to robustly challenge their Business Plan proposals.
- 3.9 The DNOs are expected to submit a full draft of their Business Plans to the RIIO-2 Challenge Group on 1 July 2021, before their final Business Plans are submitted to Ofgem on 1 December 2021. Further detail on submission requirements for the Final Business Plans will be provided in our RIIO-ED2 Business Plan guidance. We

¹⁶ We are hosting a series of four webinars to enable stakeholders, particularly those with less technical knowledge of price controls, to better understand the RIIO-2 process and our Draft Determinations. To register please visit: <https://www.ofgem.gov.uk/regulating-energy-networks/networks-explained>. In October, we intend to hold a series of online Open Meetings in lieu of the Open Hearings that we had to cancel due to COVID-19. These meetings will take the form of 'enhanced bilateral meetings' where third party stakeholders will be able to contribute and attend. Further details will be published on our website in due course.

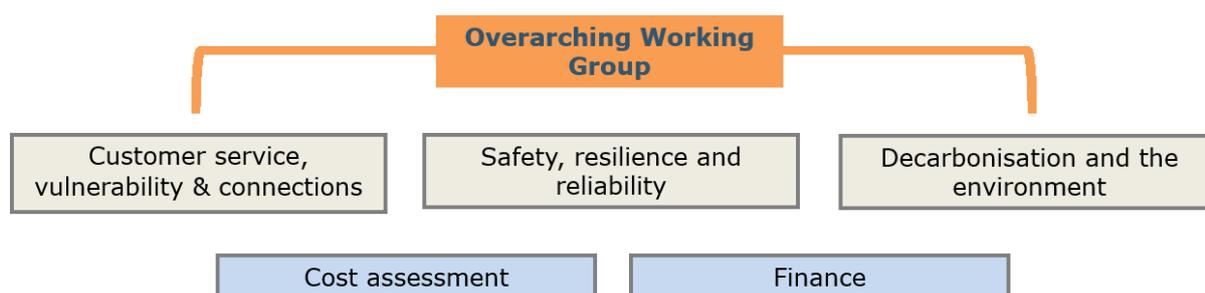
will shortly be publishing a draft version of this guidance and are inviting stakeholders to provide comments on its contents.

3.10 As well as informing Business Plans, we expect to see companies undertake robust and high quality engagement with stakeholders on an ongoing basis. We expect Business Plans to demonstrate the range of activities that companies will undertake to achieve this, including how they will report on the delivery of Business Plan commitments and to set out proposals for the potential ongoing role the stakeholder groups could play in holding them to account.

RIIO-ED2 Working Groups

3.11 We have used Working Groups with DNOs and other stakeholders to help develop these proposals. Details of these Working Groups can be found on our website. Figure 2 illustrates the framework for these groups.

Figure 2: RIIO-ED2 Working Groups



3.12 We anticipate an ongoing role for these groups as we progress towards a decision on the methodology and in its implementation.

RIIO-ED2 Building Blocks

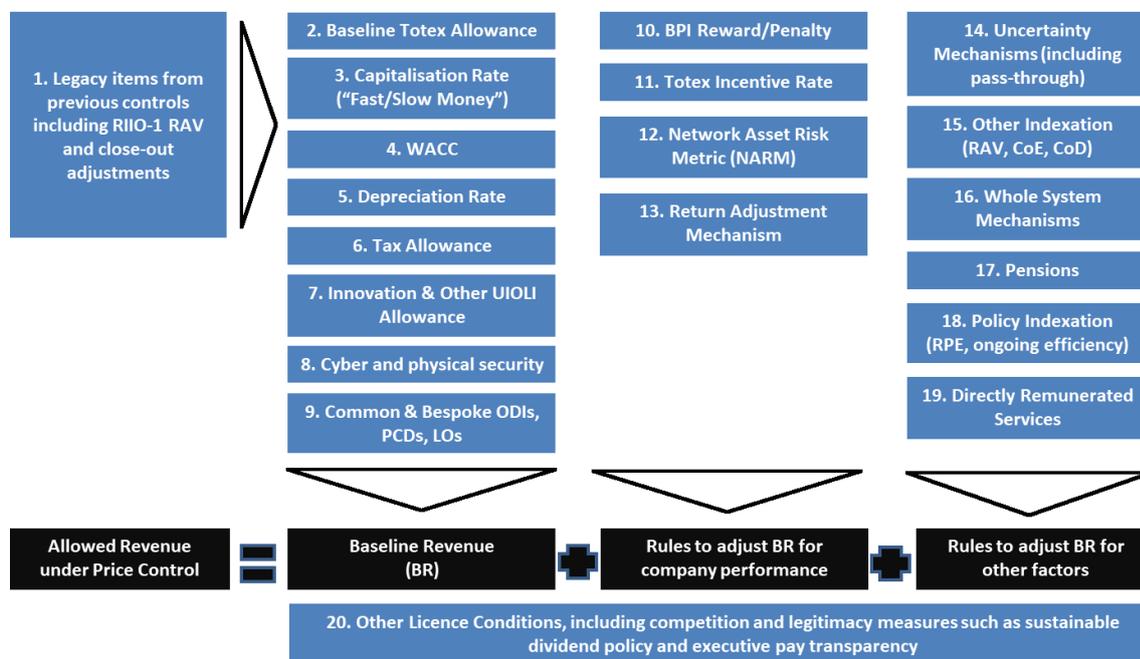
3.13 We have structured our proposals around a series of price control building blocks, as presented in Figure 3 below. We use the building blocks to set and adjust Allowed Revenue under the price controls. The building blocks cover:

3.14 baseline revenue and its composite parts, eg baseline Totex, depreciation allowance

3.15 the mechanisms that adjust this revenue during the price control period relative to company performance, eg rewards and penalties for specific incentives

3.16 other adjustments to baseline revenue, eg due to uncertainty mechanisms that increase or reduce allowances within the price control period.

Figure 3: RIIO-2 Building Blocks



Navigating the Methodology Consultation

3.17 Our Methodology Consultation document suite is set out in Figure 4. This document is the Overview document and contains details of our methodology in relation to the following:

- Net Zero and innovation
- modernising energy data
- DSO transition
- a whole system approach
- Access Significant Code Review and impact on RIIO-ED2
- impact of COVID-19 on RIIO-ED2.

3.18 This should be read alongside the following annexes.

- Annex 1 - Delivering value for money services for consumers: this contains our proposals for the outputs we expect companies to deliver in RIIO-ED2.
- Annex 2 – Keeping consumer bills low: this contains our proposals for measures to drive efficient costs and ambition in the delivery of services.

- Annex 3 - Finance: this contains our proposed approach to the regulatory finance building blocks of RIIO-ED2.

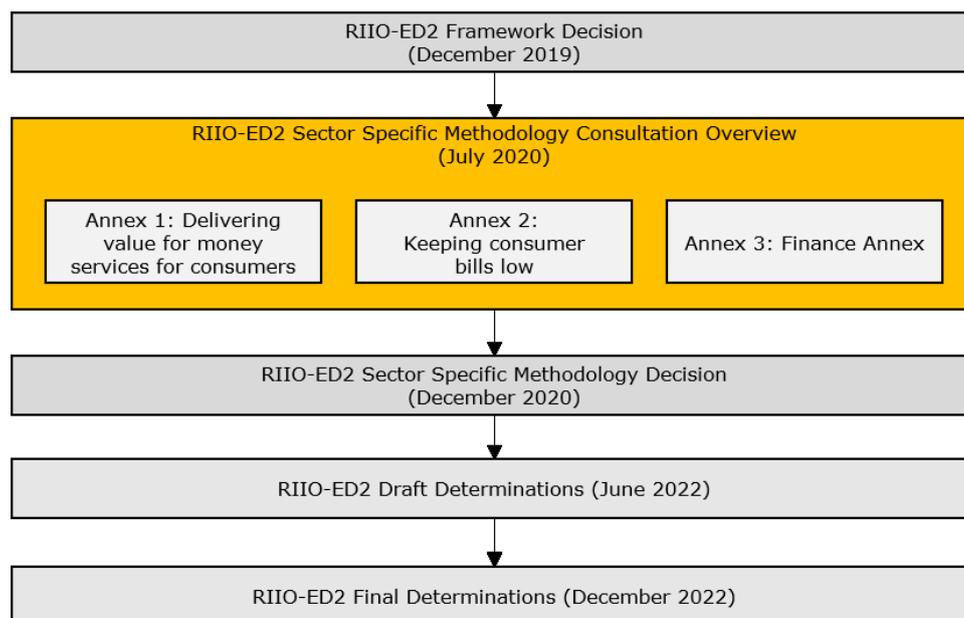
3.19 We are also publishing a suite of associated documents that support these proposals. These are:

- Draft business plan data templates
- Enhanced engagement guidance

3.20 In addition, we will shortly publish the following supporting documents:

- Draft business plan guidance
- Draft impact assessment on late competition
- Draft impact assessment (RIIO-ED2)

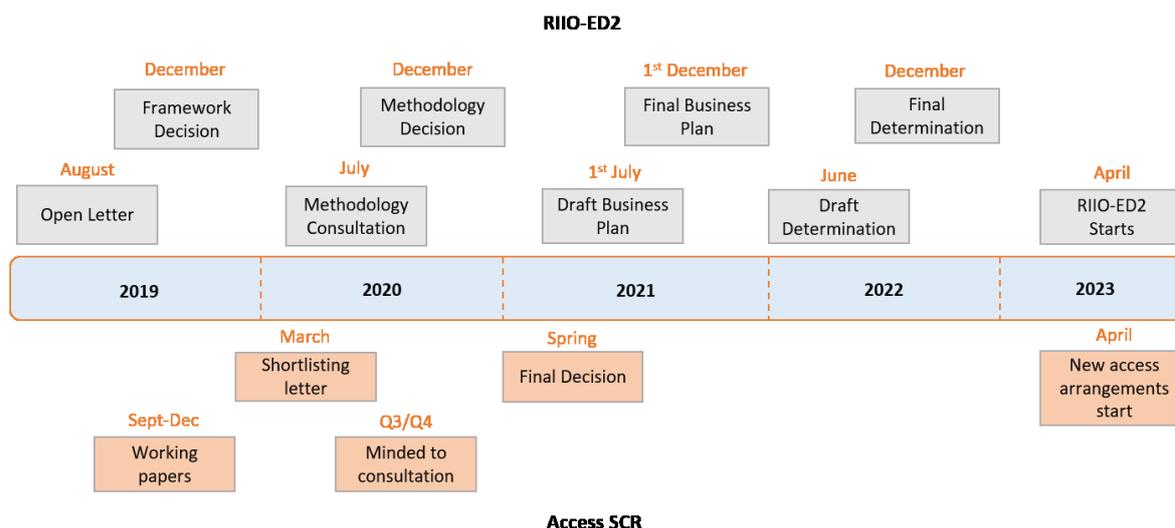
Figure 4: RIIO-ED2 Methodology Consultation documents map



RIIO-ED2 timeline

3.21 Figure 5 below, illustrates the timeline that we intend to follow for RIIO-ED2 and how these align with the Access SCR.

Figure 5: RIIO-ED2 timeline and alignment with Access SCR



Interlinkages and CMA Appeals in RIIO-2

Interlinkages

3.22 In Chapter 11 of our recent Draft Determinations for RIIO-2 for the gas distribution and transmission sectors we explain how different elements of the price controls relate to each other, and how proposals in one area relate to other areas, including assumptions used elsewhere in the price control. While the interlinkages identified in this section are specific to those sectors, we are considering carrying out a similar exercise for RIIO-ED2 to set out those interlinked components that come together to create an integrated price control.

Appeals

3.23 In the Sector Specific Methodology Consultation for the gas distribution and transmission sectors we proposed to consider the extent to which a successful appeal has consequences, if any, on other components of the price control. We said we would consider measures for addressing these consequences, to maintain a coherent regulatory settlement and to provide further transparency to stakeholders around our decision-making processes and the potential

consequences of a successful appeal.¹⁷ In the Sector Specific Methodology Decision for the gas distribution and transmission sectors we said that our policy thinking was still in development and that we would consult further ahead of any decision.¹⁸ We made clear that the policy objective was to maintain the integrity of the appeals regime and to mitigate detrimental impacts on regulatory confidence, while, insofar as is possible and where appropriate, maintaining a coherent regulatory settlement. In Chapter 11 of the Draft Determination for the gas distribution and transmission sectors we consult further on such a post appeals review, and set out our expectation that a prospective appellant send pre-action correspondence at a sufficiently early stage before the deadline for making an appeal. We consider that such a mechanism has merit across the sectors, for the reasons set out in the Draft Determinations, and as such we propose to take a similar approach for RIIO-ED2.

Consultation Questions

- OVQ1. Do you have any views on our proposal to include a statement of policy in Final Determinations that in appropriate circumstances, we will carry out a post appeals review and potentially revisit wider aspects of RIIO-2 in the event of a successful appeal to the CMA that had material knock on consequences for the price control settlement?**
- OVQ2. Do you have any views on the proposed pre-action correspondence, including on the proposed timing for sending such to Ofgem?**

COVID-19

- 3.24 COVID-19 has presented some new challenges that we have addressed as part of the development of this methodology consultation, and will continue to address as part of our ongoing work.
- 3.25 We will continue to engage with stakeholders so that we can better understand the potential long-term impacts of COVID-19 on DNOs and consider these as part of our decision on the Methodology and in our subsequent assessment of business plans. In particular, we want to understand how those impacts may interact with our commitment to support a green recovery from COVID-19.

¹⁷ https://www.ofgem.gov.uk/system/files/docs/2020/07/draft_determinations_-_core_document_redacted.pdf paragraph 2.20.

¹⁸ https://www.ofgem.gov.uk/system/files/docs/2020/07/draft_determinations_-_core_document_redacted.pdf paragraph 2.22.

3.26 Based on the improving situation with regard to COVID-19, we remain confident in our ability to deliver the existing programme for RIIO-ED2 according to the current timetable. This should result in RIIO-ED2 beginning on time and in full on 1 April 2023. More information on how we are managing the impacts of COVID-19 on network companies is provided in Chapter 9.

Consultation stages and how to respond

3.27 Table 1 below, sets out the key stages for this consultation, as well as when we intend to issue our Decision.

Table 1: Consultation stages

Stage	Date
Consultation opens	30/07/2020
Consultation closes (awaiting decision). Deadline for responses	01/10/2020
Sector Methodology Decision (including publication of consultation responses)	December 2020

3.28 Following the expected publication of our Methodology Decision in December, Draft Business Plans are to be submitted to Ofgem and the Challenge Group on 1st July 2021, with Final Business Plans submitted on 1st December 2021.

How to respond

3.29 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.

3.30 We have asked for your feedback on each of the consultation questions. Please respond to each one as fully as you can.

3.31 We will publish non-confidential responses on our website at www.ofgem.gov.uk/consultations (see Appendix 7 for details regarding how to respond and use of data).

4. Net Zero and Innovation

Chapter summary

In this chapter, we describe the methods we will use to ensure RIIO-ED2 supports Net Zero. These include the introduction of a Net Zero re-opener to ensure that the price control is adaptable and can provide the funding necessary to meet decarbonisation targets whilst protecting the interests of consumers.

We will support this with new arrangements for strategic investment. We are also proposing to introduce funding for innovation to focus on the key challenges facing the energy sector and on protecting the interests of vulnerable consumers.

Introduction

- 4.1 A key objective of RIIO-ED2 is to deliver Net Zero at lowest cost to the consumer, while maintaining world-class levels of system reliability.
- 4.2 Investment in the energy networks is likely to need to rise, perhaps significantly, to meet Net Zero targets as we progress through this decade.
- 4.3 The transition to a Net Zero future also requires a fundamental change in how we design network price controls. In February, we published Ofgem's Decarbonisation Action Plan setting out our intentions to make "the network price control regulatory regime more adaptive to deliver the most effective transition at lowest cost". To this end, we propose to make the RIIO-ED2 price control flexible enough to inject the necessary funding, at the right time, to enable the achievement of Net Zero. The proposed Net Zero re-opener would allow network companies to make requests for significant additional funding at any time within the price control period, rather than having everything settled at the beginning of the control.
- 4.4 Where there is a clear needs case to provide allowances for Net Zero investment at the start of RIIO-ED2 we intend to provide baseline funding for these. Where there is less certainty that a particular investment is needed, or the scope, timing or cost of the investment is unclear, we need an alternative approach to enable the price control to flex when investment needs become clearer.
- 4.5 In the framework for the other RIIO-2 price controls, we proposed to allow strategic network investments for Net Zero to be brought forward by companies through uncertainty mechanisms, including a Net Zero re-opener triggered by the

Authority. This approach would allow Ofgem to exercise scrutiny over company spending proposals that deliver decarbonisation, keeping the cost to consumers as low as possible. To ensure the required degree of flexibility, we propose to apply the same arrangements for a Net Zero re-opener in RIIO-ED2.

- 4.6 To make ongoing funding decisions on such major strategic investments in the most joined-up way, we want to improve our co-ordination with the UK and devolved governments and other key stakeholders such as the National Infrastructure Commission and the Committee on Climate Change. To do this, we have established a Net Zero Advisory Group (NZAG), bringing these key players together.
- 4.7 In addition, we are consulting on other models that would operate alongside the Net Zero re-opener and that would offer further flexibility to adjust expenditure to keep RIIO-ED2 aligned with Net Zero.
- 4.8 We also recognise that significant support for research and development and innovation-led trials for technologies such as hydrogen may be needed to minimise the cost of decarbonisation. For this, we are proposing a Strategic Innovation Fund (SIF). We are also proposing to retain innovation funding for DNOs via the Network Innovation Allowance (NIA) to help address issues related to the energy system transition and consumer vulnerability.

Net Zero re-opener

Table 2: Net Zero re-opener

Purpose	To provide a means to amend the price control in response to changes connected to the meeting of the Net Zero carbon targets that have an effect on the costs and outputs of network licensees. This would introduce an increased level of adaptability into the RIIO-2 price control.
Proposed approach	We are proposing a Net Zero re-opener that would enable us to reset allowances and other elements of RIIO-ED2 in order to align the price control with Net Zero targets.

- 4.9 In our Decarbonisation Action Plan, we said that we would seek to introduce a system-wide¹⁹ Net Zero re-opener spanning the gas and electricity sectors. Our

¹⁹ As the ESO has a 2-year business plan that provides sufficient overall flexibility for Net Zero adaption, we have not proposed to put this re-opener in place for the ESO.

aim was to balance the need for investor confidence with the need to respond flexibly to technological and policy developments along the path to Net Zero.

- 4.10 During RIIO-ED2, the DNOs will be expected to deliver various outputs identified at the outset of the price control using allowed revenues. Generally, we do not change output targets or revenue allowances during the price control period unless we have made provision in the price control for a known uncertainty.
- 4.11 However, it is critical that the RIIO-2 price controls enable the gas and electricity networks to support the achievement of Net Zero targets. We recognise that Net Zero policy will not develop in five-year segments, aligned with our RIIO-ED2 timetable. Accordingly, there may be circumstances during the price control period where assumptions made to set the price control are no longer appropriate, due to changes related to the transition to Net Zero. Where this is the case, it may be necessary to make adjustments (the effect of which could be, among other things, to increase or decrease allowed revenues) during the period rather than waiting until the next price control review. This is why we believe it is appropriate to introduce the Net Zero re-opener mechanism into each of the RIIO-2 price controls, including RIIO-ED2.
- 4.12 We sought views from stakeholders including all Transmission Owners (TOs), Gas Distribution Networks (GDNs) and DNOs via a letter issued in May 2020. We received responses from all but one network licensee, and received a response from one other stakeholder. We reviewed these responses, and had regard to them in arriving at the position on which we are consulting on here.
- 4.13 We consider it appropriate to include the Net Zero re-opener in RIIO-ED2, as it would provide the necessary level of adaptability to Net Zero-related developments that would not otherwise exist within the price control. It represents a distinct proposal from the other elements discussed in this chapter. We do not expect the Net Zero re-opener to be used where other mechanisms are applicable. For example, we expect companies to fund innovation projects, through Business as usual (BAU) activities or using the innovation stimulus.

Consultation position

Table 3: Net Zero re-opener consultation position

Output parameter	Consultation position
Scope	Changes connected to the achievement of the Net Zero carbon targets not otherwise captured by any other RIIO-ED2 mechanism.
Re-opener Window (year)	The re-opener mechanism could be used by Ofgem at any time throughout the RIIO-ED2 price control.
Materiality threshold / Trigger	Apply a materiality threshold in line with our common approach to re-openers ie 1% of base revenue.

Rationale for consultation position

Scope

- 4.14 In our May 2020 letter, we asked stakeholders for their views on the appropriate scope for the re-opener. Overall, responses on this point were mixed, with some respondents generally expressing a preference for a mechanism limited to changes in government policy and others a preference for a wider set of triggering events. Several stakeholders suggested that the scope of the re-opener should be kept narrow. They suggested that it should be restricted to some or all of the following: material changes in government policy, technological changes, whole system opportunities, or other events that were not well understood at the point of the Business Plans. A TO argued that a broader approach was warranted – they suggested that adopting a narrow definition could unduly limit the potential Net Zero impacts.
- 4.15 Two DNOs expressed views that a Net Zero re-opener is not necessary for RIIO-ED2. One commented that we have sufficient time before the RIIO-ED2 period begins to ensure that the price control is, as a whole aligned, with the goal to achieve the Net Zero target, without need for a specific uncertainty mechanism as envisaged. The other commented that it was not obvious that a Net Zero re-opener mechanism was needed, given the other elements of the price control expected to be in place to handle uncertainty during RIIO-ED2 (such as a volume driver to manage uncertainty over the take up of electric vehicles).
- 4.16 In their responses to the May 2020 letter, stakeholders flagged some potential areas where changes may occur during RIIO-2 for which use of the Net Zero mechanism may be appropriate. These included changes relating to:

- the use of hydrogen on the gas network
- power generation (including the prevalence of offshore wind and distributed generation) and associated impact upon energy network companies
- the use of biogas
- further electrification of the rail network
- heat policy (where not otherwise within the scope of the heat policy re-opener in the gas distribution sector)
- the nature and pace of the uptake of electric vehicles.

4.17 We propose to proceed with the introduction of the Net Zero re-opener with the wider scope detailed above. This approach will help to ensure that RIIO-ED2 can be adaptable to a wider range of potential developments. We consider that a narrowly framed re-opener would be ineffective in enabling us to respond to a broad range of potential developments in RIIO-2. We note the comments raised by two of the DNOs (see paragraph 4.15). Our current view it that is prudent for us to pursue this policy to ensure that RIIO-ED2 incorporates sufficient flexibility to manage uncertainties connected to the achievement of the Net Zero target.

4.18 In Appendix 2, we set out a proposal for the process that the re-opener mechanism would follow.

Consultation Question

OVQ3. Do you agree with our proposed approach to a Net Zero re-opener?

Strategic Investment for Net Zero

Table 4: Strategic investment

Purpose	To enable investment to support Net Zero at the lowest cost to consumers.
Proposed approach	We are setting out 4 different models for strategic investment and we seek views on when and on which parts of the network these may be appropriate.

4.19 To achieve Net Zero the use of diesel and petrol vehicles and fossil fuel heating will have to be phased-out. This will have to happen relatively quickly and it is likely that these will need to be replaced in part, if not in full, with electric vehicles and heating that draws power from the electricity grid.

- 4.20 This will represent a significant increase in electrical demand and many parts of the existing networks will need more capacity to cope.
- 4.21 A strategic approach to investment in RIIO-ED2 will enable the networks to support pathways to Net Zero, and do so in a manner that maximises efficiencies across multiple price control periods.
- 4.22 The cost of network assets are recovered from consumers over very long timeframes. Therefore, all network investment is strategic, in that it creates infrastructure intended to be used by existing and future consumers. Historically, demand for energy has been relatively predictable and changed gradually which has meant that DNOs could make investment with reasonable confidence that it would meet both current and future requirements. However, Net Zero is likely to see the pace of change increase which puts more urgency on the need for strategic investment to be made in RIIO-ED2 in order to meet future needs. This also brings to the fore a number of attendant risks and uncertainties.

RIIO-ED1 approach

- 4.23 In RIIO-ED1, we provided DNOs with an up-front (ex ante) allowance for load related expenditure (LRE). This was to invest in new capacity where they expected demand to increase beyond existing network capacities.²⁰
- 4.24 Within this allowance, we expected DNOs to manage the risk of forecast uncertainty. Where necessary, DNOs would be expected to spend more or less than their allowance if demand proved to be different from the initial forecast. To protect DNOs from significant forecasting risk, we included a re-opener so that companies could get their revenues adjusted if they had spent or anticipated spending more than 20% above their LRE allowance. We do not expect this re-opener to be used in RIIO-ED1. Overall spend by the DNOs to date in RIIO-ED1 has been 39% lower than allowances for LRE. One of the main reasons has been a lower than expected uptake of low carbon technologies (LCTs).
- 4.25 The forecasts for RIIO-ED1 could equally have underestimated the uptake of LCTs. Should that have been the case, the most efficient way of enabling a higher level of demand might have been to make more investment (above the ex ante allowance) in advance of LCTs being installed. This early investment might ensure

²⁰ During RIIO-ED1, DNOs are developing arrangements to ensure competition between traditional network investment and alternative provision of network capacity, including flexibility and smart grids technologies.

LCTs can be installed more speedily and at less cost overall than an incremental approach.

4.26 However, it is not clear that the RIIO-ED1 arrangements would have resulted in DNOs making this additional investment. At least in part, this is because of a risk that companies perceive in spending above their baseline allowance in the expectation of demand increasing. Companies may be concerned that if demand does not materialise, Ofgem might not agree to increase their allowances to match their incurred expenditure. This risk is not offset by any material benefit to the DNO in the form of an output-related reward for making this type of early investment.

4.27 We therefore consider that a different approach to strategic investment may be required for RIIO-ED2.

Our approach to strategic investment in RIIO-ED2

4.28 We are seeking to mitigate two key risks:

- Companies are not provided with sufficient and timely allowances. This could lead to constraints on the network and an uptake of LCTs that may be slower than demand would otherwise dictate. In the long-run it may prove to be more costly to consumers if networks are expanded in a piecemeal fashion.
- Companies get higher allowances than is required and investment is made in infrastructure that does not fulfil its intended purpose. This could be because the capacity created is used up by other sources of demand, but could also be because the demand growth does not materialise in the way it was forecast.

4.29 These risks exist because although there are various interim targets for Net Zero, there remains uncertainty around which pathway(s) will be followed. The industry and other bodies generate various scenarios²¹ showing multiple pathways to Net Zero. In some aspects, we can be relatively sure about the route to Net Zero, even if timing is uncertain; in other aspects, there is more uncertainty on both the route and timing including the rate of technological innovation and behavioural change required.

²¹ Future Energy Scenarios generated by the Electricity System Operator, or the Distribution Future Energy Scenarios produced by individual DNOs

- 4.30 This matters, because although we expect DNOs to consider a range of scenarios, ultimately we will base their expenditure allowances for RIIO-ED2 on a view of the 'most likely' future scenario.
- 4.31 We have to decide whether this should be derived from a centralised set of forecasted outputs that we require all DNOs to adopt. By centralised we mean that Ofgem establish forecasting parameters to ensure DNO investment plans align with national policy. The scope of this centralised set of outputs could be:
- A single, central forecast scenario which the DNOs would be required to disaggregate on a regional basis.
 - A specification of the forecast volume of LCTs (ie heat pumps or electric vehicles) that DNOs should plan to accommodate in each region.
 - A requirement on DNOs to demonstrate how their forecast and investment plans are consistent with national policy in specified areas (ie a BEIS-led approach to heat decarbonisation²²).
- 4.32 Alternatively, each DNO could determine their own 'most likely' view of the pathway to Net Zero in its region and not be required to apply centralised forecast outputs.
- 4.33 If other scenarios prove to be a more accurate indicator of demand, then DNO spending plans need to be able to adapt. We therefore also have to consider the level of confidence we have in the need, timing and scope of future investment and whether we should anticipate higher or lower investment than indicated by the 'most likely' scenario. The amount of confidence we have in the underlying forecasts and the associated investment, should determine how much expenditure we provide upfront in a DNO's baseline allowance, or subject to an uncertainty mechanism.

Strategic investment models

- 4.34 We want to establish a framework, through which we can give DNOs and other stakeholder guidance on how different investment requirements should be identified, and enable us to put in place the appropriate mechanisms to manage uncertainty.

²² Department for Business, Energy and Industrial Strategy (BEIS)

4.35 We are consulting on four different models for strategic investment. These are:

Model A: This Model might be appropriate where there is a high level of certainty for both the outputs needed to achieve Net Zero, and the scope of the investment required. This may be where demand growth will be driven by national policy interventions and there is clarity on what form these will take.

Where this is the case, Ofgem would require DNOs to base their investment proposals on a central set of forecast outputs or targets that align with Net Zero. DNOs would bring forward expenditure proposals in line with these outputs and we would incorporate funding into the baseline allowance.

Model B: This Model is similar to Model A in that a centralised forecast of outputs is more appropriate than a decentralised approach, as different regional assumptions will not combine to reflect the 'most likely' future scenario for growth nationally. However, even where this is the case there may remain uncertainty at the exact pathway, and/or the timing and scope of the associated investment required.

As with Model A, Ofgem would require DNOs to base expenditure proposals on a central forecast and DNOs would bring forward expenditure proposals that meet these. However we would apply the traditional needs case assessment (ie reasonable certainty of demand) to determine what should go into the baseline. We would use uncertainty mechanisms to flex allowances upwards to ensure DNO expenditure could be adapted within the period when there is more certainty.

Model C: This Model might be appropriate where there is a greater range of Net Zero pathways and a regional plan that takes account of national targets but can potentially deviate from them, is the best route for identifying what investment is required to a high degree of certainty.

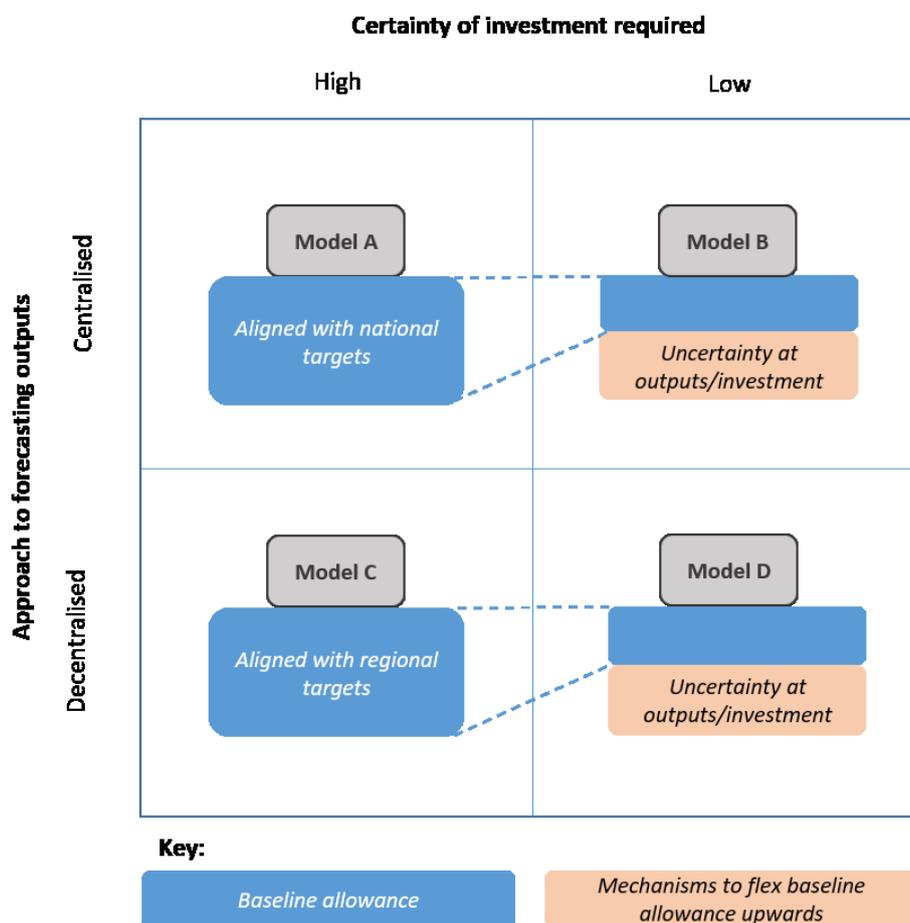
Here, instead of using a central forecast of output each DNO would need to engage with Local Authorities and other stakeholders to develop a regional plan of future energy needs, such as a Local Area Energy Plan. DNOs would use this plan to determine investment requirements and we would incorporate funding for these into the baseline allowance.

Model D: This Model is similar to Model C, in that a regional approach to planning is the best means of identifying the investment required. However, there is uncertainty at either the underlying need, or the scope and timing of the investment.

DNOs would base their investment proposals on this regional plan. We would assess these using our traditional needs case assessment to determine what should go into the baseline, and employ uncertainty mechanisms to flex allowances within the period as requirements become more certain.

4.36 We illustrate these models in Figure 6. The horizontal axis relates to the level of certainty around the investment needed while the vertical axis reflects how the baseline planning scenario (eg the number of EVs or heat pumps on the system) is established for the price control, specifically whether it is set centrally for all DNOs, or by each DNO based on a regional plan.

Figure 6: Models for strategic investment



4.37 These models are not necessarily mutually exclusive. As we have done for the transmission and gas distribution RIIO-2 price controls, we could require DNOs to adopt a single, central forecast, which would be Model A or Model B depending on the level of certainty we have on the forecasted outputs or investment required.

- 4.38 However, we could equally decide that some forecasted outputs should be determined through a centralised approach, while others should be established on decentralised and more regional basis. For example, we might consider DNOs should generally base expenditure upon a regional view of forecast demand growth, while incorporating a centralised forecast output for specified outputs.
- 4.39 We will need to determine which Model will be most appropriate and in which circumstances. This will be challenging and it is not currently clear how we should balance the various factors we will need to take into account. We discuss some of the key considerations below, along with when different approaches may be most appropriate.

Centralised vs. decentralised

- 4.40 A centralised approach would see Ofgem requiring the industry to apply a common forecast of outputs, where we have a high degree of certainty that these align with Net Zero. For instance, this may be case for decarbonised heating in off-gas grid properties²³; here, Ofgem may require the industry to base their plans around a target level of heat pump penetration in the most congested parts of the off-gas grid networks.
- 4.41 We might also choose to supplement these type of targets with further direction or guidance on how/when to carry out asset replacement in line with a 'touch the network once' approach.²⁴
- 4.42 DNO investment plans would be required to deliver these targets. This would drive consistency across the industry and there would be clear alignment between Net Zero and RIIO-ED2.
- 4.43 However, a centralised approach may not always be appropriate and could lead to higher costs to consumers or an underestimation of investment needed in different regions. For instance, and in relation to decarbonising heat, the Scottish Government is taking a "Heat Network First approach", so in some off-gas grid towns and villages, heat networks might be the future heating pathway. Therefore, it may be better to establish the investment needed to support this

²³ In areas of the country that are off the gas grid the uncertainty surrounding heat decarbonisation may be much lower, as there is not an option of using piped hydrogen in the gas network: in most cases in off-gas grid areas, buildings will need to install heat-pumps.

²⁴ When replacing an asset a DNO installs additional capacity now in the expectation that demand on that asset is likely to increase by 2050. This may be more efficient than replacing with the existing size and then having to reinstall more capacity in the future

through a decentralised approach, or exclude towns and villages from upgrades until there is more clarity on policy surrounding Heat Networks.

4.44 Other examples of where a decentralised approach may be more appropriate could be if regions expect a faster uptake in low carbon technologies (LCTs, such as electric vehicles), than is anticipated nationally. This may be prompted by interventions from devolved governments and regional authorities. For instance, a devolved government or regional Authority may have an ambition to electrify transport earlier than the targets declared at a UK or national level.

4.45 We recognise that DNOs and regional stakeholders engaged in developing these regional plans may be disappointed if Ofgem decides not to set expenditure allowances to reflect these proposals. However, we face a difficult analytical challenge in judging whether these proposals reflect a realistic view of what infrastructure is required, and by when. This is because:

- Regional targets may depend on additional policy and financial commitments to make them a reality. These may come from national, devolved or regional authorities, but in their absence there is a risk that network investment does not lead to the intended outcome.
- Boundaries of network companies may not fit neatly with local and regional government structures. Where costs are socialised broadly within an area of democratic accountability, it may be right to support proposals for strategic investment, even where there is risk. But where funding needs to be cross subsidised, with customers from one region/city paying to realise the ambitions of another, then the trade-offs may be different.
- Establishing a regional plan is likely to rely heavily on the resource and knowledge of the DNO and this puts the DNO in a position of influence over the nature of the resulting plan. However, DNOs also have other incentives that could affect their input. We use the DNO's assessment of future requirements when we set their expenditure allowances and DNOs share in any underspend (or overspend) against budgets for expenditure. Therefore, there is both an opportunity and an incentive on DNOs to overestimate future requirements, in order to increase their price control allowance.

4.46 Assessing investment proposals derived through a decentralised approach will therefore require us to scrutinise closely the process and assumptions used to develop the regional plan. We will expect there to be evidence of structured and effective consultation with national and local stakeholders and supported by

leadership from democratically accountable bodies. We will expect plans to consider how regional and national targets align, and for there to be robust, transparent modelling to establish a 'most likely' regional pathway to Net Zero.

- 4.47 Demonstrating that a regional plan has been developed in line with these expectations may be easier to do and to assess, if there is guidance on what the characteristics of a robust and credible regional plan should be. The Centre for Sustainable Energy, together with the Energy Systems Catapult, have developed best practice guidance for Local Area Energy Plans (LAEPs)²⁵ and this may provide a useful framework which could be used to assess what a robust process looks like.

Baseline allowance vs. uncertainty mechanisms

- 4.48 A baseline allowance gives DNOs certainty that they will be remunerated for the investment they undertake. This shields them from the risk that expenditure does not achieve the intended outcome. As a result, DNOs may be more prepared to undertake strategic investment to support Net Zero if their baseline allowances incorporate the necessary expenditure.
- 4.49 However, incorporating strategic investment into baseline allowances exposes consumers to the risk of inaccurate forecasts. In some instances, this risk can be temporal in that there is high certainty that the investment will be required, but the exact timing for when it is needed is less clear. Where there is a small lag between investment and need, this risk may be relatively minor. As the gap increases, there could be a bigger difference between those consumers paying for infrastructure and those benefitting. In other cases, there is a more significant risk that the investment is not needed at all; this can lead to consumers, now and in the future, paying for the cost of stranded assets.
- 4.50 Ahead of the start of RIIO ED2, and in order to inform their Business Plans, DNOs can minimise some of this uncertainty by gathering and making publicly available information on current levels of network utilisation and changes to utilisation based on different forecast growth scenarios. For large parts of the network, DNOs will already have this information, and will be using it for network planning. For lower voltage areas where less information is available, the most obvious means

²⁵ www.cse.org.uk/local-area-energy-planning

of doing so is by installing monitoring on parts of the network that are constrained, or may become constrained.

- 4.51 We recognise that DNOs may have other means of generating this information, such as modelling, especially in those areas where significant capacity is available. What is most important is that there is visibility across DNOs, industry stakeholders and policy-makers of how much of an increase in demand the existing network can accommodate. This enables a much more comprehensive assessment of the need for investment, and the respective benefits of different solutions. We will expect any DNO proposal for investment to add capacity to the network to support their proposal with this information.
- 4.52 External stakeholders should have access to this data as it can inform business strategies for market participants, as well as being used for centralised decision-making, for instance establishing heating requirements in off-gas grid areas. We expect that information on current and forecast network capacity is published in alignment with Data Best Practice. This should include its integration into the joint network mapping platform that Energy Networks Association's (ENA) members have already been working on. This should be undertaken in a way that is consistent with Ofgem-led reforms to the Long Term Development Statement (LTDS), which proposes enhancing data on headroom to the 11kV network, and the Network Development Plan, where readily accessible data on network headroom will form a central component.²⁶
- 4.53 Where there is uncertainty of future requirements, we may set a lower baseline and rely more on mechanisms that adjust allowances upwards during the period. These uncertainty mechanisms can allow DNOs to respond to changes in the external environment when they have better insight.
- 4.54 However, uncertainty mechanisms add complexity to the price control and make it harder for companies, investors and consumers to know how much expenditure will be required over a price control period. Depending on how we design the uncertainty mechanism, there can also still be a lag between the timing of the need for expenditure and its remuneration. This could slow down the provision of infrastructure necessary to support Net Zero.

²⁶ Further information on reform to the LTDS and the Network Development Plan can be found in Appendix 5.

Uncertainty mechanisms and incentives

- 4.55 In each of these cases, we may wish to supplement the model with incentives on DNOs to forecast accurately and invest sensibly; to design efficient uncertainty mechanisms; and to return unused funding to consumers. For instance, we may wish to supplement any of these models with:
- price control deliverables for funding allocated in the baseline, where the output can be clearly specified and measured
 - uncertainty mechanisms to flex allowances within the period, such as re-openers, or PCDs with clearly defined triggers for expenditure linked to regional plans, or volume drivers to vary allowances per unit of capacity/LCTs installed
 - output incentives on asset utilisation or on LCTs installed that share the risk of stranding of new investment between investors and consumers.
- 4.56 In general, the more we move away from a centralised approach to forecasting outputs, the more we may need to rely on supplementary incentives to ensure accurate forecasting and efficient investment.
- 4.57 Equally, the greater the stress we place on uncertainty mechanisms, the greater the need to make them as agile and quick to respond as possible.
- 4.58 In Appendix 3, we provide details on the suite of uncertainty mechanisms and incentives that could be used. The applicability of each may depend on the nature of the expenditure and the associated level of uncertainty.

Consultation Questions

- OVQ4. In what circumstances, would a centralised approach to setting forecasted outputs be appropriate? What form should this take?**
- OVQ5. What would be the factors we should take into account that would give us high certainty in a centralised approach to setting outputs?**
- OVQ6. Alternatively, in what circumstances would it be more appropriate to take a decentralised approach to determining forecasts?**
- OVQ7. What would be the factors that we should take into account that would give us high certainty in forecasted outputs derived through a decentralised approach?**

OVQ8. Do you consider that the LAEP Best Practice guidance produced by the Centre for Sustainable Energy and the Energy Systems Catapult provides adequate checks and balances to ensure that local or regional energy plans are robust, unbiased and have broad support?

OVQ9. Which of the uncertainty mechanisms and incentives in Appendix 3 will be most effective in enabling efficient strategic investment?

Innovation

Table 5: Innovation

Purpose	To enable innovation to drive down costs to consumers and support Net Zero
Proposed approach	We are proposing to: <ul style="list-style-type: none"> • Drive more innovation as business as usual • Use the SIF to drive forward large scale, strategic innovation projects in RIIO-ED2 • Retain the opportunity for DNOs to receive a Network Innovation Allowance

Introduction

4.59 The RIIO framework puts innovation at the heart of what companies do, rewards them for reducing costs and improving service and enables them to take forward innovation to support the transition to Net Zero and address consumer vulnerability.

4.60 Although price controls can incentivise innovation, they can also discourage certain types of innovation. This is because increased expenditure on research and development can make companies look inefficient in the context of a five-year price control period, if the cost of these activities does not deliver benefits within that period. The resetting of allowances in subsequent price controls can limit the payback period for successful innovation projects.

Summary of RIIO-ED2 Framework Decisions

4.61 We are encouraging companies to do more innovation as part of their BAU activities, and limiting the innovation stimulus to projects that might not otherwise

be delivered under the core RIIO-2 framework.²⁷ We are pursuing three main areas of reform in relation to the innovation stimulus: focus on the key energy system transition challenges and opportunities; greater coordination of public sector innovation funding; and enabling increased engagement from third parties.²⁸

4.62 Taken together, this reduces the risk of fragmentation, supporting a more strategic and coordinated approach to the transition of the power and heat sectors. In 2020, for other sectors, we also decided to focus innovation stimulus funding on addressing consumer vulnerability.²⁹

4.63 We propose to adopt a similar position on innovation-related methodology for ED2 as we did for the transmission and gas distribution sectors and the ESO.³⁰ This will enable DNOs to continue to collaborate and share learnings with others across the energy sector. Accordingly, in the RIIO-ED2 Framework Decision, we decided to:

- remove the Innovation Rollout Mechanism (IRM) re-opener
- introduce a new innovation funding pot that targets future-facing strategic challenges, replacing the Network Innovation Competition (NIC)
- retain the opportunity for network companies to receive Network Innovation Allowance (NIA) funding.

4.64 Here we set out our proposals in relation to our methodology for ED2.

Strengthening innovation as part of BAU activities

4.65 Network companies have undertaken some innovation as part of BAU activities during the course of RIIO-1. However, this should be far more commonplace in RIIO-2, considering that DNOs have had access to ring-fenced innovation funds since 2005³¹ supporting a large number of projects and enabling a cultural shift

²⁷ RIIO-2 Framework Decision; https://www.ofgem.gov.uk/system/files/docs/2018/07/riio-2_july_decision_document_final_300718.pdf

²⁸ The rationale underpinning these areas of reform is set out in the RIIO-2 Framework consultation (see page 48); https://www.ofgem.gov.uk/system/files/docs/2018/03/riio2_march_consultation_document_final_v1.pdf

²⁹ RIIO-2 SSMD Core Document; https://www.ofgem.gov.uk/system/files/docs/2019/05/riio-2_sector_specific_methodology_decision_-_core_30.5.19.pdf

³⁰ On 9 July 2020, we published our Draft Determination for the ESO, ET, GT and GD, containing proposals for RIIO-2 NIA funding and the RIIO-2 NIA framework and the RIIO-2 Strategic Innovation Fund; see Core Document, Chapter 8; <https://www.ofgem.gov.uk/publications-and-updates/riio-2-draft-determinations-transmission-gas-distribution-and-electricity-system-operator>

³¹ The timeline of different innovation funding mechanisms is illustrated here; <https://www.smarternetworks.org/funding-timeline>

within companies.³² Therefore, DNOs' business plans should reflect the learning from innovation projects funded via the Innovation Funding Incentive, the Low Carbon Network Fund, and RIIO-1 NIA and NIC.

4.66 We expect companies to do more innovation as part of their BAU activities, and rely less on ring-fenced innovation funds. At the very least, companies should fund low-risk innovation projects, especially those focused on operational and maintenance activities, as BAU because incentives already exist for companies to undertake this type of innovation through their base revenues. The totex incentive mechanism (TIM) will ensure that companies will share the benefits of these innovations where these are likely to pay back within the period of RIIO-ED2.

4.67 In addition to the TIM, we propose two other mechanisms to ensure that companies demonstrate robust plans to undertake and rollout proven innovation as part of BAU activities and challenge their ambition in this regard:

- Business Plan Incentive - we will set minimum requirements for DNOs to demonstrate how they will undertake lower risk innovation projects within their BAU activities, as well as requiring DNOs to clearly identify the impact of past innovation stimulus spending on reductions in their RIIO-ED2 expenditure. We will also take into account the arrangements they will have in place to rollout innovation into BAU and the quality of their plans to involve third parties within their innovation programmes.
- Challenge from CEGs and the RIIO-ED2 Challenge Group - these groups will challenge the level of ambition within companies' innovation strategies.

Strategic Innovation Fund

4.68 As stated in the RIIO-ED2 Framework Decision, we will replace the RIIO-1 NIC with a new innovation fund (the RIIO-2 Strategic Innovation Fund (SIF)) that will target future-facing strategic challenges. We consider that this will enable DNOs to take forward the strategic network innovation projects necessary to support the decarbonisation of power, heat, transport and wider industry and support the energy system transition at least cost to consumers

³² There is no centralised record of the number of projects DNOs have funded with the Innovation Funding Incentive, Low Carbon Networks Funds, NIA and NIC. However, we estimate DNOs may have undertaken more than 500 projects, as over 280 Network Innovation Allowance projects alone have been registered on the Smarter Networks Portal since the start of RIIO-ED1 in 2015; <https://www.smarternetworks.org/>

4.69 We have recently consulted on our proposals for the SIF for other sectors.³³ We consider that there are benefits to having a consistent framework for RIIO-ED2 as it will ensure network companies and the ESO can collaborate on projects across sectors. We have not identified any characteristics of the electricity distribution sector that would indicate this approach would not be appropriate. We therefore propose to align our methodology with the approach we have adopted for other sectors. We intend to consult later this year on the detailed arrangements for the practical operation of the SIF.

4.70 Our proposals are summarised below in Table 6. In addition, we have set out our proposals and the rationale for them in detail within Appendix 4.

Table 6: Strategic Innovation Fund proposals

Strategic Innovation Fund	Consultation position on methodology
Key aims	<ul style="list-style-type: none"> • To support strategic innovation that contributes to the achievement of Net Zero targets and benefits network companies and consumers as a whole. • To facilitate meaningful progress in the decarbonisation of power, heat, transport and wider industry, and support the energy system transition at lowest cost to consumers. • To increase the coordination of network innovation funding with other public sector funding initiatives, ensuring greater strategic alignment and eliminating funding gaps. • To respond flexibly to challenges that arise, moving away from a rigid annual competition process to evaluate projects.
Setting an innovation strategy	Set the strategic focus for network innovation projects funded by the SIF by working with the government, in particular through the Net Zero Innovation Board, to develop a sector-wide energy innovation strategy.
Setting Innovation Challenges for SIF projects	Set Innovation Challenges, in response to which we expect companies to bring forward network innovation projects
Frequency of Innovation Challenges	Set challenges for SIF projects as and when strategic issues arise during the price control period.
Scope of eligible projects	The SIF would focus on strategic EST projects that would not otherwise be taken forward as BAU activities by companies or via NIA funding. Projects would only be eligible for funding where (a) access to the assets of a network company are essential, or (b) in the case of third-party innovators, the innovation would not happen but for the provision of SIF funding.

³³ RIIO-2 Sector Specific Methodology Decision (for the Electricity System Operator and gas distribution and transmission sector) Core Document, Chapter 8

Strategic Innovation Fund	Consultation position on methodology
Requiring industry collaboration and third party involvement	The Innovation Challenges would include requirements relating to the composition of consortiums and project partnerships that bid in for funding, where required to ensure greatest benefit to network customers.
Value of funding available	The SIF would be used to fund individual high-value innovation projects over £5m. The SIF would make available a level of total funding equivalent to that provided via the RIIO-1 Network Innovation Competition (NIC), which was £450m, and may increase if we consider this is necessary and in the interests of consumers.
Percentage of innovation project funded	We would consider on a case-by-case basis what percentage of projects would be funded via the SIF
Source of funds for the approved projects	Approved projects would be funded via use of system charges
Evaluation of projects	Projects would be evaluated using an independent expert panel.

4.71 In addition to considering feedback from this consultation, over the coming year, we will seek to develop and consult on arrangements for the practical operation of the SIF. Through this future consultation we will consider:

- the definition of 'innovation' for the purposes of the SIF
- the possibility of using one public sector energy innovation interface through which companies would apply for energy innovation funding
- the source of funds for the administration of the SIF
- potential challenges for design-only early competitions
- how we can build upon the existing joint gas and electricity innovation strategies network companies produce
- how we can ensure network companies' knowledge dissemination activities build upon and link up with innovation activities funded by other bodies.

Improving data transparency within innovation projects

4.72 Chapter 5 discusses our work to modernise energy data. We consider innovation projects should maximise the value of data to energy consumers. This is particularly relevant for projects funded via the RIIO-2 NIA and SIF as these projects will be funded using consumer funds.

4.73 All work relating to data as part of innovation projects funded via the NIA and SIF will be expected to follow our Data Best Practice guidance.³⁴ Iteratively and continuously improving the use of data during these projects will help to deliver short- and long-term value for consumers.

Network Innovation Allowance

4.74 As stated in the RIIO-ED2 Framework Decision, we will retain the opportunity for DNOs to receive individual NIA funding.³⁵ This additional funding will enable network companies to undertake projects they would not otherwise undertake within the price control; namely, energy system transition, whole system, or vulnerability-related innovation, which have the potential to deliver net benefits to network customers, although the cost to the individual DNO may outweigh the share of the benefit they would receive.

4.75 We consider that there is benefit in having a consistent NIA framework for the DNOs and other sectors, given the longer-term network customer benefits that might be supported through this allowance. This consistency should allow collaboration across sectors on projects where this is likely to maximise network customer benefits, and to facilitate third party contributions by reference to a single accessible framework.

4.76 Within other sectors, we decided that the RIIO-2 NIA should be focused primarily on projects related to the EST and consumer vulnerability, and within the recent Draft Determination, we proposed to build upon and strengthen the NIA framework for RIIO-2.³⁶

4.77 Accordingly, we propose to adopt the same RIIO-2 NIA-related methodology as that proposed in other sectors. Our proposals for the RIIO-ED2 NIA-related methodology are summarised below. Further details are provided in Appendix 4. We propose to:

- provide a single 'use it or lose it' allowance to cover the duration of the price control
- restrict the scope of eligible projects to those focusing on the EST or addressing consumer vulnerability, which have the potential to deliver net benefits for network customers within the electricity sector

³⁴ [Data best practice guidance.](#)

³⁵ RIIO-ED2 Framework Decision, paragraph 2.81

³⁶ RIIO-2 Draft Determination Core Document (for the ESO, ET, GT and GD), Chapter 8;

- no longer fund the demonstration of commercially available technologies that have been demonstrated outside of GB.
- require that companies conduct an impact assessment to assess the expected effects of innovative solutions upon vulnerable consumers
- implement the improved industry-led reporting in RIIO-2 NIA governance arrangements³⁷ (We also note that DNOs currently report on the benefits of innovation projects within their reporting packs. Once we more fully understand proposals on the industry-led reporting framework, we will consider whether they should fully replace the current ED innovation reporting arrangements)
- require network companies to produce guidance for third parties on the treatment of Intellectual Property Rights within NIA projects
- introduce additional quality assurance measures, such as a peer review or independent audits of projects upon completion.

Setting levels of NIA funding

4.78 Within the RIIO-2 SSMD for the transmission and gas distribution sectors and the ESO, we confirmed our approach to determining the individual levels of NIA funding each company would receive.³⁸ The RIIO-2 SSMD for the transmission, ESO and gas distribution companies set out our expectation that companies fund more innovation as part of BAU activities and rely less on ring-fenced innovation stimulus funds. Companies requesting high levels of RIIO-2 NIA funding were expected to provide clear evidence justifying an increase in funding relative to RIIO-1. We also expected them to provide evidence of strong delivery arrangements, with plans to collaborate, involve third parties, disseminate learnings and rollout any proven innovation into the wider business.

4.79 We have not identified any need for adjustment of the above approach for the electricity distribution sector and therefore propose to set any allowances based on the justification set out in company Business Plan submissions.³⁹ When setting allowances, we would take into account the following, along with other information that may be relevant:

- companies' proposals for these allowances in their Business Plans

³⁷ We note progress made by all network companies to develop arrangements to improve reporting; <https://www.energynetworks.org/assets/files/ENA%20Benefits%20Reporting%20Framework%20-%20Delivery%20Plan%20v6%20-%20Clean.pdf>

³⁸ RIIO-2 SSMD (for the ESO, ET, GT and GD) Core Document, paragraph 10.61-10.62

³⁹ We will set out what we want companies to include in their business plans in regard to NIA funding in Business Plan Guidance.

- the extent to which companies are undertaking other innovation as BAU activities
- the extent to which companies' proposals incorporate the application of best practices
- the processes companies have in place to roll out proven innovation into BAU and the evidence that they are already doing so
- the processes companies have in place to monitor, report and track innovation spending and the evidence that they are already doing so.

4.80 We do not believe we should increase the absolute level of NIA funding available to DNOs (ie the £m value) above what is available in RIIO-ED1, unless there is a really strong proposal from DNOs. This is because there are substantial levels of NIA funding available in RIIO-1 and increasing the level of funding available would further increase short-term costs imposed on consumers, which would be inappropriate considering that the benefits from innovation projects are uncertain. We have also clearly stated that we expect companies to fund more innovation as part of their BAU activities, relying less on innovation stimulus funds.

4.81 However, we may consider increases in funding where innovation proposals are fully justified with reference to the above-mentioned criteria, and the need for an increased level of NIA funding is strongly evidenced and supported by a clear delivery plan.

Consultation Questions

- OVQ10. Do you agree with our proposals to increase levels of BAU innovation?**
- OVQ11. Do you agree with our proposed methodology in relation to the RIIO-2 Strategic Innovation Fund?**
- OVQ12. Do you agree we should adopt a consistent NIA framework for DNOs, and other network companies and the ESO?**
- OVQ13. What are your thoughts on our proposals to strengthen the RIIO-ED2 NIA framework?**
- OVQ14. Do you have any additional suggestions for quality assurance measures that we could introduce to ensure the robustness of RIIO-2 NIA projects?**
- OVQ15. Do you agree with our proposed approach for setting individual levels of NIA funding?**

5. Modernising Energy Data

Chapter summary

We outline our expectations for how we can use regulation to unlock the benefits of data for energy consumers, enabled through effective digitalisation of electricity distribution networks and better use of data.

We seek views on all of the topics raised in this chapter, and ask specific questions at the end of the chapter.

Table 7: Data

Purpose	To modernise the UK energy system network companies need to undergo effective digitalisation
Proposed approach	We are proposing to introduce cross-sector licence obligations

Introduction

- 5.1 In June 2019, the Energy Data Taskforce⁴⁰ (EDTF) published its recommendations on how to modernise the UK energy system.⁴¹ One of the recommendations made by the EDTF was that Ofgem should ensure that all network companies undergo effective digitalisation. Digitalisation, in this context, means making better use of energy system data and digital technologies to generate value for consumers and stakeholders more generally. We support the EDTF's recommendations⁴².
- 5.2 In November 2019, we announced we are developing data best practice guidance⁴³ to define how we expect energy system data⁴⁴ to be used. We did that as part of our programme, Modernising Energy Data; a collaboration between Ofgem, the Department for Business, Energy and Industrial Strategy and Innovate

⁴⁰ <https://www.gov.uk/government/groups/energy-data-taskforce>

⁴¹ <https://es.catapult.org.uk/reports/energy-data-taskforce-report/>

⁴² <https://www.ofgem.gov.uk/publications-and-updates/ofgem-strategic-narrative-2019-23>

⁴³ <https://www.ofgem.gov.uk/publications-and-updates/we-are-creating-data-best-practice-guidance>

⁴⁴ Our working definition of Energy System Data has evolved from the definition provided by the Energy Data Task Force and is "facts and statistics collected together that describe the energy system (current, historic and forecast), including: the presence and state of infrastructure, its operation, associated market agreements and their operations, policy and regulation." See: <https://es.catapult.org.uk/reports/energy-data-taskforce-report/>

- UK.⁴⁵ Draft versions of the guidance have been publicly available since January 2020.⁴⁶
- 5.3 In September 2019, we asked the network companies who have licenses as part of the RIIO price controls for transmission, gas distribution and the Electricity System Operator to publish digitalisation strategies alongside the submission of their Business Plans in December 2019.⁴⁷ We asked DNOs to participate in that process voluntarily. All DNOs did that and their digitalisation strategies engaged positively with the recommendations made by the EDTF.⁴⁸ The strategies outline the actions network companies will take to digitalise the energy system.
- 5.4 In June 2020 we published our feedback on the digitalisation strategies in an open letter to the network companies.⁴⁹ In the open letter we said we wanted network companies to use the feedback to review their strategies, and to publish an updated “digitalisation strategy and action plan” by 31 December 2020.
- 5.5 We also said that we are minded to include two Licence Obligations in the RIIO-2 price controls for transmission, gas distribution and the Electricity System Operator starting in April 2021 and, separately, for the RIIO-ED2 price control starting in April 2023, relating to the use of energy data and digitalisation of the energy system.
- 5.6 In July 2020 we published our Draft Determinations consultation for the RIIO-2 price controls for transmission, gas distribution and the Electricity System Operator and included those two Licence Obligations in our proposal⁵⁰.
- 5.7 We recognise that the data licence obligations proposed form the overarching expectations on data management by network licensees. These are by no means exhaustive, and further regulatory measures at a more granular level will be required to manage specific issues. These include licence obligations related to data required for DSO function delivery, as outlined in chapter 6. Such detailed regulatory measures are aligned to the modernising energy data programme, and complement the overarching expectations on data management.

⁴⁵ <https://www.gov.uk/government/organisations/innovate-uk>

⁴⁶ <https://www.ofgem.gov.uk/publications-and-updates/early-draft-data-best-practice-guidance-available>

⁴⁷ <https://www.ofgem.gov.uk/publications-and-updates/modernising-energy-data-digitalisation-strategy>, see paragraph 2.44

⁴⁸ <https://www.ofgem.gov.uk/publications-and-updates/digitalisation-strategies-modernising-energy-data>

⁴⁹ <https://www.ofgem.gov.uk/publications-and-updates/review-and-next-steps-riio-digitalisation-strategies>

⁵⁰ <https://www.ofgem.gov.uk/publications-and-updates/riio-2-draft-determinations-transmission-gas-distribution-and-electricity-system-operator>

The proposition for digitalisation

5.8 We are proposing to adopt the same stance on regulating digitalisation across each network sector. The proposals we made in Draft Determinations for RIIO-2 (the next price control for gas distribution and gas and electricity transmission) therefore inform our current approach to Modernising Energy Data for RIIO-ED2.

5.9 We propose to introduce the following licence obligations in RIIO-ED2:

- A Licence Obligation requiring regular publication of updates to a Digitalisation Strategy & Action Plan. Regular open publication of updates and improvements to these documents will give the marketplace clarity about digitalisation intentions and progress made. This will create opportunities for insight into and scrutiny of the data services as well as the associated digital infrastructure investment plans.
- A Licence Obligation requiring use of data to meet the expectations of Data Best Practice guidance.⁵¹ The draft of this guidance includes delivering the EDTF recommendation for treating data as “presumed open” and carrying out a data triage process to identify and manage sensitivities associated with the data. The goal of this Licence Obligation is to ensure decision-making processes relating to data are transparent. It is also to ensure that data exchanges between market actors are “friction free”.

Our approach

5.10 The timing difference between RIIO-ED2 and the other RIIO-2 price controls will inform our approach to modernising data in RIIO-ED2. This is because:

- When RIIO-ED2 begins in April 2023, the EDTF report and its recommendations will be nearly 4 years old. Data services and stakeholders’ knowledge on the subject evolve continuously and quickly and it may be necessary to update our expectations based on the learning during this period. Any industry progress that is made following the EDTF’s report will inform our final regulatory position.
- DNOs will have had time to consider and, potentially, respond to the EDTF recommendations (published June 2019) by incorporating modernising energy data objectives into their business plan submissions in December 2021. That opportunity was much more limited for the gas distribution and gas and

⁵¹ <https://www.ofgem.gov.uk/publications-and-updates/we-are-creating-data-best-practice-guidance>

electricity transmission companies when they submitted their RIIO-2 business plans in December 2019.

- DNOs may make considerable progress towards digitalisation and the modernisation of how energy data is used between now and April 2023. That progress will need to be reflected in our expectations for the baseline level of digitalisation we expect from DNOs at the beginning of RIIO-ED2 price control. That may mean that expectations are set higher than those which apply to the other sectors under RIIO-2.

5.11 We will develop our policy for RIIO-ED2 taking into consideration the above factors, along with responses to this consultation.

5.12 As with our entire Modernising Energy Data programme, we are adopting an iterative approach to encourage continuous improvement, wherever practical. We recognise that the needs for business planning for data and digital services can differ substantially to the work that the price controls have traditionally facilitated. Importantly in relation to this, the time between inception and final delivery of data/digital work is typically much less than for physical infrastructure; also there is a need for much more rapid feedback on progress and plans for data/digital work.

5.13 We expect regulation will accelerate delivery of the ultimate goal of unlocking the benefits of data to consumers so that they gain maximised benefits from its use. We anticipate this will include data being created, used and made available by network companies enabling the proliferation of market-led service innovation. This will provide system benefits, provide critical enablement to the delivery of a Net Zero carbon emissions energy system, reduce energy costs for consumers and potentially serve wider applications for consumers across the economy. We expect that digitalisation will contribute to companies becoming more efficient through operational and investment efficiency savings.

Consultation Question

OVQ16. Do you agree with our approach to regulating digitalisation and better use of data through the introduction of cross-sector licence obligations?

6. DSO transition

Chapter summary

In this chapter we set out our proposed package of measures to drive DNOs to effectively deliver DSO functions in RIIO-ED2. We position DNOs' role in DSO as underpinned by five principles across planning, network operation and market development roles.

We propose a new DSO incentive framework comprising two parts. First, we propose to require DNOs to set out DSO strategies in their Business Plans and that such content will form part of the assessment in the Business Plan Incentive. Second, we propose an ODI through which we would undertake an ex-post incentive of DNOs' delivery of DSO functions. We would penalise companies who fail to uphold prescribed standards but could reward those who exceed them. This would be additional to the totex incentive mechanism and interruptions incentive scheme, which will provide underpinning incentives to use flexibility where it contributes to efficient and reliable operation of the network.

We are not in this document proposing or consulting on whether to separate DSO functions from the DNO. We are however proposing measures in our RIIO methodology that would support optionality around institutional arrangements. We are proposing to separately identify and record the costs associated with flexibility and DSO roles, and to inform and act as an enabler on decisions on any future institutional change.

In this chapter, we are seeking views on the proposed measures for embedding optionality for alternative institutional models and for incentivising DNOs to deliver effectively in RIIO-ED2.

Table 8: DSO transition

Purpose	To enable more effective and efficient development and use of the distribution system, and realise efficient whole electricity system benefits across the transmission-distribution boundary
Proposed approach	We are proposing a DSO incentive framework to reveal and require best practice, using the business plan incentive and a DSO output delivery incentive

Introduction

6.1 Fundamentally, distribution system operation represents more effective and efficient development and use of the distribution system. In an energy system where there are increasing amounts of flexible and inflexible energy resources connected to the distribution system, enhanced capabilities in planning, network operation and market development, together with close coordination and

cooperation amongst industry stakeholders, are required to deliver decarbonisation at lowest cost.

6.2 In this Chapter, we first describe the context for our proposals. This includes explaining what we mean by distribution system operation (DSO) and DSO functions.⁵² We also describe some background around the institutional arrangements for DSO – including responsibilities of DNOs delivering DSO – and the work in train to drive progress in RIIO-ED1 and what we expect to have been delivered before the start of RIIO-ED2. We then put forward our RIIO-ED2 proposals for promoting optionality for future institutional change models, while incentivising DNOs to deliver good DSO outcomes. This includes introducing a new DSO incentive framework, comprising aspects of the business plan incentive and a new DSO ODI. In Appendix 5 we set out our expectations for specific actions, behavioural standards and outcomes that would underpin the DSO incentive framework.

Distribution system operation

6.3 DSO is not one activity, but the delivery and coordination of a range of functions involved in developing and operating the distribution system efficiently. It requires the coordination of a number of parties, including the ESO and the DNO, and there are alternative future institutional models for the responsibilities of different parties. In this document we set out the distribution system operation responsibilities of the DNO in RIIO-ED2.

6.4 We have grouped DNOs' DSO functions into three broad roles, underpinned by five principles.

Table 9: DSO roles and principles

Roles	Principles
Planning and network development	Plan efficiently in the context of uncertainty, taking account of the whole electricity system and promote planning data availability
Network operation	Promote operational network visibility and data availability
	Operate an economic and efficient distribution system
Market development	Provide accurate, user-friendly and comprehensive market information

⁵² Further details can be found in our 2019 Position Paper on Distribution System Operation: <https://www.ofgem.gov.uk/publications-and-updates/ofgem-position-paper-distribution-system-operation-our-approach-and-regulatory-priorities>

Roles	Principles
	Simple, fair and transparent rules and processes for procuring DSO ancillary services, aligned with ESO markets where appropriate.

- 6.5 These roles include functions that DNOs have delivered historically, functions that will need to be enhanced, and functions that are entirely new.
- 6.6 Planning and network development includes improving how DNOs take account of uncertainty in planning for future developments, then identifying, signalling and resolving their future needs. DNOs' network operation must reflect distributed energy resources' (DER) ability to cause and alleviate network constraints, and the need for sufficient network visibility and efficient dispatch decisions. DNOs must actively develop markets to enable and appropriately reward DER to provide services, including distribution non-frequency ancillary services (DSO ancillary services), to efficiently manage their network. DNOs must coordinate the development of these markets, their procurement and the dispatch of flexibility with the ESO to ensure efficient whole systems outcomes. DNOs must not, however, act as an aggregator, or otherwise act as a commercial route for third parties to sell into the ESO's market.
- 6.7 We provide more detail on the actions, behavioural standards and outcomes we expect across these principles later on in this chapter and in Appendix 5. First, we provide some contextual background and further information on what we expect DNOs to deliver before the start of RIIO-ED2.

Background to institutional arrangements for DSO

- 6.8 DNOs have conventionally been responsible for planning and operating their networks. They have now started to deliver some market facilitation functions too. For example, all of the DNOs now tender for flexible alternatives to resolve network needs. The increase in decentralisation, digitalisation and targets for decarbonisation means that in order to run networks efficiently, there is a greater need and ability for enhancing these DSO functions, for more coordination across network boundaries and better visibility of what is happening on the networks.
- 6.9 The need for enhanced DSO functions has prompted debate around who should be responsible for delivering them. Particularly, there has been concern around potential conflicts between DNOs owning network infrastructure while at the same time planning for and operating markets for flexible alternatives to network

- infrastructure. In transmission, the ESO role has been distinct from transmission operators' roles for some time, with this separation embedded in industry processes and codes. In April 2019, the National Grid Electricity System Operator was legally separated from National Grid Electricity Transmission Limited. A new, separate price control for the ESO will commence in April 2021.
- 6.10 There is not the same separation of processes, operation and codes at distribution level as there has been at transmission level and there is no single agreed model of DSO separation. For example, one model could involve a separate distribution system operator, or other party such as the ESO or an independent system operator, taking responsibility for all planning, operation and market functions while the DNO is solely responsible for owning and maintaining network assets. In another model, DNOs could hand over responsibility for longer-term planning and network need identification, but otherwise retain responsibility for meeting those needs including by tendering for non-network solutions. Most proposed models would necessitate fundamental changes in the industry, not only in how we regulate the sector, but also in the day-to-day operation and codes that govern its running.
- 6.11 Earlier this year we kicked off a review of GB system operation, through which we are considering the effectiveness of arrangements across electricity and gas, with a focus on national system operation.⁵³ Our review is ongoing and we intend to publish a report in autumn setting out options and implications for ownership and coordination of system operation. The findings may have implications for future DSO arrangements and coordination, but we are not planning to make a specific recommendation on ownership and operation at distribution level in that report.
- 6.12 We will keep the case for separation and different institutional arrangements at distribution under review throughout the RIIO-ED2 period. We are prepared to take necessary actions to reassign or begin the process of reassigning functions within period, if we consider for example that an entity other than the DNO would be best placed to deliver roles, principles or other aspects of DSO. Nevertheless, the decision and implementation of fundamental changes to institutional arrangements at distribution level will require significant consideration, industry changes and costs, and processes and tools that are outside the scope of the price

⁵³ <https://www.ofgem.gov.uk/publications-and-updates/ofgem-review-gb-system-operation-terms-reference>

control methodology. Therefore, we are not - in this document - setting out and consulting on separation of DSO from DNOs.

6.13 We need to make sure that the right framework is in place for DNOs to deliver the physical infrastructure, data architectures and flexibility markets that will be required in any system operation model in the future. So, as we continue to drive DNOs to coordinate with the ESO to plan and operate networks and markets that deliver whole system efficiencies, we want to ensure that the price control methodology ensures:

- DNOs are clear on the outcomes they need to achieve
- the developing DSO capability is built with optionality to be reassigned
- that we can isolate the costs of the various functions, to better inform future decisions.

DSO and flexibility reforms now, during RIIO-ED1

6.14 We are not waiting until RIIO-ED2 to drive DNOs to deliver DSO functions and to support the development of flexibility markets. Since we published our Smart Systems and Flexibility Plan, jointly with government, in 2017, where we instructed network companies to coordinate and develop markets for alternatives to traditional reinforcement, some good progress has been made.^{54, 55} For example, all DNOs now tender for flexibility actions to resolve network issues. There is clearly more work to do to grow these markets and ensure they are coordinated with other markets, but their existence is a step change in itself.

6.15 This progress will be built upon for the remainder of the current price control, to continue to lay the foundations for effective DSO prior to RIIO-ED2. This includes us embedding new obligations on network companies to mandate actions and minimum standards, defining and developing the key enablers – the technology, data and engineering competencies – required for effective DSO, and continuing to monitor the delivery of coordinated capabilities through the ENA’s Open Networks Project.

6.16 In Appendix 5, we provide detailed information on the licence conditions that will take effect prior to RIIO-ED2. These are designed to set new obligations for DSO

⁵⁴ <https://www.ofgem.gov.uk/publications-and-updates/upgrading-our-energy-system-smart-systems-and-flexibility-plan>

⁵⁵ <https://www.ofgem.gov.uk/publications-and-updates/upgrading-our-energy-system-smart-systems-and-flexibility-plan-progress-update>

function delivery and coordinate with other flexibility and system operation reforms. New licences will cover enhanced planning and network development; network operation; and market development. They will have a strong emphasis on the need to share data, get active stakeholder input, and coordination.

6.17 These will provide some underpinning obligations. Alongside these, there is more work for industry to take forward. In particular, we want to see both the ESO and the DNOs prioritise coordination with each other, for example to ensure consistent and efficient deployment of flexibility across transmission and distribution networks. We are encouraging ENA members via the Open Networks Project to develop and deploy capabilities and raise and progress code modifications as required, with stakeholder input.⁵⁶ We also wish to see DNO markets develop across timeframes. Trials have begun to explore DNO flexibility markets in closer to real time, including day-ahead markets. We expect to see these to be more fully explored in the coming years, and, if effective, to be rolled out during RIIO-ED2.

6.18 We expect that by the start of RIIO-ED2, DNOs will have embedded improvements throughout their roles. We have previously written to the ENA members, with government, to set out a number of areas we expect to see progressed rapidly.⁵⁷ Outcomes, we have conveyed in this letter and in other forums, that we expect DNOs to achieve by the end of RIIO-ED1 broadly include:

- consistency between national and regional future scenarios, with clear visibility of the stakeholder inputs and data used to develop them
- transparency in the identification and signalling of expected network needs, including anticipated flexibility requirements, developed with relevant stakeholder input, for example local or regional authorities
- clear, neutral and transparent valuation of network and non-network solutions, with price discovery through common products and processes that are based on technological requirements, and informed by stakeholder input. This also requires any conflicts of interest to be addressed

⁵⁶ We note that the ENA will shortly be consulting on a package of flexibility proposals, which includes a common flexibility evaluation methodology, alignment of tenders and products, and consideration of more work to enable stacking of revenue streams. They are seeking stakeholder views, to inform their next steps. We will also be closely monitoring this work and the stakeholder feedback received.

⁵⁷ <https://www.ofgem.gov.uk/publications-and-updates/open-letter-ena-open-networks-project-ofgem-and-beis>

- coordinated flexibility markets that efficiently value flexibility, provide transparency of prices and utilisation, and enable flexibility providers to stack value across markets, wherever technically possible
- demonstrable progress in deploying key enablers of more efficient system operation, particularly across DNOs and the ESO, including through enhanced data visibility, cooperative developments in resolving conflicting requirements, and implementing relevant code modifications. This also requires significant developments in ensuring the deployment of supporting infrastructure, IT, OT and open data standards.

6.19 Our proposed licence conditions and industry codes will obligate minimum standards, including in these areas above. In RIIO-ED2, we will push companies to drive standards upwards, to converge around good practice, and be held to account on their performance, including on a comparative basis.

Embedding optionality in RIIO-ED2 for wider institutional change

6.20 Building on the foundations of DNOs progress to date and the synergies between ownership and operation can allow us to deliver these capabilities and consumer benefits sooner. But as set out above we are keeping the case for DSO separation under review. As such we wish to ensure the RIIO-ED2 methodology is not an obstacle to any part or full separation, should we make a decision that doing so is desirable.

6.21 At present, there is significant diversity in the systems, processes and data formats DNOs use as they deliver DSO functions. We will use the price control and other regulatory mechanisms to drive interoperability and ensure data standards that do not limit who could operate equipment or access data in future, whilst remaining cyber secure. Our view is that DNOs should enable, and never prevent, the opportunity for third parties to provide these services where they could do so more efficiently. Our proposed baseline expectations set out in Appendix 5 include requirements for DNOs to embed data standards and interoperability.

6.22 In addition to technical enablers of separation, we are proposing new ways of cost reporting through the business plan data templates. We are seeking to isolate costs associated with flexibility, and reform how we capture costs associated with planning, operation and market development. These will be reflected and continually revised through the DNO's Regulatory Instructions and Guidance.

6.23 We think the DSO incentive framework that we set out later in this chapter will provide us with useful information to inform our review of separation. It will enable scrutiny of DNOs’ performance, by us and other stakeholders. It could also offer a foundation for how we could incentivise DSO functions separately from the DNO.

6.24 As set out above we are prepared to take necessary actions to reassign functions within the RIIO-ED2 period. Between now and the end of the year we will further define and develop the processes and regulatory tools to enable this. This will include considering actions that need to be taken outside the price control, but we also need to consider how the price control would need to change, and the tools to implement such change. We have already signalled our intention to include a DSO re-opener, which we will continue to scope. We recognise the consequences of separation could include a decrease in allowed revenue for DNOs (reflecting their fewer responsibilities). It could also result in a change in their outputs, for example removing rewards and penalties associated with any or all aspects of the proposed DSO ODI.

DSO roles and principles for DNOs in RIIO-ED2

6.25 In RIIO-ED2 we expect DNOs to build on the progress made in RIIO-ED1, and uphold our baseline expectations of performance. We set these out in detail in Appendix 5, but in Table 10 we provide at a high level a non-exhaustive list of our proposed objectives for each principle.

Table 10: High-level objectives of DNOs' DSO principles in RIIO-ED2

Roles	Principles	Objectives
Planning and network development	Plan efficiently in the context of uncertainty, taking account of the whole electricity system and promote planning data availability	<ul style="list-style-type: none"> • Better data gathering and modelling capabilities improve identification of network needs. • Transparent, robust decision-making processes that fairly value flexibility. • Planning information is made available to support decision-making of current and prospective network users.
Network operation	Promote operational network visibility and data availability	<ul style="list-style-type: none"> • DNOs identify and use operational data to support reliable, economic and efficient network operation. • Data and information is exchanged with the ESO to enable optimised whole system operation decisions.

		<ul style="list-style-type: none"> Operational data is shared with network users and other relevant stakeholders.
	Operate an economic and efficient distribution system	<ul style="list-style-type: none"> DNOs use of flexibility promotes safe and secure operation of the network. There are clear rules in place for how and when DNOs send instructions for DER to dispatch. Dispatch is coordinated to optimise whole electricity system outcomes and promote markets.
Market development	Provide accurate, user-friendly and comprehensive market information	<ul style="list-style-type: none"> DNOs share all reasonable data and information that could support development of flexibility markets. The information they share is tailored to their stakeholders.
	Simple, fair and transparent rules and processes for procuring DSO ancillary services, aligned with ESO markets where appropriate.	<ul style="list-style-type: none"> Standardised products, contracts and other market services that enable flexibility providers to easily engage with multiple DNO flexibility markets. Market-based mechanisms that promote liquidity and meet the needs of flexibility providers. Commercial structures that enable flexibility providers to stack revenue across markets. Measures to address conflicts of interest provide confidence in the neutrality of DNOs.

Incentivising and measuring performance in RIIO-ED2

6.26 We are proposing a DSO incentive framework to reveal and require best practice in delivering DSO roles and principles. In Appendix 5, we propose baseline expectations for how DNOs must deliver these roles and principles in RIIO-ED2. Through the incentive framework, we could penalise companies who do not meet our expectations, but could reward companies who exceed them.

6.27 The proposed DSO incentive framework comprises a two-stage approach: (i) driving quality DSO strategies through the business planning process; and (ii) a new DSO ODI in which we undertake an ex post evaluation of companies' performance against those strategies, half way through the price control and again at the end.

(i) Our proposal on driving quality DSO strategies

- 6.28 In the DSO Roles and Principles section of Appendix 5 of this document, we propose roles and principles that underpin DNO's delivery of DSO in RIIO-ED2. There we set out our proposed baseline expectation of performance, including some prescriptive guidance on activities and outputs we expect DNOs to deliver as well as broader behavioural standards and outcomes.
- 6.29 Companies must have a DSO strategy as part of their business plan that sets out how they are delivering against these principles and meeting or exceeding the baseline expectations, while respecting the boundary between monopoly and market provision of DSO. Strategies must be specific, measurable and time-bound. See the 'DSO transition' section in the Business Plan Guidance for the overarching required features of a DSO strategy, and the information that it must include.
- 6.30 Companies whose DSO strategies are incomplete or do not meet our baseline expectations as they are set out in the SSMD could be penalised through the Business Plan Incentive (BPI). We will incentivise companies to be ambitious; companies whose DSO strategies demonstrate standards of performance that go beyond the baseline expectations could receive a reward through the Consumer Value Proposition (CVP). We discuss our proposal for CVPs in more detail in Chapter 13 of Annex 2.
- 6.31 As part of their DSO strategies, companies should propose performance metrics that we could use in an ex post evaluation of performance as part of the DSO ODI. Companies should propose ambitious performance benchmarks that would demonstrate performance at or above our baseline expectations where these are relevant. Metrics of performance are more likely to be adopted in the ODI where they can be applied across the sector, for example, where they allow for quantifiable and comparative assessment. We therefore invite companies to work together in developing these metrics, but will also review metrics proposed by individual companies, which we could apply to all companies.

(ii) Our proposal on holding companies to account through a financial DSO ODI

- 6.32 We are proposing that a new DSO ODI would enable measuring, rewarding and penalising companies based on their performance throughout ED2.

- 6.33 Following submission of business plans and assessment of penalties and CVP rewards, we plan to update our baseline expectations for all companies. We may include good practice revealed by any individual company as part of the new baseline. The purpose is to drive convergence around good practice in delivery, but we will take into account genuine regional specificities. Similarly, we will set out metrics and performance benchmarks for each company, with the intention these are as consistent as possible across the sector. These may include metrics proposed in companies' business plans and others we have developed in coordination with companies and wider stakeholders.
- 6.34 Companies will report on their delivery against these baseline expectations, and performance against any metrics. We propose to carry out an ex post evaluation of activities, within and at the end of the price control period. Companies who do not meet baseline expectations or hit performance benchmarks could be penalised. Meanwhile, companies who exceed performance benchmarks could be rewarded.

Application of the DSO incentive framework

- 6.35 We recognise the role that other mechanistic financial incentives will have in incentivising behaviour, and that there are benefits to not separating revenues for DNO and DSO roles. We think the TIM will remain a strong incentive for driving DNOs to use competition to find the most efficient solutions to network management, including through using flexibility. At the same time, the IIS will encourage DNOs to put in appropriate processes and safeguards so that flexibility markets support rather than undermine the reliability of the network.
- 6.36 The role of the DSO incentive framework sits parallel to these, incentivising behaviours less well served by mechanistic financial incentives. By requiring and incentivising DNOs to identify deliverables and outcomes and using an evaluative ex post assessment of outturn evidence, we seek to better align the DNOs' incentives with consumer outcomes. This approach is similar to the regulatory and incentives framework we use for the ESO.⁵⁸
- 6.37 Our proposal reflects the need to promote transparency and scrutiny in a roadmap for how DNOs deliver DSO functions, which is crucial as stakeholder engagement and coordination underpin effective DSO. It will drive convergence around best

⁵⁸ <https://www.ofgem.gov.uk/electricity/wholesale-market/market-efficiency-review-and-reform/system-operator-incentives>

practice, lifting the quality of service and standardising processes, which in itself can be beneficial, for example in helping flexibility providers with a portfolio of DER across regions participate in different DNOs' markets for DSO ancillary services.

- 6.38 There are several considerations regarding the application of this DSO ODI, including the value of any reward or penalty, the assessment criteria and approach, and frequency of the ex post assessment.
- 6.39 We are considering what the strength of this ODI should be, in terms of the value that could be applied as a reward or penalty. One approach could be to expose DNOs to the same percentage of baseline revenues that the ESO is exposed to in the ESO Regulatory and Incentive Framework, but apply this only to the revenue that we have identified as associated with DSO via the Business Plan Data Templates. A problem with this is it risks inconsistent cost reporting, or gives an incentive to shift costs from one category to another to maximise (or minimise) the value of rewards (or penalties). Alternatively, we could apply a consistent assumption of DSO costs across companies (as either an absolute value or percent of baseline revenue) to reduce this risk. At this stage we are not presenting a minded-to value or approach to setting the value, but in general think they should be strong enough to incentivise good behaviour but not disproportionately reward or penalise companies.
- 6.40 Another consideration is the appropriateness of opportunities for rewards and penalties. We recognise that mechanistic financial incentives such as the TIM will reward efficiencies delivered by enhanced DSO functions. We therefore need to take care to avoid rewarding actions that would have been done without the DSO incentive, but ensure sufficient value opportunities to drive genuine improvements. The incentive might be asymmetric, with more opportunities for penalty than for reward. For example, we generally consider that achieving a deliverable, ie taking the steps set out in the DSO strategy to meet a baseline expectation, should not result in a reward for the company. But failure to deliver it could result in a penalty.
- 6.41 We are considering different options for how discretely we treat deliverables and performance benchmarks in determining penalties and rewards. The incentive could comprise numerous discrete evaluations of performance, each independent of one another. We could impose a single, more holistic incentive approach to offer a single reward or penalty to the company based on its performance against

all baseline expectations and metrics. More holistic approaches that take account of a variety of deliverables and metrics might mitigate risks of DNOs deprioritising areas where they see lower potential for reward.

- 6.42 In addition to the deliverables and performance metrics, we could set out other upfront criteria for the ex post assessment. In the ESO's incentive framework, their performance panel will also take into account evidence of (delivered or future) consumer benefits and stakeholder views. We think this inclusion of wider criteria could be useful as part of an assessment of DSO but it should be balanced with an approach that standardises and quantifies performance as far as possible to enable simple assessment and comparability.
- 6.43 We know that we must be adaptive to a fast changing sector, and enable and encourage innovation. We think performance metrics that measure outcomes, updates throughout the price control to DSO strategies and baseline expectations, and flexibility in the ex post assessment will deliver this. We propose to undertake one assessment in the middle of the price control, and one at the end. The DSO strategy and baseline expectations would be updated for the second half of the price control, but our assessment approach would be flexible enough to recognise justified changes in strategies and baseline expectations within each assessment period.

Consultation Questions

- OVQ17. Do you agree with the proposals we have set out to support optionality for wider institutional change should we later decide to separate DSO functions from DNOs? How else could the methodology support optionality?**
- OVQ18. Do you agree with our proposal to use the Business Plan Incentive to encourage companies to reveal standards of performance higher than our baseline expectations in their DSO strategies? Do you agree we should require, where appropriate, all DNOs adopt these revealed standards?**
- OVQ19. Do you agree with our proposal to invite companies to provide metrics and performance benchmarks in their DSO strategies?**
- OVQ20. Do you agree with our proposal to introduce a DSO ODI in which we would, via an ex post incentive, penalise or reward companies based on their delivery against baseline expectations and performance benchmarks? If so, what criteria and other considerations should we**

take into account in determining whether we should apply a reward or penalty?

- OVQ21. Do you agree with our proposal to undertake that ex post incentive performance assessment in the middle and at the end of the price control? Do you think the assessment should be more or less regular?**
- OVQ22. Do you have views on how we might set appropriate values for rewards and penalties associated with the DSO ODI?**
- OVQ23. Do you agree with the DSO roles, principles and associated baseline expectations in Appendix 5? Does it provide sufficient clarity about the role of DNOs in RIIO-ED2? Do you think amendments or additional baseline expectations are required?**

7. A whole system approach

Chapter summary

In this chapter, we describe our proposals for enabling whole system solutions in RIIO-ED2. These include using the Business Plan Incentive to drive ambitious plans and offering innovation funding to support activity that increases cooperation across energy vectors. We outline our proposal for the operation of a new re-opener for reallocating an output/project from one network company's price control to another network company.

Table 11: Whole system

Purpose	To enable more coordination between network companies to maximise benefits across the whole energy system.
Proposed approach	<p>We are proposing to introduce:</p> <ul style="list-style-type: none"> • a whole system element to the Business Plan Incentive • an increased focus on the whole system in the innovation stimulus • a whole system re-opener called the 'Coordinated Adjustment Mechanism' (the CAM).

Introduction

- 7.1 The energy system, including the different networks, are becoming increasingly interlinked as the actions of a network company can impact other network companies in the same or other energy sectors, as well as non-energy sectors such as transport, water or waste. As these linkages grow, coordination across the whole system can deliver benefits to consumers.
- 7.2 In our Sector Specific Methodology Decision (SSMD) for the RIIO-2 price controls starting in 2021⁵⁹, we introduced a whole system element to the Business Plan Incentive and the innovation stimulus, and proposed a whole system re-opener called the CAM.
- 7.3 We required networks to adopt a broad definition of 'whole system' where, in addition to the gas and electricity sectors, the scope is expanded to apply to any other area, such as transport, water or waste, so long as coordination with those

⁵⁹ [Chapter 8. Enabling whole system solutions](#), paragraph 8.20

areas produces net benefits for the existing and future consumers of the relevant network sector.⁶⁰

- 7.4 We developed our whole system policies to be applicable to all price controls, including RIIO-ED2. We consider that whole system policies, by nature, should be available to licensees in all sectors to ensure the greatest potential coordination.
- 7.5 In Appendix 5, we also outline our intention to introduce a new Whole Electricity System licence condition requiring cooperation and coordination across the electricity sectors.

Our proposed approach for RIIO-ED2

- 7.6 To capture efficiencies across the wider whole system (beyond the electricity sector), we are proposing to introduce three elements for RIIO-ED2:
- the incorporation within the Business Plan Incentive of an assessment of each DNO's whole system plan
 - a whole system element to the innovation stimulus
 - a new re-opener (the CAM).
- 7.7 We propose that the definition of 'whole system' as defined in paragraph 7.3 above will also apply to electricity distribution licensees.

Business Plan Incentive

- 7.8 Network planning decisions at an individual licensee level can impact positively or negatively on the needs and costs of a range of other linked networks.
- 7.9 There is evidence that adopting whole system thinking and solutions to address these impacts can deliver benefits for consumers⁶¹, and DNOs are particularly well placed to move swiftly with solutions. As such, we expect to see a high level of cooperation, ambition, and collaboration in their Business Plans.

⁶⁰ https://www.ofgem.gov.uk/system/files/docs/2019/05/riio-2_sector_specific_methodology_decision_-_core_30.5.19.pdf, p.55

⁶¹ CEPA review of RIIO at https://www.ofgem.gov.uk/system/files/docs/2018/03/cepa_review_of_the_riio_framework_and_riio-1_performance.pdf; E3G paper on whole system integration costs at http://e3g.wpengine.com/wp-content/uploads/docs/Plugging_the_Energy_Gap.pdf. An Imperial College paper at http://energysuperstore.org/esrn/wp-content/uploads/2016/11/Whole-system-cost-of-variable-renewables-in-future-GB-electricity-system-Imperial_Nov2016.pdf estimates £0.5bn per year could be saved by 2030 by electricity distribution networks alone.

- 7.10 Greater coordination and investment planning can help minimise costs across the whole system. For that coordination to be timely and consistent, we propose that licensees should develop processes to do this systematically by embedding whole system thinking in corporate policy, rather than relying on ad hoc stakeholder engagement opportunities.
- 7.11 Licensees who embed this thinking and uncover wide-ranging opportunities across multiple sectors and vectors will see their efficiencies rewarded, as with other minimised costs, under the Totex Incentive Mechanism (TIM).
- 7.12 In the Business Plan Guidance, we provide details on the minimum standards of performance for whole system thinking that we expect to see reflected in each DNO's business plan. These require demonstrable cross-sector engagement and planning with licensees in sectors or vectors other than their own.⁶²

Innovation

- 7.13 The full innovation stimulus package is discussed in Chapter 4. In this chapter, we note our intention to support new approaches to whole system solutions.
- 7.14 A focus on the whole system in the innovation stimulus package will support untested whole system projects or behaviours, which we expect will be highlighted as the decarbonisation agenda develops. We particularly expect to see cross-vector solutions investigated. Such projects will increase capability and learning across all parts of the system, and will reduce costs for consumers in the long run.
- 7.15 We also propose that licensees should include whole system thinking in their respective gas and electricity joint innovation strategies. We note the ENA is producing a joint gas and electricity strategy that brings together elements from both of these. Chapter 4 discusses the full innovation stimulus.

Coordinated adjustment mechanism

- 7.16 We have recently consulted on our proposals for the CAM re-opener as part of Draft Determinations for transmission and gas distribution.⁶³ We propose that the CAM re-opener, as it has been set out in these Draft Determinations, will apply to

⁶² 'Sector' refers to the distribution, transmission and operation of a single energy source. For example, the 'gas sector' includes the firms responsible for gas transmission, distribution, and system operation. By 'cross-sector', we refer to any licensee in one energy source sector, eg electricity, working with any licensee in another energy source sector, eg gas.

⁶³ <https://www.ofgem.gov.uk/publications-and-updates/riio-2-draft-determinations-overview>

Electricity Distribution to ensure that all licensees are able to cooperate with any other type of licensee.

- 7.17 We propose that the CAM would enable the reassignment of responsibility for and revenue associated with an output/project from one network company to another network company (the "Partner Licensee") who can deliver that output/project, where this will deliver greater benefits for consumers. The intention is to ensure that the party best placed to deliver a more efficient solution can do so, even where we have initially assigned price control funding for that activity to another licensee. We propose that the CAM could allow for transfers across sectors, such as from a gas network licensee to an electricity network licensee and vice versa.
- 7.18 We consider that the appropriate reallocation of responsibilities will improve in-period cooperation, provide greater benefits to consumers, and make the price controls more resilient to changes arising across the energy system.
- 7.19 We propose that the CAM will operate within a predesignated window (or windows). Within a re-opener window, a network company can bring forward to Ofgem projects that they wish to be reassigned either from or to the Partner Licensee.
- 7.20 Where we consider it is in the best interests of consumers, we would adjust revenues of both network companies to reflect the new responsibilities, also adjusting any other associated elements of the price control, such as an output.
- 7.21 In establishing the benefits of reassignment, we note the work being carried out through the ENA Open Networks Project (Workstream 4⁶⁴) to develop a methodology for a whole system cost benefit analysis that is relevant to all regulated sectors. We will consider the output of this work when developing the methodology for assessing re-opener applications, to be included in the associated re-opener guidance document.
- 7.22 We set out our proposed position on key features of the CAM for RIIO-ED2 in Table 12 below.

⁶⁴ <https://www.energynetworks.org/electricity/futures/open-networks-project/workstream-products-2020/ws4-whole-energy-systems.html>

Table 12: Proposed position on key features of the CAM

Key feature	Rationale
No materiality threshold	<p>The value attached to the transfer is the scale of benefits to be gained by the consumer, not the costs relating to the activity. We do not consider that networks will put in speculative applications where those benefits are negligible, as unsuccessful re-opener applications have a resource cost that cannot be recouped.</p> <p>We will include indicative examples of the scale and type of benefits we expect to see in the accompanying re-opener guidance, and keep the need for a threshold under review.</p>
No financial incentive for companies to use the CAM	<p>Exploring whole system options should be business as usual. DNOs already have performance incentives, such as avoided costs through the TIM and those related to delivery of outputs. We acknowledge that a company transferring activity out of its price control may impact their level of reward or penalty under the TIM, but consider that the networks involved are best placed to agree a compensatory value for this risk to be passed between them, and allow for it in the assessment of net benefits likely for the consumer.</p> <p>We will not set fixed rules for these commercial agreements, but will expect to see it included in the re-opener application cost benefit analysis, and will include some indications of reasonable scale in the Re-opener Guidance.</p>
Two windows for RIIO-ED2 in May 2024 and May 2026	<p>This will allow an appropriate period after RIIO-ED2 has commenced to identify projects within the electricity distribution and other sectors.</p>
Applications should come from a single network company, but must include a statement of agreement with the counterparty	<p>A process that does not involve the agreement of both parties could result in a resource-intensive and more wide-ranging reopening of RIIO-2 price controls. We have not seen evidence that would justify the uncertainty and disruption this might cause.</p> <p>It is not appropriate for Ofgem to trigger this re-opener, as it is the process to transfer activity where licensees are in agreement, not a tool for one network to ask Ofgem to impose a decision upon another.</p> <p>The CAM is available to transmission and gas distribution from 2021 onwards, but currently not proposed for DNOs until 2023, meaning single applications cannot be initiated by DNOs until 2023.</p>

Consultation Questions

OVQ24. Are there any electricity distribution specific barriers to whole system solutions, and if so, are there any sector specific price control mechanisms to address these?

- OVQ25. Are there any electricity distribution specific issues you think should be accounted for in the Business Plan Incentive?**
- OVQ26. Do you agree that whole system solutions are relevant to the innovation stimulus?**
- OVQ27. Do you agree with our key proposals for the CAM?**
- OVQ28. Do you consider that two application windows, or annual application windows, are more appropriate, and should these be in January or May?**
- OVQ29. Do you consider that the current electricity distribution licences should be amended to include the CAM, or wait until in 2023 at the start of their next price control?**

8. Access Significant Code Review and impact on RIIO-ED2

Chapter summary

This section summarises the interactions between the Access Significant Code Review (SCR) and RIIO-ED2. For most up-to-date information for the Access project, please refer to our website.⁶⁵

Introduction

- 8.1 Current and future trends in the energy system will transform how we use the electricity networks. Smart technologies and new, innovative business models offer opportunities to adjust demand and supply at times and places where network capacity is limited. It is increasingly important that network capacity is allocated and used in a way that reduces the potential costs to consumers as a whole and allowing customers to make best use of the capacity available.
- 8.2 The objective of the Access SCR work is to ensure electricity networks are used efficiently and flexibly, reflecting users' needs and allowing consumers to benefit from new technologies and services while avoiding unnecessary costs on energy bills in general. A key part of this is through reducing the need for reinforcement of distribution networks by shifting usage away from times and locations where there is network congestion.
- 8.3 Amongst other elements, the Access SCR covers:
 - a review of the definition and choice of access rights for distribution users
 - a wide-ranging review of distribution network charges (Distribution Use of System (DUoS) charges)
 - a focused review of transmission network charges (Transmission Network Use of System (TNUoS) charges), including those incurred by distribution-connected users
 - a review of the distribution connection charging boundary.

⁶⁵ <https://www.ofgem.gov.uk/electricity/transmission-networks/charging/reform-network-access-and-forward-looking-charges>

Impact of Access SCR on RIIO-ED2

8.4 There are some key interactions between the Access SCR and RIIO-ED2. Access and charging reforms may change the scope of what is included in the sector price control. The change in scope as a result of reforms could reflect changes in the triggers for investment, the amount of investment expected, or in how investment costs are recovered. We will consider how this is best reflected in RIIO-ED2 arrangements and will coordinate with the network companies so that as far as possible any changes can be incorporated into their planning.

Table 13: Potential impact of Access SCR on RIIO-ED2

Area of reform	Description	Potential impact on RIIO-ED2
Review of the definition and choice of access rights for distribution users	Network access rights define the nature of users' access to the network (eg how much they can import/export, when and whether this can be interrupted). We are reviewing options to improve the definition and choice of non-firm ⁶⁶ (ie interruptible), time profiled ⁶⁷ and shared access rights. ⁶⁸	This could enable more users to connect to the network during RIIO-ED2 without the need for network reinforcement, by providing new access choices that make better use of existing network capacity.
Review of the electricity distribution connection charging boundary	New users seeking connection to the distribution networks are usually asked to pay a proportion of reinforcement costs needed to connect them. We are considering options that reduce the level of network reinforcement costs that are funded via connection charges. We are also considering making other changes, such as allowing connection charges to be paid over time.	This could enable more users to connect to the network during RIIO-ED2 by reducing the upfront cost of connecting to the system; this could impact DNO network planning and investment decisions. Instead of being recovered upfront from connection customers, these costs would be recovered from use of system charges. This would change the revenue collected via the price control and would therefore need to be taken into account as part of RIIO-ED2 business plans.

⁶⁶ Under a non-firm access right, a user agrees for their access to import or export electricity to be restricted, subject to certain parameters. We are exploring the options to improve the definition about when and how much a user can be curtailed.

⁶⁷ Where a users' access rights vary over time. For example, a user may agree an access right that allows them to export or import more overnight than during the day.

⁶⁸ Shared access would allow multiple sites, in the same broad area, to obtain access up to a jointly agreed level.

Area of reform	Description	Potential impact on RIIO-ED2
A wide-ranging review of distribution network charges	To improve efficient use of the network, we are reviewing options to improve the locational and temporal accuracy of distribution network charges.	Improving the price signals sent to users could reduce the need to increase network capacity during RIIO-ED2, thus reducing costs for consumers.
A focused review of transmission charges	Current transmission charging arrangements for distributed generation and transmission demand do not reflect their impact on the transmission network. We are considering options to amend this. We are also considering amending the "reference node" to improve cost reflectivity of charges between different types of users.	Improving the cost reflectivity of price signals could reduce the amount of distributed generation that connect in locations where distribution generation is contributing towards transmission network costs.

8.5 We note that as part of the RIIO-ED2 price control we are already considering improvements in a number of key areas that may facilitate longer-term changes to access arrangements and forward-looking charges. These include our proposals for DNOs to play an active role in developing flexibility markets and to make use of these as alternatives to expenditure on new infrastructure, where it is efficient to do so. This could alter the amount of investment that DNOs are required to make during the RIIO-ED2 period.

8.6 If we decide to make a change to the Connection Boundary, we aim to align this with the start of the RIIO-ED2. In Chapter 2, we outlined how the timelines for RIIO-ED2 and Access SCR will work together, and recognised some of the potential challenges should our final decision on the Access SCR change significantly from our minded-to position that will we will consult on later this year. Accordingly, for business planning purposes we are currently proposing that the DNOs:

- use Access SCR Minded-to Consultation as a baseline for the draft Business Plan submissions due to be submitted to the RIIO-2 Challenge Group on 1 July 2021
- use Access SCR Final Decisions as a baseline for final Business Plan submissions to Ofgem on 1 December 2021.

8.7 As part of this consultation process it would be helpful for DNOs to identify the parts of their draft business plan submissions that could be impacted by our

Access SCR proposals (eg costs or volumes of connections). This includes any cost increases linked to implementation of the Access SCR proposals.

- 8.8 We do not expect our work on Access SCR Impact Assessment modelling to generate specific values that can be inputted into DNOs' business plans. However, we expect to challenge DNOs to maximise the benefits of access reform for consumers, and justify how they have taken account of Access SCR proposals as part of their RIIO-ED2 business plans.

Consultation Questions

- OVQ30. Do you agree with the impacts of our potential Access SCR proposals that are identified in this Chapter? Are there additional impacts that are not identified?**
- OVQ31. Do you agree with the proposed Access SCR baselines for the RIIO-ED2 business plan submissions (ie that Draft RIIO-ED2 Business Plan submissions should use Access SCR Minded to Consultation as a baseline, and that Final Business Plan submissions should use Access SCR Final Decision as a baseline?)**
- OVQ32. How do DNOs propose to demonstrate the impact of our Access SCR reforms on RIIO-ED2 Business Plans?**
- OVQ33. What further guidance might be required from us to allow DNOs to identify the parts of their draft Business Plan submissions that could be impacted by our Final Decision of the Access SCR?**

9. Impact of COVID-19 on the price controls

- 9.1 The various measures taken by the Government and devolved administrations to control the spread of the COVID-19 virus had a significant and immediate impact on the way network companies and the system operator carried out their 'business as usual' activities between mid-March and the end of June 2020. Although reduced, there continues to be an impact across all sectors, in particular on distribution networks.⁶⁹
- 9.2 In response to the issues that arose in that period, Ofgem published a regulatory easement framework for companies for a limited period and set out proposals to allow energy suppliers to defer some of their network charges to relieve financial stress on the sector.^{70 71}
- 9.3 On 16 June 2020, we set out our expectation that network companies and ESO comply with all of their regulatory obligations from 1 July 2020 onwards.⁷² The only exception to this approach is where works and services cannot be delivered to the required standards because of the need for the companies, their supply chain, or their customers to comply with government COVID-19 related guidance to keep customers and staff safe.
- 9.4 With over 2 years of RIIO-ED1 still to run, it is not possible to forecast accurately the final impact of COVID-19 on RIIO-ED2. Work is ongoing to identify options that might better enable a 'Green Recovery' from COVID-19 as well as accelerating net benefits to consumers through decarbonisation of the energy networks. Such options could include accelerated spending as well as opportunities to improve the quality of service from a Net Zero perspective within the existing settlements for RIIO-ED1. We will consider carefully any options brought forward through the current industry processes and will review the impact of these throughout the process of setting the RII-ED2 price control.

⁶⁹ Impacts in distribution are likely to be greater than in transmission due to a higher level of interaction with people in their homes.

⁷⁰

[Impact of COVID-19 on energy network companies - an enabling framework for regulatory flexibility](#)

⁷¹ These proposals are reflected here: <https://www.ofgem.gov.uk/publications-and-updates/managing-impact-covid-19-energy-market-relaxing-network-charge-payment-terms>

⁷² [Impact of COVID-19 on network utilities - regulatory expectations from 1 July 2020.](#)

- 9.5 Ofgem had to reprioritise its workload in response to COVID-19. As a key priority, we are continuing to follow the existing timeline for RIIO-ED2, although we have already changed the way we are carrying out some of our RIIO-1 related work.
- 9.6 Based on the improving situation with regard to COVID-19, we remain confident of being able to deliver the existing programme for RIIO-ED2. However, COVID-19 continues to present some risks to delivery, including if there should be any subsequent 'waves' of infection. We therefore believe it is prudent to have contingency plans⁷³ in place in the event that impacts on Ofgem or company resources means that we cannot adhere to the existing timeline for RIIO-ED2. We consider it unlikely that such a contingency will arise, but we will keep the programme under review, including in terms of any key dependencies such as the Access SCR.

Consultation Question

OVQ34. Do you think we need specific mechanisms in RIIO-ED2 to manage the potential longer-term impacts of COVID-19? If yes, what might these mechanisms be?

⁷³ We recently issued an open letter setting out our COVID-19 contingency plans for the RIIO-2 price controls for the transmission, gas distribution and Electricity System Operator price controls <https://www.ofgem.gov.uk/publications-and-updates/covid-19-contingency-plan-riio-2-open-letter>

Appendices

Index

Appendix 1 - RIIO-ED2 Framework Decisions	78
Appendix 2 - Net Zero Re-opener	79
Appendix 3 – Uncertainty mechanisms and incentives for Strategic Investment Models	82
Appendix 4 - Innovation	89
Appendix 5 - DSO roles and principles in RIIO-ED2, and work during RIIO-ED1	97
Appendix 6 - Consultation Questions	111
Appendix 7 - Consultation responses, data and confidentiality, and general feedback	121
Appendix 8 - Glossary	123

Appendix 1 - RIIO-ED2 Framework Decisions

	Decision
1	Ensure that DNOs deliver the value for money services that both existing and future consumers need
2	Maintain the default length of the price control at five years, as with the other sectors
3	Apply the enhanced engagement arrangements for RIIO-ED2
4	Apply the output and incentive arrangements developed for the other sectors
5	Apply the Network Asset Risk Metric (NARM) for RIIO-ED2, as part of a toolbox approach to justifying and assessing network companies' (proposed) investments and preferences for chosen strategies
6	Introduce arrangements to ensure DNOs are appropriately managing the risks associated with cyber and physical security, and workforce resilience
7	Ask network companies to focus on decarbonising the networks themselves, reducing the environmental impact of network activity, and supporting the transition to a smarter, more flexible, sustainable low carbon energy system
8	Refrain from aligning (start and end dates of) the electricity distribution and transmission price controls
9	Ensure Coordinated Adjustment Mechanism design for the electricity distribution sector is sufficiently consistent with the other sectors
10	Ensure whole system scope for electricity distribution is consistent with the other sectors and include whole system elements in the Business Plan Incentive (BPI)
11	Explore the use of indexation where feasible to remove risk of forecasting error
12	Offer the same opportunity to DNOs to present us with highly anticipatory projects in their business plans
13	Offer DNOs the opportunity to set out in their business plans how these highly anticipatory investments should be treated
14	Introduce an innovation funding pot that targets future-facing strategic challenges
15	Retain the opportunity for network companies to receive Network Innovation Allowance (NIA) funding
16	Remove the Innovation Rollout Mechanism (IRM)
17	Work towards introducing models of both early and late competition for RIIO-ED2 which are in consumers' interests
18	Introduce arrangements, potentially by enforcing best practice or competition obligations, which will enable native competition to be more effective
19	Remove the early settlement (fast-tracking) process for RIIO-ED2
20	Use the BPI to reward DNOs putting forward ambitious plans
21	Set incentive rates via a confidence dependent incentive rate approach
22	Retain debt indexation for RIIO-ED2
23	Set the baseline allowed return to equity using the same methodology as applied to the other RIIO sectors
24	Use either CPI or CPIH for inflation measurement in calculating both RAV and allowed returns
25	Introduce the sculpted sharing factor Return Adjustment Mechanism for RIIO-ED2

Appendix 2 - Net Zero Re-opener

A2.1 In Chapter 4, we described our proposal to introduce the Net Zero re-opener to enable us to reset allowances and other elements of RIIO-ED2 in order to align the price control with Net Zero targets. In this Appendix, we set out our proposed process that the re-opener mechanism would follow.

Process

A2.2 We envisage the re-opener mechanism would operate along the following lines.

A2.3 Having regard to all relevant available evidence, received through the NZAG or other representations, for instance, we would consider whether a relevant change of circumstances that could have a material impact on RIIO-2 costs or outputs has occurred or will occur.

A2.4 Where a relevant change in circumstances is identified, we would invite views on the anticipated impact of the change, including on whether, and how, the change should be reflected in the price control.

A2.5 We would then seek views on any proposed amendments to RIIO-ED2 licences to facilitate the change, and the extent to which other uncertainty or price control mechanisms could facilitate the required changes, or whether the Net Zero re-opener should be triggered. We consider that Ofgem should have the sole ability to initiate the Net Zero re-opener. However, stakeholders would have the option of drawing to our attention issues that they believed were relevant.

A2.6 In response to our May 2020 letter, some network companies expressed the view that they should be given the ability to trigger the use of this re-opener. They suggested that they were better placed to anticipate and identify whether a re-opener is required than Ofgem, and that restricting their ability to do so may lead to missed opportunities.

A2.7 Input from stakeholders will be vital in allowing this proposed mechanism to work effectively. Through ongoing engagement with licensees, policy-makers (including via NZAG) and a wider group of stakeholders, we will be able to gather sufficient information to inform us as to when this mechanism should be used. Furthermore, we consider it important that the mechanism should only be used in circumstances where it will lead to consumer benefit. We are well placed to make decisions as to when and in what circumstances the mechanism should be used, taking

stakeholder views into consideration. Therefore we propose that Ofgem alone may trigger this re-opener mechanism.

Materiality threshold

A2.8 As set out in the Uncertainty Mechanisms section of Annex 2 of this SSMC, we are proposing to adopt a set of common parameters for re-opener mechanisms in RIIO-ED2. As a general principle, we believe that re-openers within the RIIO-ED2 price control should feature specific materiality thresholds which have to be met in order to trigger use of the mechanism. We have considered whether such an approach would be appropriate in this case.

A2.9 A materiality threshold would also help to ensure that the re-opener process is only used where the expected benefits of running the process would outweigh the expected costs to stakeholders and Ofgem. It would prevent relatively minor adjustments with overall limited potential benefits for consumers from being pursued.

A2.10 Conversely, in this particular instance, it is difficult to foresee in detail the precise nature of the changes that may be addressed via this mechanism or the associated adjustments that may be required. On this basis, it may be preferable to make an exception to the general rule and leave the materiality question open but consider this on a case-by-case basis, when faced with a relevant change.

A2.11 On balance, we propose to apply a materiality threshold in line with our approach to common design parameters for re-openers⁷⁴. This would ensure that Ofgem and licensees only deal with changes that are sufficiently material and where the costs of using the mechanism are clearly outweighed by the expected benefits.

Adjustments

A2.12 We envisage that, through the re-opener process, the types of changes that could ultimately be made to network companies' licences could include:

- increases or decreases in allowed revenue
- adjustments to existing output targets or the introduction of new output arrangements

⁷⁴ For more information on our common design parameters for re-openers see Chapter 11, Annex 2: Keeping bills low for consumers

- changes to existing reporting requirements or the introduction of new reporting requirements.

Appendix 3 – Uncertainty mechanisms and incentives for Strategic Investment Models

A3.1 In Chapter 4, we described how our approach to strategic investment will take into account whether forecasts of demand are driven by centralised targets or through a decentralised approach, and how much certainty we have that the expenditure will be required. We highlighted that the more we move away from our traditional needs case assessment, the more we may need to rely on uncertainty mechanism and incentives. In this Appendix, we describe the type of uncertainty mechanisms and incentives we could apply and the circumstances when each might be appropriate.

Uncertainty Mechanisms

A3.2 Where we have less confidence in the need for or scope of expenditure, we are likely to require an uncertainty mechanism to enable revenues to adjust with requirements as and when there is more certainty. We have identified the following types of uncertainty mechanisms that could be applied:

- a Price Control Deliverable (PCD) with funding triggers linked to regional plans
- volume drivers
 - LCT volume driver
 - Capacity Volume Driver
- re-opener.

PCD with funding triggers linked to plans

A3.3 For the type of expenditure that is best established through a decentralised approach, a robust local plan identifying regional energy requirements could be used to identify where and when network upgrades should take place.

A3.4 Where a regional plan exists prior to the start of RIIO-ED2, DNOs could agree with local stakeholders the triggers that can be attached to the plan to indicate when that investment might be required. For instance, this could be the penetration of electric vehicles in congested areas that would require an increase in capacity, or investment required subject to the awarding of grants from government, changes in planning permission (prohibiting the replacement of gas boilers).

- A3.5 Companies would identify a scheme solution to the requirements identified through the regional plan. Revenues will be allocated to each scheme via a PCD. Allowances would be automatically adjusted to reflect these additional revenues upon the submission that the triggers associated with each scheme have been met.
- A3.6 This approach may be more applicable where there is uncertainty over when the investment is likely to be needed, but when it is required there is certainty at the solution that should be delivered.

Volume Drivers

- A3.7 We can also adjust allowances through other mechanisms, known as volume drivers.

LCT Volume Driver

- A3.8 For the LCT Volume Driver, DNOs would firstly need to identify what outcome or output is expected to be achieved during the period of RIIO-ED2 as a direct result of the strategic investment. This may be a volume of new connections of low carbon technologies (LCTs), such as electric vehicles or heat pumps, or their uptake through existing connections. The DNO would have to indicate where they anticipate this growth arising and the level of existing network capacity on the associated parts of the network.
- A3.9 A unit cost for each type of installation would be established. This would take into account the respective average cost associated with installing different LCTs.
- A3.10 Ex ante funding would be provided to reflect the projected volume of LCT installations that would require additional capacity multiplied by the unit cost. This initial allowance would be subject to a volume driver through which company allowances would be revised upwards/downwards at the end of the period depending on the volume of LCTs that have actually been installed.
- A3.11 This approach may be appropriate where strategic investment by the DNO will directly enable a targeted volume of LCT installations in a region within the RIIO-ED2 period to be achieved.

Capacity Volume Driver

A3.12 For the Capacity Volume Driver, DNOs would first need to indicate how heavily utilised their network is. This should be in total, but should also indicate what proportion of their network falls into different utilisation 'bands', ranging from underutilised to heavily utilised.

A3.13 DNOs would need to identify the cost of adding a unit of capacity, for instance 1MW, to each utilisation band. The more heavily utilised the network is, the greater the likelihood that adding a unit of capacity will require network reinforcement. Therefore unit costs should increase with utilisation levels.

A3.14 DNOs would then need to identify where on their network, in terms of utilisation bands, they forecast an increase in demand. The DNO would identify what impact this demand would have on the proportion of assets in each utilisation band if the DNO took no action.

A3.15 The DNO would then set out their Network Utilisation Strategy. This would indicate the proportion of their assets that they intend to be in each band by the end of the price control and the overall utilisation of their network. In doing so, they would indicate the amount of intervention, in terms of units of capacity, they expect to undertake to realise this strategy.

A3.16 An average unit cost per MVA will be established based on achieving their utilisation strategy.

A3.17 The DNO's allowance would then adjust by the average unit cost each time they installed new capacity, or enabled the equivalent amount of capacity to be made available through engaging with a provider of flexibility services, such as storage or demand response, to reduce their contribution to peak demand.

A3.18 The Capacity Volume Driver is illustrated in Figure 7 below. Based upon a current network utilisation level of 40%, a projected level of demand and a utilisation strategy to maintain an average level of utilisation of 50%, a DNO is provided with a unit cost of £35 per MVA of additional capacity added. The DNO's allowance is then automatically adjusted by this rate for every MVA they add.

Figure 7: Illustration of Capacity Volume Driver

Utilisation bands	% of assets in utilisation band	% of assets in utilisation band without intervention	% of assets in utilisation band WITH intervention	MVA required to deliver utilisation strategy	£ per MVA expected to be delivered	Total expected spend
0-60%	75	60	70	0	0	0
60-80%	10	10	15	200	20	4000
80-100%	10	20	15	400	20	8000
100%+	5	10	0	1000	100	100000
Average	40		50		35	
Total	100	100	100	1600		112000

A3.19 This may be appropriate, where there is uncertainty at the level and location of forecasted increases in demand, and a DNO needs flexibility to add capacity to ensure the network can accommodate growth.

Re-opener

A3.20 Instead of using automatic mechanisms to increase allowances within the period, we could instead use a re-opener to assess the requirement for additional funding and adjust allowances accordingly.

A3.21 We could base a re-opener on total expenditure levels exceeding a predetermined value. This was the approach in RIIO-ED1, where companies could seek additional revenues if load related expenditure was more than 20% above the baseline allowance.

A3.22 Alternatively, a re-opener could apply to a specific need, for instance, it could enable funding for new schemes identified through an ongoing regional planning process, or for those regions who establish a regional plan during the course of RIIO-ED2.

A3.23 In addition, we could use the Net Zero re-opener to determine the need for an increase in allowances where higher investment is needed to keep the price control aligned with government policy and technology advancements.

A3.24 This may be appropriate, where the additional expenditure on specific schemes, or in total is likely to represent a material increase on baseline allowances and where the requirement for this is likely to become more certain during the period.

Output Incentives

A3.25 Through the Totex Incentive Mechanism (TIM), DNOs will have incentives to outperform allowances (or unit costs provided for through volume drivers). However, while the TIM while encourage DNOs to outperform expenditure allowances, this may not always lead to the most efficient outcome. Companies may seek expenditure efficiencies in the shorter-term at the expense of longer-term gains. Where we apply the TIM on a per-unit delivered basis, DNOs may be encouraged to maximise the units delivered, while minimising the cost per unit. This could lead to an oversized and underutilised network. Therefore incentives against the outputs that DNOs deliver through their expenditure may result in a more efficient outcome.

A3.26 In response to these issues, we have identified three different output measures:

- Asset utilisation incentive for heat pump penetration
- Network Utilisation Strategy Incentive
- LCT incentive.

Asset utilisation incentive for heat pump penetration

A3.27 In Chapter 4, we indicated that there could be circumstances where we would require DNOs to base their expenditure plans around central forecast targets, for instance for heat pump penetration in off-gas grid areas.

A3.28 We would fund the expenditure necessary to support this. However, we would want to ensure that this was delivered as efficiently as possible and that companies were not oversizing their network. One way of achieving this might be to incentivise DNOs to maintain or improve the efficient utilisation of their network.

A3.29 This incentive would operate through DNOs indicating the number of customers served by a substation and recording the annual peak demand versus trough, both at the start and end of RIIO-ED2. This would be calculated as a percentage figure. Through this process, DNOs would also record the number of heat pump connections. DNOs would be incentivised to achieve utilisation of the network within a predetermined range while accommodating the installation of heat pumps.

A3.30 By way of illustration, under standard conditions (with limited smart operation of heat pumps, and limited energy efficiency in houses) a 20% heat pump penetration results in a ~14% increase in peak demand. Where a DNO manages to keep the peak increase for 20% heat pumps below 5%, this might be rewarded, and penalties may apply where the peak demand increases above 15%.

A3.31 This may be appropriate to drive efficient utilisation of the network where the DNO is capable of taking action to influence the level of peak demand.

LCT incentive

A3.32 This would accompany the LCT Volume Driver. If DNOs invest in line with their projected expenditure but the volume of installations prove to be lower than *anticipated*, we would adjust their allowance below their level of expenditure, effectively meaning that they will have overspent. They will share in this overspend with consumers.

A3.33 This may *discourage* investment ahead of need and so to offset this risk, DNOs would have a 'deadband', within which we would not adjust their allowance downwards to reflect actual volumes of LCTs installed.

A3.34 To further encourage investment ahead of need, DNOs will earn an additional return as well as the unit cost if the volume of LCT installed proves to be higher than the forecast in the business plan.

A3.35 We would mirror the depth of the downside deadband for upside rewards. So the more protection a DNO wants from the risk of lower volumes, the less benefit they will gain if higher volumes of LCTs end up being installed.

A3.36 This may be appropriate where we consider that DNO investment will drive the volume of LCTs installed, and where we consider there is a benefit to consumers of maximising this volume.

Network Utilisation Strategy Incentive

A3.37 This would accompany the Capacity Volume Driver. DNOs will be incentivised to maintain overall network utilisation in line with their utilisation strategy. DNOs that have installed excessive capacity leading to a much higher proportion of their assets falling into an underutilised band than was anticipated may be subject to a penalty.

A3.38 Using the example given at Figure 7 above, if at the end of the period the average utilisation of 50% is not achieved then the DNO may be penalised.

A3.39 This may be appropriate where DNOs are not directly able to influence growth in demand, but are able to add capacity to their network in a way that maximises its efficient utilisation.

Appendix 4 - Innovation

A4.1 Chapter 4 sets out our proposed methodology in relation to the RIIO-2 NIA framework and the SIF. In this Appendix, we provide fuller details on that methodology and our rationale for applying it.

RIIO-2 Strategic Innovation Fund

Background

A4.2 In our RIIO-2 SSMD for the transmission and gas distribution sectors and ESO, we confirmed that we will include a new innovation funding pot in RIIO-2.⁷⁵

A4.3 The current process by which companies identify projects for network innovation funding can be uncoordinated and lack strategic focus. This is particularly problematic given that the nature of future system challenges is likely to require increased collaboration between network companies, third parties and funders of innovation⁷⁶, and greater consideration of whole system solutions.

Table 14: Consultation position for Strategic Innovation Fund

Strategic Innovation Fund	Consultation position on methodology
Key aims	9.7 To support strategic innovation that contributes to the achievement of Net Zero targets and benefits network companies and consumers as a whole.
	9.8
	9.9 To facilitate meaningful progress in the decarbonisation of power, heat, transport and wider industry, and support the energy system transition at lowest cost to consumers.
	9.10
	9.11 To further coordinate network innovation funding with other public sector funding initiatives, ensuring greater strategic alignment and eliminating funding gaps.
	9.12
Setting an innovation strategy	9.13 To respond flexibly to challenges that arise, moving away from a rigid annual competition process to evaluate projects.
	Set the strategic focus for network innovation projects funded by the SIF by working with the government, in particular through the Net Zero Innovation Board, to develop a sector-wide energy innovation strategy.

⁷⁵ The introduction of the SIF was also a key action within our Decarbonisation Action Plan published in February 2020.

⁷⁶ Including the Department for Business, Energy and Industrial Strategy, the Department for Transport, UK Research and Innovation (UKRI), and the devolved administrations.

Strategic Innovation Fund	Consultation position on methodology
Setting Innovation Challenges for SIF projects	Set Innovation Challenges against which we expect companies to bring forward network innovation projects.
Frequency of Innovation Challenges	Set challenges for SIF projects as and when strategic issues arise during the price control period.
Scope of eligible projects	The SIF would focus on strategic projects that would not otherwise be taken forward as BAU activities by companies or via NIA funding. Projects would only be eligible for funding where (a) access to the assets of a network company are essential, or (b) in the case of third-party innovators, the innovation would not happen but for the provision of SIF funding.
Requiring industry collaboration and third party involvement	The Innovation Challenges will include requirements relating to the composition of consortiums and project partnerships that bid in for funding, where appropriate.
Value of funding available	The SIF should be used to fund individual high-value innovation projects over £5m. Make available a level of total funding equivalent to that provided via the RIIO-1 Network Innovation Competition (NIC), which was £450m, and may increase this if necessary.
Percentage of innovation project funded	Consider on a case-by-case basis what percentage of projects would be funded via the SIF.
Source of funds for the approved projects	Approved projects would be funded via use of system charges.
Evaluation of projects	Projects will be evaluated using an independent expert panel.
Administration of SIF	Appoint a third party to administer the fund on our behalf.

Rationale for our consultation position

Key aims

- A4.4 Our proposed methodology for the SIF builds upon the three areas of reform that we set out in July 2018: to increase alignment of funding to support the energy system transition, to increase coordination with other public innovation funding and to enable increased engagement from third parties.
- A4.5 Additionally, innovation required to meet Net Zero needs will require us to operate more flexibly than we did within the RIIO-1 NIC to ensure we can quickly respond to emerging innovation needs.

Setting an innovation strategy

- A4.6 We would work with the government, in particular through the Net Zero Innovation Board⁷⁷, to develop a sector-wide energy innovation strategy. We expect BEIS to take the lead on the overall approach, and for Ofgem to focus on key areas relevant to our duties, including network regulation.⁷⁸
- A4.7 We anticipate that increased alignment with the government's sector-wide energy innovation strategy would help ensure that network innovation increasingly aligns with innovation within the wider energy supply chain, and benefits from increased international coordination (via engagement with the government's international innovation partnerships).

Setting Innovation Challenges for SIF projects

- A4.8 Innovation Challenges will likely be set around a range of network issues associated with the future of heat, power, transport and wider industry. In setting these Innovation Challenges, we may collaborate with other innovation funders, including BEIS, UKRI, third party innovators, and bodies such as the Health and Safety Executive. We consider that this strategic focus will help to ensure coherence and collaboration across various end-to-end projects.

Frequency of Innovation Challenges

- A4.9 As we want to be flexible to respond to the innovation needs of the energy system transition, we propose to set Innovation Challenges during the price control as they arise, coordinating with other public innovation funders.

Scope of eligible projects

- A4.10 The SIF would focus on strategic network innovation projects that would not otherwise be taken forward as BAU activities by companies or via NIA funding. Accordingly, we propose that projects would only be eligible for funding where (a) access to the assets of a network company are essential, or (b) in the case of third-party innovators, the innovation would not happen but for the provision of SIF funding.
- A4.11 All SIF projects must deliver net benefits for network consumers, as the funding for these will ultimately come from consumer bills. Nevertheless, we believe our

⁷⁷ The Net Zero Innovation Board will soon replace the existing [Energy Innovation Board](#).

⁷⁸ We note Ofgem will likely input into this wider strategy in line with Ofgem's wider responsibilities, such as generation, retail and consumer protection.

proposals would enable us to support a range of projects, considering network issues associated with the future of heat, power, transport and wider industry. Additionally, eligible projects could include anything from early-stage research through to deployment trials.

Requiring industry collaboration and third party involvement

A4.12 To ensure collaboration between network companies and third parties, we propose that the Innovation Challenges will impose requirements relating to the composition of consortiums and project partnerships that bid in for funding, where appropriate. For example, to ensure a given project's links across a sector are reflected, we may require that all network companies within that sector, academia and other relevant stakeholders are involved as project partners.

Value of funding available

A4.13 In view of the continuation of the NIA for smaller-scale innovation projects, we propose that, in principle, the SIF should be used to fund individual high-value innovation projects over £5m. However, we may make exceptions to this in certain cases where projects would not otherwise be taken forward by companies as BAU activities or via the NIA.

A4.14 During the RIIO-2 period, we propose to make available a level of funding equivalent to that provided via the RIIO-1 NIC, which was £450m, and may increase this if necessary.⁷⁹ However, we do not propose to set an annual funding limit and would instead set a cap for funding available for each challenge.

Percentage of innovation project funded

A4.15 Within RIIO-1, the NIC funds 90% of projects, with companies or project partners making a 10% 'compulsory contribution'. However, as the nature of projects funded via the SIF may vary significantly in RIIO-2, for each Innovation Challenge, we propose to consider on a case-by-case basis what percentage of projects would be funded via the SIF.

Source of funds for approved projects

A4.16 We propose that approved projects would be funded via use of system charges, in the same way as they are funded under the RIIO-1 NIC. As such, the cost of the

⁷⁹ The level of funding available via the RIIO-1 NIC covered GD, GT, ET, ESO and ED. We will consult separately on whether the proposed cap remains appropriate ahead of RIIO-ED2.

innovation projects would be socialised across GB consumers, which we consider to be appropriate given the GB-wide learnings from innovation projects.

A4.17 RIIO-1 gas NIC funds are currently raised from transmission customers via NTS Charges. We propose to adopt the same cost recovery mechanism for gas innovation projects funded via the SIF. In the case of electricity projects funded via the SIF, we propose that costs related to projects led by TOs would be recovered from Transmission Network Use of System (TNUoS) Charges, as is the case for RIIO-1 NIC funds. Costs related to projects led by the ESO would be funded via Balancing Services Use of System (BSUoS) Charges because many of the benefits of those projects relate to balancing and settlement.

Evaluation of projects

A4.18 Decisions on project funding need to be evidence based. The involvement of the expert panel to evaluate projects would help to feed into our consideration as decision makers that project costs are reasonable and that projects will deliver benefits to network consumers.

A4.19 The level of scrutiny of the expert panel would be proportionate to the scale of the project in question. For example, the expert panel may use a series of bilaterals with bidders to evaluate high-value or complicated projects, whereas other smaller-value projects may not need bilaterals to support the evaluation.

A4.20 Ultimately, all decisions on which projects receive funding via the SIF would be made by GEMA (or by delegated authority).

Appointing a third party to administer the SIF

A4.21 The nature of the energy system transition means that the SIF will need to be capable of responding flexibly to emerging issues. Appointing a third party to administer the SIF would enable the fund to operate more flexibly and align with other funding programmes. Our proposal is that the role of the third party would be to:

- administer the funding programme - including setting the timeline and process for each challenge, processing bids for funding and engaging with bidders
- act as a secretariat for the expert panel - for example, by administering the recruitment of the expert panel

- conduct initial analysis of bids for funding - for example, by conducting background analysis and considering how projects submitted for funding build upon past innovation. This initial analysis would support the expert panel's evaluation and be considered by GEMA as decision maker.

RIIO-2 NIA Framework

Table 15: Consultation position for NIA

NIA	Consultation position on methodology
Funding arrangements	Companies would have a single 'use it or lose it' allowance to cover the duration of the price control period.
Scope of eligible projects	Projects should focus on the energy system transition or addressing consumer vulnerability, and deliver net benefits for network consumers within the electricity sector. Demonstrations of commercially available technologies that have been demonstrated outside of GB would no longer be eligible for the NIA.
Considering the impact of innovation on vulnerable consumers	Companies conduct an impact assessment to assess the expected effects of the innovative solution upon vulnerable consumers.
Improving NIA reporting	Implement the improved industry-led reporting framework in RIIO-2 NIA governance arrangements.
Increasing third party involvement	Network companies produce guidance for third parties on the treatment of Intellectual Property Rights (IPRs) in NIA.
Quality assurance of projects	The introduction of additional quality assurance measures, such as a peer review or independent audits of projects upon completion.

Rationale for our consultation position

Funding arrangements

A4.22 We propose to give companies a single allowance for the length of the relevant price control. We consider that providing allowances in this way will improve transparency and simplify the process for third parties that wish to engage with innovation projects. This would provide clarity around when innovation funding would be available, enabling third parties to approach network companies at a time of their choosing.

A4.23 We expect that such an arrangement would avoid the peaks and troughs of innovation activity seen at the start and end of each regulatory year during the price control.

Scope of eligible projects

A4.24 We propose that all projects must focus on the energy system transition or addressing consumer vulnerability in order to be eligible for NIA funding. Other innovation projects, for example those aiming to improve operational efficiencies, should be funded as part of network companies' BAU activities.

A4.25 In our SSMD for the transmission and gas distribution sectors and ESO, we set out our view that consumers should not pay twice for innovation that realises cost efficiencies within the price control period – as companies would already be able to benefit from these projects via the TIM. By restricting the scope of eligible projects to those focused on energy system transition challenges or addressing consumer vulnerability, we would ensure that companies only use the NIA for projects that they are not otherwise incentivised to take forward. This would enable companies to take forward projects that, for example, deliver wider whole system benefits beyond the timeframe of the current price control.

A4.26 We additionally propose to introduce a requirement that all NIA projects must aim to develop solutions that deliver net benefits to their sector's consumers. This is consistent with the definition of whole systems adopted in our SSMD.⁸⁰

A4.27 We do not consider that GB demonstrations of commercially available technologies should be eligible for NIA funding. The RIIO-1 NIA Governance stated that NIA funding could be used to support demonstrations of technologies that have been successfully trialled in other countries⁸¹, and as a result there were several projects trialling commercially available technologies. We no longer consider that such demonstrations represent sufficient risk to warrant innovation funding. This is in line with our expectation that network companies fund lower-risk innovation as part of BAU activities.

Considering the impact of innovation upon vulnerable consumers

A4.28 Our view is that the impact of the energy system transition on vulnerable consumers needs to be considered throughout the development of innovative network solutions. This will help to ensure these consumers are not left behind or adversely affected. In establishing the detailed arrangements for the NIA, we will set out how best we can achieve this. For instance, this may include a requirement for companies to conduct an impact assessment which might help to

⁸⁰ [SSMD Core Document](#), paragraph 8.14.

⁸¹ For example, [RIIO-1 Gas NIA Governance](#), paragraph 3.6.

identify and address the expected effects, or lack thereof, of innovation projects on vulnerable consumers.

Improving public reporting of the NIA

A4.29 In our SSMD for the transmission and gas distribution sectors and the ESO, we proposed to improve public reporting of NIA activities, including costs and benefits, and to enhance how learning is shared across the industry. Within their Business Plans, all network companies noted their involvement in the development of a common benefits measurement framework.⁸²

A4.30 Ahead of the start of RIIO-2 for the ESO, ET, GT and GD, we have challenged network companies and the ESO to develop an improved, industry-led reporting framework that is ready to be implemented on 1 April 2021. We consider that improved reporting would also be beneficial in the electricity distribution sector and for this reason, NIA funding should be conditional on an appropriate reporting framework being in place.

Increasing third party involvement

A4.31 We propose to improve the RIIO-2 NIA governance arrangements in order to increase and support third party involvement, in recognition of the potential for valuable innovation outside of network companies' own areas of discipline. We consider that increased clarity in respect of the practical application of governance arrangements would enable more third parties to become involved in projects.

Quality assurance of projects

A4.32 We consider that quality assurance measures, to test the robustness and compliance of NIA projects, will help to improve confidence in the merits of innovation projects. These measures might include, for example:

- peer review of NIA projects upon completion by another network company or an external party such as an academic⁸³
- independent audit of completed projects by an independent body tasked with examining the research conducted and its compliance with governance requirements.

⁸² For summary of this work, see [ENA Benefits Reporting Framework – Delivery Plan, December 2019](#).

⁸³ This could replicate the requirements imposed in the RIIO-1 NIC Governance that NIC Close Down Reports must be peer reviewed by at least one other network company before they are finalised. For example, see Gas NIC Governance, paragraph 8.38-8.40.

Appendix 5 - DSO roles and principles in RIIO-ED2, and work during RIIO-ED1

- A5.1 In Chapter 6, we set out the overarching proposed approach to DSO, including the roles and responsibilities of DNOs, during RIIO-ED2. In this Appendix, we seek to define more clearly DNOs' DSO proposed roles and principles, and our baseline expectations across these, for RIIO-ED2. We are consulting on these expectations, and we will provide an updated version in the SSMD. Setting out how they plan to achieve those expectations will form part of the minimum requirements of the business plan. We would use a form of these expectations as part of a DSO ODI, in which we would measure DNOs' performance against them throughout RIIO-ED2.
- A5.2 Following this roles and principles section, we also provide more detail on the changes underway to facilitate DSO in RIIO-ED1. We are not consulting on this work in this document, but we expect it will provide useful context for the outcomes we will expect to have been achieved prior to the start of RIIO-ED2.

DSO roles and principles in RIIO-ED2

- A5.3 Through these roles and principles we explain our proposed baseline expectations on DNOs delivering DSO functions in RIIO-ED2. In some cases, we are prescriptive about the specific actions and outputs that form this baseline. But generally the principles and associated guidance below serve to outline behavioural standards and outcomes.
- A5.4 As set out above, we expect significant progress in this space to have been delivered prior to RIIO-ED2, and some of the baseline expectations below will already be obligated through licence conditions. Where that is the case, their inclusion as part of the DSO Incentive Framework allows for identification of best practice in delivery, a tool for monitoring and benchmarking performance, and as a driver for continuous improvement.
- A5.5 In the Business Plan Guidance we set out the information we propose requiring from the companies to assess compliance with these baseline expectations.

Role 1: Planning and network development

A5.6 The drivers for network investment in RIIO-ED2 are different and more complex than at the start of RIIO-ED1. For example, electrification of heat and transport could result in greater and more volatile demand and generation patterns. At the same time, DNOs will have an increasingly comprehensive array of tools to forecast their network needs, and a wider range of options to resolve those needs.

A5.7 Consumers will benefit where DNOs build efficient levels of capacity, using both network and flexibility solutions. Decisions on network needs and solutions must be transparent and built on robust evidence bases that embed uncertainty. Flexibility must be valued fairly, recognising the option value it provides. Meanwhile, providing more insight into the development of the network can signal opportunities for market participants to provide economical flexibility solutions.

A5.8 DNO network planning and forecasting processes are opaque at present, limiting scrutiny on best practice and reliable data driven decision-making. Further, where there are recognisable actions, there is a lack of clarity on how processes are joined together. 'End-to-end network planning' must be better articulated, not least as network developments and decision-making becomes more complex.

Principle 1.1: Plan efficiently in the context of uncertainty, taking account of whole electricity system outcomes, and promote planning data availability

A5.9 The purpose of this principle is to ensure that DNOs' planning processes are clear, that high quality, data driven decisions are made, and that DNOs provide stakeholders with relevant information to inform their own decision-making.

A5.10 Our proposed baseline expectations are:

- DNOs to define and develop enhanced forecasting, simulation and network modelling capabilities, with processes in place to drive continual improvement. We expect increased monitoring equipment to be rolled out across their network where it has demonstrable net value for the DNOs or network users. DNOs should also explore all reasonable options to use data from third parties, including smart meter data, to improve their simulated forecasting.
- DNOs have in place standard and effective processes for sharing network planning information: to other network licensees, including the ESO; to network users and also beyond network users, for example to enable

innovation and support the development of local government plans for decarbonisation. As part of this, we expect DNOs to publish comprehensive heat maps that provide network users high value information about where to connect and to inform their operations. These geographic information system datasets should be available for download or for access independently of DNO websites (for example, via Web Map Service server connections).

- DNOs to have in place transparent and robust processes for identifying and assessing options to resolve network needs, and using competition where cost effective. This should include engaging with other network companies, current and prospective network users to support identification of solutions. DNOs should explore smart network control options including network reconfiguration and voltage control where these do not have detrimental impacts on network users' electricity supply quality. Options must be fairly compared against one another, with flexibility used where it is economic and efficient over the long term compared to investing in traditional reinforcement or technological solutions. We expect a consistent approach for valuing flexibility, taking into account the option value it provides in the context of uncertainty. DNOs must ensure transparency in their approach to allow scrutiny of decision-making.

Role 2: Network operation

A5.11 DNOs must operate their networks safely, adapting their behaviours to reflect new variable generation and loads. We also expect DNOs to identify and use new operability tools and approaches that minimise network losses and maximise the efficiency of network capacity. This includes smarter use of existing assets, the promotion of the uptake of energy efficiency measures where this cost effectively alleviates the need to upgrade or replace electricity capacity and supports the efficient and secure operation of the distribution system, and deployment of flexibility. Flexibility should be dispatched on an economic and efficient basis. This will require sufficient availability of network and DER data, and the sharing of that data with the ESO to manage conflicting requirements.

A5.12 Whilst we have clearly stated that DNOs should provide a range of DSO functions, the capabilities under network operations should not be developed in such a way that precludes a third party from accessing data or operating systems in future.

Principle 2.1: Promote operational network visibility and data availability

A5.13 The purpose of this principle is to ensure that DNOs are able to share relevant data on network operations to stakeholders, and to ensure that DNOs have sufficient network knowledge to operate their network under safe and reliable conditions.

A5.14 Our proposed baseline expectations are:

- DNOs to improve network visibility, and identification and sharing of operability constraints, including to enable avoidance of conflicts, for example where the ESO can avoid procuring services from an asset connected to an already congested part of the distribution network.
- DNOs to provide the ESO with information across timescales about the DER it is planning to instruct to dispatch. Sharing this information closer to real-time should enable the ESO to identify which DER are available for its own needs, and ultimately improve the ability of DER to stack value across markets.
- DNOs to gather sufficient information on DER availability to aid securing against DER losses.
- DNOs to make available operational data that supports network users and other relevant stakeholders to make better decisions about how to use the network.

Principle 2.2: Operate an economic and efficient distribution system

A5.15 This principle is about defining and developing system operability capabilities and the actions network companies take to operate the distribution system safely. The aim is to ensure DNOs facilitate dispatch of DER that is economic and efficient. Principally that means (i) applying a transparent, economic and efficient framework for sending dispatch instructions, and (ii) that the underpinning IT and OT infrastructure is scalable and allows cost-efficient participation.

A5.16 In the near term, including for the start of RIIO-ED2, we believe the DNO is the right entity to own the decision-making framework for what should be dispatched in real-time on their networks and for sending the dispatch instructions for DSO ancillary services, in order to maintain the distribution network within operability limits. As they deliver this and the underpinning IT and OT infrastructure, they need to have clear governance arrangements for the development of that

framework, including potential for codification and stakeholder input, and transparency in how they are applied.

A5.17 In RIIO-ED2, DNOs shall not procure ancillary services from flexibility providers on behalf of the ESO or otherwise act as the commercial route to market for flexibility providers. We do however recognise there will in some cases be a need for DNOs to set parameters for what the ESO can procure from the distribution network to maintain safe operation of the network.

A5.18 As a proposed baseline standard, we expect:

- DNOs to have and regularly review a decision-making framework for when DER are instructed to dispatch in real-time to provide DSO ancillary services. This shall be to promote coordination across services (including curtailment as part of non-firm connection agreements) to maximise liquidity, avoid market fragmentation and ensure dispatch results in the best outcome for the whole system.
- As part of this decision-making framework, there must be rules in place for coordinating dispatch instructions for DSO and ESO ancillary services. This could be through primacy rules or more comprehensive optimisation processes that better enable stacking of revenues for DER. The rules should be transparent and objective, with an intention to promote whole system efficiencies.
- The DNOs shall facilitate secondary trading of DSO ancillary services and curtailment obligations (pending the outcome of the Access SCR). In this context, facilitate means provide the relevant operational data, ensure the DNO has processes in place to collect the relevant data about the trade, and make the operational parameters clear (and justified in the context of network reliability and efficiency). Facilitating does not mean communicating bids and offers about these trades to enable commercial agreement, make decisions about matching bids and offers, or dispatching these trades – third parties skilled in this area should be better placed to more efficiently deliver this.
- DNOs to introduce clear processes for the design, development and communication of the decision-making framework. These should include transparent and participatory processes for stakeholder input.
- DNOs to develop efficient, scalable dispatch instruction infrastructure. We expect standard application protocol interfaces or otherwise avoidance of proprietary systems so that third parties can operate dispatch

infrastructure, for example for the ESO instructing dispatch for an ESO ancillary service, and so DER can simply interface with multiple DNOs' systems without having to invest in multiple dispatch systems.

- We expect clear definitions of different types of dispatch instruction for DSO ancillary services and transparent rules about when and in which markets they should be used. DNOs should not directly dispatch (have 'hard control' on) customer assets except potentially in clearly defined and justified exceptional circumstances. Definitions of these circumstances should be developed with input and cooperation from network users. The application of hard dispatch controls shall be to the improved reliance on market-based mechanisms, not to the detriment of their development.
- Capabilities in network operations, for example in dispatch instructions and associated system architectures shall not be hard coded to the DNO. These must be developed so that they can be cost effectively assigned to another party in future, if this is needed.

Role 3: Market development

A5.19 Effective, coordinated flexibility markets will be essential to efficiently use network capacity and support national system balancing in a context of highly distributed and variable generation and load. The DNO must act as a neutral facilitator of markets. This means network users should be able to simply identify opportunities to participate in markets, understand how the markets interact, be able to trade with other network users, and offer network and system services to the ESO, and for those services to be coordinated to result in whole electricity system efficiencies.

A5.20 We recognise principles in 'insights, planning and forecasting' and 'network operation' roles contribute to market facilitation.

Principle 3.1: Provide accurate, user-friendly and comprehensive market information

A5.21 The purpose of this principle is to ensure that DNOs are able to sufficiently inform stakeholders of information that will assist them in participating in, managing or otherwise engaging with markets in the long and short term. We recognise there are overlaps across other principles, but at the same time believe this information is sufficiently critical to warrant its own statement, and to also include wider information that that mentioned in prior principles.

A5.22 It is incumbent on DNOs to share all relevant and valuable information to enable markets wherever possible. But this principle is also about how that valuable information is identified, and how it is shared to be as useful as possible.

A5.23 Ensuring the information is comprehensive, user-friendly and accurate is essential for the efficient development and operation of flexibility markets. This principle applies to all the information required under other principles, as well as other information that supports the development of flexibility markets.

A5.24 Our proposed baseline expectations are:

- DNOs collate and publish as much relevant data and information as reasonable that will help market participants identify and value opportunities to provide network services to DNOs and take market actions that support efficient whole electricity system outcomes. Relevant data and information includes planning and operational data (such as that set out in principle 1.1 and 2.1). This should be provided with sufficient lead times to enable wider participation in DSO ancillary service markets. It also includes information on historic and future DSO ancillary service market actions. This should include tender results, prices bid and paid, the carbon content of aggregated units, how often DER is dispatched (and volumes) and other actions taken by the DNO (with anonymisation of DER as required), including curtailment as part of non-firm connection agreements. The information should support DER to identify revenue opportunities. DNOs should develop robust strategies for how they will collate and publish more helpful information, wherever possible consistent and in coordination with other network licence holders, and communicate this clearly.
- DNOs should regularly and actively engage with market participants to understand what data and information is helpful, and the most effective format and frequency of publishing that data to ensure it is user-friendly. The information must be easily accessible and navigable. We expect this includes publishing data in machine-readable formats. DNOs should tailor both their information provision and engagement approaches, reflecting different needs of market participants. Where appropriate, collaboration across DNOs in engagement is expected to reduce duplication and avoid stakeholder fatigue.
- DNOs should seek continuous improvement to ensure the information they publish is accurate and unbiased (ie correct at time of publication, as close as possible to the actual value and not skewed in any direction).

Principle 3.2: Simple, fair and transparent rules and processes for procuring DSO ancillary services

A5.25 The purpose of this principle is to ensure DSO ancillary service market design leads to good competitive outcomes, including downward pressure on prices and innovative services.

A5.26 The widest reasonable range of DER should be able to simply engage with the DNO's DSO ancillary service markets and stack value across multiple flexibility markets. DER should be able to access revenues where they provide value to the DNO via simple market processes. Synergies in procurement with other markets (ie where one flexibility action can meet two system needs at the same time) should be harnessed, and conflicts (eg where a flexibility action to meet an ESO need creates a distribution cost) should be minimised. This principle is distinguished from Principle 2.2 by its focus on the network user-centric aspects of market engagement rather than the DNOs' operability processes (which might not be visible to network users). Primarily, this principle means DNOs design market-based mechanisms that allow market parties to operate effectively across multiple markets and provide value to the energy system.

A5.27 Our proposed baseline expectations are:

- DNOs to have rolled out standardised DSO ancillary service products, processes and related contracts that align with network needs and promote ease of participation for providers.⁸⁴ Any DNO area specific products should be sufficiently aligned with the principles and governance arrangements for standardised products, ie so that they are simple to engage with.
- DNOs should identify the optimum combination of longer and shorter term lengths of markets and contract lengths reflecting the network need, different characteristics of DER, and liquidity and the opportunities for innovation and dynamic competition. Individual decisions and frameworks for deciding market timeframes and contract lengths should be transparent, informed by stakeholders and justified as promoting economic and efficient markets.
- Clear governance arrangements for how products and contracts are developed and amended on an ongoing basis as appropriate. These must ensure flexibility providers and other relevant stakeholders input into their development and decisions must be transparent and justifiable, with an

⁸⁴ Standardisation of the technical parameters of the product, processes and the applicable contracts, not just in branding, with clear justification for any deviations.

objective to enable as wide participation in DSO ancillary service markets as possible. They should be adaptive to reflect prevailing system needs, type and availability of flexible resources.

- Clear, comprehensive and transparent mechanisms and associated commercial structures for coordinating DSO and ESO ancillary services procurement. DNOs shall not act as the commercial route for DER accessing ESO ancillary services, but transparent (and possibly tripartite) commercial agreements may be required to reflect potential effects of DER dispatch on distribution system operability and the role of DNOs in setting dispatch parameters (as set out in Principles 2.1 and 2.2). These agreements should remove exclusivity clauses as far as possible. Coordination on dispatch parameters should enable a closer to real-time understanding of what DER needs to be armed and available for a particular service, and what can be available to provide other services. Meanwhile, arrangements should enable remuneration for providing flexibility that fulfils an ESO and DNO need that effectively incentivises such whole system efficiencies.
- DNOs should enable secondary trading, for example capacity and other peer-to-peer trading. Enabling includes defining, communicating and justifying the parameters in which these trades can take place for operability purposes.
- Market support services, such as pre-qualification, credit-checking and settlement must enable simple and cost-efficient participation in markets. DNOs should enable, and never prevent, the opportunity for third parties to provide these services where they could do so more efficiently. Qualification criteria should be standard across DNOs, and with ESO markets where practicable, and share IT infrastructure where efficient.
- DNOs to introduce other measures, developed with robust stakeholder engagement, to address actual and perceived conflicts between its market development and network ownership roles or other business interests.⁸⁵ This might include ring-fencing of particular teams and external auditing of objectivity in addition to measures that promote transparency and enable scrutiny.
- Third party platform providers can add value to flexibility providers in offering new routes to market. DNOs must not prevent the emergence of this sector, but should promote coordination of DSO ancillary services and interoperability across these platforms in order to avoid market fragmentation. This might

⁸⁵ Other business interests could include services DNOs are able to provide outside of their regulated income. Earlier this year we consulted on DNOs using remote voltage control to provide the ESO with balancing services (CLASS) in RIIO-ED2. We are carefully considering the responses to this consultation, and expect to provide an update in the autumn.

include through standard APIs, clear decision-making rules and data standards, so that multiple platform providers can 'plug-in' to DNOs' flexibility procurement processes and offer new commercial routes to market.

For information: DSO licence condition and changes in RIIO-ED1

A5.28 Below, we set out licence condition updates, including new licence conditions we are developing, to drive further change during the remainder of RIIO-ED1. These are structured under the DSO roles of: Planning network development, Network operation, and Market development.

A5.29 Some of the licences build on the Licence Obligations for publishing a Digitalisation Strategy and Action Plan and complying with Data Best Practice, outlined in chapter 4, Modernising Energy Data. As well as complying with those Licence Obligations, for DSO and flexibility reforms we believe it is appropriate to set out additional, more focussed, expectations.

Progressing planning and network development during ED1

A5.30 Planning processes are starting to take account of uncertainties in future demand and generation growth, and the value of flexibility. We expect all DNOs to improve planning and network development to accommodate LCT and DER uptake.

A5.31 All DNOs have proactively developed Distribution Future Energy Scenarios (DFES). There has not to date been a requirement placed on DNOs to produce these; they have been developed on the initiative of DNOs themselves. Methodologies applied, and outputs produced, have therefore varied significantly during this exploratory period. We welcome the work to develop consistent building blocks for scenarios across the ESO and DNOs that is being driven through the ENA's Open Networks Project.

A5.32 This year, we are developing a network development plan (NDP) licence condition, which will take effect from next year. This licence condition will be inserted into the distribution licence via a statutory instrument before the end of this year, as part of the government's implementation of the Clean Energy Package. This will require DNOs to develop and publish a plan for network developments in the five-to-ten year window, based on a single central best view network forecast of changes in demand and generation, reinforcement needs, and expected flexibility use, and is derived from their DFES. We will require DFESs and the NDP to be

produced in consultation with stakeholders, to be written in a consistent manner, be auditable, and for data to be fully available.

A5.33 Through our ongoing reforms to the DNOs' Long Term Development Statements,⁸⁶ we will require DNOs to improve the quantity and quality of near term planning data covering a zero-to-five year time window, that they must make available to assist network users evaluate opportunities to come into contract with them, for example in the provision of flexibility services. This work is closely aligned to, and draws upon, Grid Code modification GC0139, designed to enhance the exchange of planning data at week 24 and week 42 between DNOs and ESO.⁸⁷ The LTDS is distinct from the NDP, since it provides more granular information with a greater degree of certainty, on a shorter-time horizon. Planned reforms to the LTDS include enhancements to data content, extending this to the 11kV network, and the instruction to present data in the Common Information Model (CIM) format where practicable. We will provide more detail on this in a Key Enablers next steps document to be published later this summer.

A5.34 We are continuing our work on the proposed Whole Electricity System Licence Condition [D17]~[7A], which was formally consulted on in March 2020.⁸⁸ The proposed licence will require Electricity Distributors and transmission owners to cooperate and coordinate to define and carry out actions that contribute whole electricity systems outcomes.

Progressing network operation during RIIO-ED1

A5.35 As distribution network management becomes increasingly complex, high quality distribution network operational data is required by more parties, for example, flexibility providers require detailed information to more effectively provide services to DNOs.

A5.36 We will be developing and consulting on a DNO operational data licence condition, where we will propose to require the full and open sharing of DNO constraint and configuration data on days to weeks ahead timescales, and planned outage data. Constraint data will provide network users with a forward view of functional 'bottlenecks' on the network that cannot be identified by static network topology

⁸⁶ <https://www.ofgem.gov.uk/publications-and-updates/key-enablers-dso-programme-work-and-long-term-development-statement>

⁸⁷ <https://www.nationalgrideso.com/industry-information/codes/grid-code-old/modifications/gc0139-enhanced-planning-data-exchange>

⁸⁸ <https://www.ofgem.gov.uk/publications-and-updates/statutory-consultation-proposed-whole-electricity-system-licence-condition-d177a-electricity-distributors-and-transmission-owners>

or asset data. Outage data would provide network users a detailed schedule of network configuration changes that may affect their current or prospective connections.

A5.37 We may also include a requirement for the sharing of historical data held in PI Historian or analogous data systems, which will allow network users to understand historical network utilisation across the EHV network, and HV network work where this data is available. More detail will be provided in our next steps document on Key Enablers later this summer.

A5.38 In line with the 9 August 2019 power cut report action eight, we have considered options for improving distributed generation (DG) visibility.⁸⁹ Existing DG visibility and subsequent data sharing to the ESO is poor. We will shortly be issuing a call for evidence to better understand the costs and benefits of wider rollout of systems to improve DG visibility, and this could result in the establishment of new minimum standards on DNOs.

Progressing market development during RIIO-ED1

A5.39 As DNOs have started to roll out the procurement of flexibility services over the past couple of years, they have developed different techniques and processes, to build this nascent market. The contracts the DNOs offer are usually for months to years ahead of need, and contract terms range from one to seven years. Trials are taking place to explore DNO flexibility markets that operate closer to real time, including day-ahead and intraday. As learning about these markets is developed, we are urging the work in the ENA Open Networks project to focus on alignment, transparency and coordination, across both DNO and ESO markets, to better support flexibility providers in understanding and accessing these markets.

A5.40 The ENA will shortly be consulting on the latest developments in some of their flexibility related work in the Open Networks Project. This includes a common evaluation methodology and tool for DNOs to assess flexibility against other network options; proposals on aligning procurement processes across the DNO flexibility tenders; additional alignment on the parameters of the four core active power services they will tender for; and an assessment of where more work is needed to better enable stacking of flexibility revenue streams, particularly with ESO markets. We welcome this progress and are encouraging the ENA to ensure

⁸⁹ <https://www.ofgem.gov.uk/publications-and-updates/investigation-9-august-2019-power-outage>

they are engaging with all relevant stakeholders, asking the right questions, and appropriately using the responses to inform their forward programme of work and deliver visible results. We will continue to monitor their developments and intervene where necessary to ensure progress continues at pace and in the priority areas stakeholders, including ourselves and government, have defined.

A5.41 Meanwhile, we are developing a new underpinning licence condition to require DNOs to have in place transparent, non-discriminatory and market-based flexibility procurement procedures. This licence condition is being inserted via a statutory instrument towards the end of this year, as part of the government's Clean Energy Package implementation.

A5.42 We are developing the licence condition to include requirements for the DNOs to procure and use flexibility services where it is efficient to do so, implement standardised products and services, and to have non-discriminatory procurement processes. They must develop and utilise these procedures in coordination with the ESO to enable flexibility providers to stack revenue across markets, and for optimal use of resources across the whole system. We will also require DNOs to engage with flexibility providers and other relevant stakeholders in the development of these procedures. DNOs will be required to transparently publish the outcome of their procurement.

Coordinating wider flexibility reforms

A5.43 The development of distribution flexibility markets does not take place in isolation, and we are focussing on the interactions with our wider ranging reforms to promote economic and efficient flexibility. Our review of access and charging arrangements, discussed in more detail in Chapter 8, will work with other flexibility reforms to send the right signals for efficient network development and flexibility response.

A5.44 We are also conducting a review of ESO licence condition C16 (procurement and use of balancing services) within the context of ESO's RIIO-2 price control which we will be consulting on later this year.⁹⁰ This will include changes that will align with the DNO licence conditions we are developing, to ensure that the ESO and DNO licence conditions work together to drive an efficient system.

⁹⁰ https://www.ofgem.gov.uk/system/files/docs/2020/07/draft_determinations_-_eso.pdf

A5.45 Meanwhile, our review of GB system operation is considering the current system operation model and assessing whether the existing framework needs to change in a more fundamental manner to meet future challenges.⁹¹ We also continue to work closely with BEIS on the broader package of reforms for a smarter and more flexible system.

⁹¹ <https://www.ofgem.gov.uk/publications-and-updates/ofgem-review-gb-system-operation-terms-reference>

Appendix 6 - Consultation Questions

Overview Document	
Interlinkages and CMA Appeals in RIIO-2	
OVQ1	Do you have any views on our proposal to include a statement of policy in Final Determinations that in appropriate circumstances, we will carry out a post appeals review and potentially revisit wider aspects of RIIO-2 in the event of a successful appeal to the CMA that had material knock on consequences for the price control settlement
OVQ2	Do you have any views on the proposed pre-action correspondence, including on the proposed timing for sending such to Ofgem?
Net Zero and Innovation	
OVQ3	Do you agree with our proposed approach to a Net Zero re-opener?
OVQ4	In what circumstances, would a centralised approach to setting forecasted outputs be appropriate? What form should this take?
OVQ5	What would be the factors we should take into account that would give us high certainty in a centralised approach to setting outputs?
OVQ6	Alternatively, in what circumstances would it be more appropriate to take a decentralised approach to determining forecasts?
OVQ7	What would be the factors that we should take into account that would give us high certainty in forecasted outputs derived through a decentralised approach?
OVQ8	Do you consider that the LAEP Best Practice guidance produced by the Centre for Sustainable Energy and the Energy Systems Catapult provides adequate checks and balances to ensure that local or regional energy plans are robust, unbiased and have broad support?
OVQ9	Which of the uncertainty mechanisms and incentives in Appendix 3 will be most effective in enabling efficient strategic investment?
OVQ10	Do you agree with our proposals to increase levels of BAU innovation?
OVQ11	Do you agree with our proposed methodology in relation to the RIIO-2 Strategic Innovation Fund?
OVQ12	Do you agree we should adopt a consistent NIA framework for DNOs, and other network companies and the ESO?
OVQ13	What are your thoughts on our proposals to strengthen the RIIO-ED2 NIA framework?
OVQ14	Do you have any additional suggestions for quality assurance measures that we could introduce to ensure the robustness of RIIO-2 NIA projects?
OVQ15	Do you agree with our proposed approach for setting individual levels of NIA funding?
Modernising Energy Data	
OVQ16	Do you agree with our approach to regulating digitalisation and better use of data through the introduction of cross-sector licence obligations?
DSO transition	
OVQ17	Do you agree with the proposals we have set out to support optionality for wider institutional change should we later decide to separate DSO functions from DNOs? How else could the methodology support optionality?
OVQ18	Do you agree with our proposal to use the Business Plan Incentive to encourage companies to reveal standards of performance higher than our

Overview Document	
	baseline expectations in their DSO strategies? Do you agree we should require, where appropriate, all DNOs adopt these revealed standards?
OVQ19	Do you agree with our proposal to invite companies to provide metrics and performance benchmarks in their DSO strategies?
OVQ20	Do you agree with our proposal to introduce a DSO ODI in which we would, via an ex post incentive, penalise or reward companies based on their delivery against baseline expectations and performance benchmarks? If so, what criteria and other considerations should we take into account in determining whether we should apply a reward or penalty?
OVQ21	Do you agree with our proposal to undertake that ex post incentive performance assessment in the middle and at the end of the price control? Do you think the assessment should be more or less regular?
OVQ22	Do you have views on how we might set appropriate values for rewards and penalties associated with the DSO ODI?
OVQ23	Do you agree with the DSO roles, principles and associated baseline expectations in Appendix 5? Does it provide sufficient clarity about the role of DNOs in RIIO-ED2? Do you think amendments or additional baseline expectations are required?
A Whole system approach	
OVQ24	Are there any electricity distribution specific barriers to whole system solutions, and if so, are there any sector specific price control mechanisms to address these?
OVQ25	Are there any electricity distribution specific issues you think should be accounted for in the Business Plan Incentive?
OVQ26	Do you agree that whole system solutions are relevant to the innovation stimulus?
OVQ27	Do you agree with our key proposals for the CAM?
OVQ28	Do you consider that two application windows, or annual application windows, are more appropriate, and should these be in January or May?
OVQ29	Do you consider that the current electricity distribution licences should be amended to include the CAM, or wait until in 2023 at the start of their next price control?
Access SCR	
OVQ30	Do you agree with the impacts of our potential Access SCR proposals that are identified in this Chapter? Are there additional impacts that are not identified?
OVQ31	Do you agree with the proposed Access SCR baselines for the RIIO-ED2 business plan submissions (ie that Draft RIIO-ED2 Business Plan submissions should use Access SCR Minded to Consultation as a baseline, and that Final Business Plan submissions should use Access SCR Final Decision as a baseline?)
OVQ32	How do DNOs propose to demonstrate the impact of our Access SCR reforms on RIIO-ED2 Business Plans?
OVQ33	What further guidance might be required from us to allow DNOs to identify the parts of their draft Business Plan submissions that could be impacted by our Final Decision of the Access SCR?
COVID-19	
OVQ34	Do you think we need specific mechanisms in RIIO-ED2 to manage the potential longer-term impacts of COVID-19? If yes, what might these mechanisms be?

Annex 1 - Delivering value for money services for consumers	
Approach to setting outputs and incentives	
OUTQ1	Do you agree with our proposal for setting upper and lower limits on the value of bespoke ODIs?
OUTQ2	Do you agree with our proposal for a minimum value for bespoke PCDs?
Meet the needs of consumers and network users: Customer satisfaction	
OUTQ3	Do you agree with the proposed scope and associated customer category weightings for the satisfaction survey?
OUTQ4	Do you agree with our proposed approach to target setting and calculating rewards and penalties in RIIO-ED2?
OUTQ5	Do you agree with our proposed approach to setting complaints metric targets in RIIO-ED2?
OUTQ6	Do you agree with our proposal to remove the Stakeholder Engagement and Consumer Vulnerability Incentive in RIIO-ED2?
Meet the needs of consumers and network users: Connections	
OUTQ7	Do you agree with our proposal to expand the connections element of the customer satisfaction survey?
OUTQ8	Do you consider that we have identified the relevant considerations to determine which customers should be captured in its scope?
OUTQ9	Do you agree with our proposal to retain the TTC incentive as a financial ODI in RIIO-ED2?
OUTQ10	Do you agree with our proposal to include a reopener which allows us to revisit targets, and potentially introduce penalties, in the period?
OUTQ11	Do you agree with the methodology we propose to use to set the new TTC targets?
OUTQ12	Do you have views on our proposed Connection Principles and associated standards (in Appendix 4) for RIIO-ED2? Do you disagree with any of the standards we have proposed? If so, why?
OUTQ13	Do you have views on our proposal to use the Business Plan Incentive to encourage companies to reveal higher baseline standards of performance and to apply this, where appropriate, to all DNOs?
OUTQ14	Do you agree with our proposal to use an ex post assessment to penalise/reward companies who fail to deliver their strategies in line with our guidance/exceed performance targets?
OUTQ15	Do you consider that an assessment of performance in the middle and at the end of the price control is a proportionate approach?
OUTQ16	Do you agree with our proposal to retain the Connections GSoPs for all connection customers in RIIO-ED2?
OUTQ17	Do you agree with our proposed approach to uplifting the Connections GSoP payment values in line with inflation, indexing payment levels to inflation, and rounding to the nearest £5?
OUTQ18	Do you agree with our proposal to remove the Incentive on Connections Engagement for RIIO-ED2?
Meet the needs of consumers and network users: Consumer Vulnerability	
OUTQ19	Do you agree with our proposed approach to ensuring consumers in vulnerable situations receive an appropriate range and level of support in RIIO-ED2? If not, what alternative approach should we consider?

Annex 1 - Delivering value for money services for consumers	
OUTQ20	Do you have views on our proposed Vulnerability Principles and associated standards (in Appendix 5) for RIIO-ED2? Do you disagree with any of the standards we have proposed? If so, why?
OUTQ21	Do you agree with our proposal to use an ex post assessment to penalise/reward companies who fail to deliver their strategies in line with our guidance/exceed performance targets?
OUTQ22	Do you consider that an assessment of performance in the middle and at the end of the price control is a proportionate approach?
Maintain a reliable network	
OUTQ23	Do you agree with our proposed approach to retain the RIIO-ED1 methodology for setting unplanned interruptions targets?
OUTQ24	Do you have views on the alternative approaches to setting unplanned interruptions targets set out? Are there any other approaches that we have not considered?
OUTQ25	What are your views on revisiting unplanned interruptions targets within the price control period?
OUTQ26	Do you agree with our proposed position not to introduce further convergence of DNOs' targets over time?
OUTQ27	What are your views on retaining an incentive for planned interruptions performance, and the associated targets?
OUTQ28	What are your views on the potential amendments that could be made to the mechanism, including (but not limited to) the options presented in Tables 23 and 24?
OUTQ29	What are your views on how VoLL should be updated for RIIO-ED2?
OUTQ30	What are your views on the different methodologies for updating VoLL?
OUTQ31	Do you have a view on retaining alignment with VoLL figures used in other RIIO price controls and/or parts of the energy sector?
OUTQ32	Do you agree with our proposed approach to retain the RIIO-ED1 revenue cap for the IIS at 250 RoRE basis points?
OUTQ33	Do you agree with our proposal not to introduce an incentive on short interruptions in RIIO-ED2? If not, how should such an incentive be structured and developed?
OUTQ34	What are your views on a minimum standard for short interruptions for RIIO-ED2?
OUTQ35	What information should we be capturing in RIIO-ED1 and RIIO-ED2 to better understand short interruptions and how DNOs are performing?
OUTQ36	Do you agree with our proposal to retain the RIIO-ED1 SWEE mechanism?
OUTQ37	Do you agree with our proposal to remove the OEE mechanism? If not, what evidence is there to support its retention, and what changes should be made to the existing approach to improve it?
OUTQ38	What are your views on the threshold that should apply to either exceptional event mechanism?
OUTQ39	What performance do you think should be excluded under each mechanism?
OUTQ40	Do you agree with our proposal to retain the existing GSoPs? If not, what changes do you think are necessary and what are the reasons for them?
OUTQ41	Do you agree with our proposal to uplift payment values in line with inflation, indexing payment levels to inflation, and rounding to the nearest £5 for clarity for stakeholders?

Annex 1 - Delivering value for money services for consumers	
OUTQ42	Do you agree with our proposal to retain some form of mechanism for WSC in RIIO-ED2?
OUTQ43	What are your views on the options presented for WSC? Are there other options that we should consider?
Maintain a safe and resilient network	
OUTQ44	Do you have any views on our proposed NARM framework?
OUTQ45	Do you agree with our proposal not to introduce outputs or incentives related to workforce resilience?
OUTQ46	Do you agree with our proposal that DNOs should submit a Cyber Resilience IT Plan and a Cyber Resilience OT plan?
OUTQ47	Are there further requirements of expectations that we should be considering for the DNOs?
OUTQ48	Do you agree with our proposal for the establishment of a 'climate resilience' taskforce or working group, to help DNOs develop strategies for managing the risks of climate change?
OUTQ49	How should DNO strategies inform best practice that is used across the industry? How can these be used to help DNOs develop longer term investment proposals to manage the risks of climate change?
OUTQ50	Do you agree with our proposal to retain the RIIO-ED1 approach to flood resilience?
OUTQ51	What are your views on how we/industry reports on progress against flood resilience plans?
OUTQ52	Do you agree with our proposal to retain the RIIO-ED1 approach to ensuring networks are resilient to trees?
OUTQ53	Do you agree with our proposal to develop a wider resilience measure over the course of RIIO-ED2? If so, what should it cover?
OUTQ54	Do you agree with our proposed approach of retaining the existing arrangements for Black Start, physical security, and telecommunications resilience?
OUTQ55	Do you agree with our proposal to include a reopener for physical site security, with a window during the price control and a window at the end of the price control?
OUTQ56	Do you agree with our proposal to continue monitoring the development of telecommunications resilience and reviewing the arrangements as necessary?
Delivering an environmentally sustainable network	
OUTQ57	Do you think our proposed environmental framework will drive DNOs to deliver an environmentally sustainable network?
OUTQ58	Do you consider that the proposed areas in scope of the Environmental Action Plan, and associated baseline standards, are appropriate? We particularly welcome views on any areas that should be omitted/included and if new areas should be included, what the baseline standard should be?
OUTQ59	Do you agree that the annual reporting through the Environmental Impact Report will increase transparency of the DNOs' activities and the resulting impacts on the environment?
OUTQ60	Do you agree with our proposal to introduce a re-opener to accommodate environmental legislative change within the RIIO-ED2 period?
OUTQ61	Do you agree with our proposed removal of the Losses Discretionary Reward?
OUTQ62	Do you agree with our proposal to retain the visual impact allowance for RIIO-ED2?

Annex 1 - Delivering value for money services for consumers

OUTQ63	Do you agree with our proposed approach to setting a funding pot for the visual impact allowance for RIIO-ED2?
--------	--

Annex 2: Keeping bills low for consumers

Approach to Aggregated Econometric Analysis

COQ1:	Do you agree with our proposal to include totex benchmarking in our toolbox for cost assessment in RIIO-ED2?
COQ2:	What cost drivers do you consider appropriate for our proposed totex benchmarking? Why?
COQ3:	What are your views on the use of both historical and forecast data in our modelling?
COQ4:	At what level should we set the efficiency benchmark?
COQ5:	Do you agree with the proposed criteria for developing cost pools for a middle-up approach?
COQ6:	What cost drivers would be appropriate in a middle-up approach?
COQ7:	What are your views on the CEPA developed totex and opex plus approach? What opex activities are there trade-offs that support the rationale for testing 'totex and opex plus' modelling?
COQ8:	Do you believe it is appropriate to use bottom-up, activity-level, disaggregated modelling in RIIO-ED2?
COQ9:	If we use a combination of aggregated and disaggregated modelling approaches, how should we determine the weight we apply to each, in combining our analysis?
COQ10:	If we did not use disaggregated modelling approaches, what approach should we consider for disaggregating totex allowances for the setting of PCDs?

Model Specification

COQ11:	What model estimation options should be considered for our cost assessment and why?
COQ12:	Do you agree with our proposal to continue using Cobb-Douglas functional form? Why?
COQ13:	Do you have any views on our proposed model selection criteria?

Regional and Company Specific Factors

COQ14:	Do you agree with the proposed criteria for assessing regional and company specific cost factors that we have outlined?
COQ15:	What are your views on our approaches to account for regional and company specific cost factors in our modelling?

Real Price Effects and Ongoing Efficiency

COQ16:	Do you agree with our proposed approach to index RPEs, rather than setting an ex-ante allowance based on forecasts?
COQ17:	Do you agree with our proposal to have a high materiality threshold for RPEs? What are your views on the materiality level for RPE submissions, and the criteria we use to select input price indices?
COQ18:	Do you agree with the suggested common input and expenditure categories for structuring RPEs in ED2?
COQ19:	Do you agree with our proposed approach, and its scope, to set an ongoing efficiency assumption for RIIO-ED2?

Annex 2: Keeping bills low for consumers	
COQ20:	Do you agree with our proposal to use a growth accounting approach as our primary source of evidence to set an ongoing efficiency assumption? What parameters would best support this approach?
Disaggregated Cost Assessment	
COQ21:	Do you agree with our proposed approach on forecasting options for RIIO-ED2
COQ22:	What are your views on our proposal for establishing network impacts and assessing LRE requirements for RIIO-ED2?
COQ23:	Do you agree with our proposal to compare flexibility solutions and network based solutions evenly in our cost assessment?
COQ24:	How should we treat the fixed costs of procuring flexibility when considering flexibility solutions as an alternative to reinforcement?
COQ25:	What are your views on the use of LIs as outputs in RIIO-ED2?
COQ26:	What are your views on the treatment of incremental costs in RIIO-ED2?
COQ27:	Do you agree with our proposal to maintain the RIIO-ED1 approach to assessing Non-op capex costs in RIIO-ED2?
COQ28:	Do you agree with our proposal to maintain the RIIO-ED1 approach to assessing NLRE in RIIO-ED2?
COQ29:	Do you agree with our proposal to maintain the RIIO-ED1 approach to assessing NOCs in RIIO-ED2?
COQ30:	Do you agree with our proposal to maintain the RIIO-ED1 approach for assessing CAIs in RIIO-ED2?
COQ31:	What are your views on the different approaches presented for the treatment of BSCs in RIIO-ED2?
Cost Benefit Analysis	
COQ32:	Do you agree with our proposed application of CBA in the appraisal of investment options for RIIO-ED2?
Engineering Justification Papers	
COQ33:	Do agree with our proposals to retain the requirement for DNOs to produce Engineering Justification Papers?
COQ34:	Do agree with our proposal retain the assessment framework for EJPS developed as part of the RIIO2 process?
COQ35:	Do agree with our proposal to adopt the principals outlined above to guide the production of EJPS and focus the engineering submission?
Data Assurance and Compliance	
COQ36:	What specific activities and methods should be adopted to ensure the Data, Data Assurance and Compliance processes of the RIIO-ED2 price control are run as effectively as possible?
Uncertainty Mechanisms	
COQ37:	Do you agree with our proposed uncertainty mechanisms and their design?
COQ38:	Are there any other uncertainty mechanisms that we should consider? If so, how should these be designed?
COQ39:	Do you agree with our proposed removal of the above uncertainty mechanisms for RIIO-ED2?
COQ40:	Do you agree with our proposed common approach for re-openers being applied to RIIO-ED2?
Increasing Competition	

Annex 2: Keeping bills low for consumers	
COQ41:	Do you agree that our flexibility proposals are sufficient to incentivise DNOs' native competition?
COQ42:	Do you believe there are similarities between DNOs running early competitions and the roles and activities that may be related to electricity DSO functions?
COQ43:	Do you agree with our proposed approach on early competition?
COQ44:	Do you have any views on our draft RIIO-ED2 Late Competition Impact Assessment?
COQ45:	What are your initial views on the three models of late competition (CATO/CADO, SPV and CPM) in the context of electricity distribution? If there would need to be differences from the other sectors, can you please explain what these should be, and why.
COQ46:	Do you agree that the late competition models proposed could deliver benefits in RIIO-ED2?
COQ47:	Do you agree that our proposed criteria for identifying projects suitable for late model competition are applicable in the context of electricity distribution?
COQ48:	What are your views on the best ways to identify a suitable project pipeline for late competition in electricity distribution (eg our proposal to require flagging of projects that meet the high-value, new, and separable criteria)?
COQ49:	Do you agree with the proposed range of options available for repackaging projects in RIIO-ED2 in order to maximise consumer benefit?
COQ50:	What relevant factors do you think we should consider in deciding how these repackaging proposals are specifically applied in electricity distribution?
Incentivising Business Plans and their Delivery	
COQ51:	Do you agree with our proposed approach to implementing the CDIR method in setting the TIM efficiency incentive rate?
COQ52:	Do you agree with our proposed design of the BPI for RIIO-ED2?
COQ53:	What are your views on our suggestion to use proposals contained in draft business plans in the setting of baseline standards in a number of areas (as discussed in paragraphs 13.28 and 13.29)?
COQ54:	Do you agree with our proposal to cap the number and value of CVP proposals that can be included within business plans
COQ55:	Is there any further detail on the proposed content of the Business Plans that you think should be set out in the Business Plan Guidance?
COQ56:	Is there other information that we should be requesting in the Business Plan Guidance in order to assess a network company's Business Plan?
COQ57:	Do you agree with the proposed set of minimum requirements for Stage 1 of the BPI that are set out in the draft Business Plan Guidance?
COQ58:	Do you agree with the approach for assessing companies CVP proposals that is set out in the draft Business Plan Guidance?
COQ59:	We anticipate that DNOs are investing in improving / creating data dictionaries and business information models that describe the data-driven aspects of DNOs overall business architecture. We anticipate there may be opportunities to take advantage of these investments to support the process of cross-referencing data used within RIIO-ED2 Business Plans. What are your views on this?

Annex 3: Finance	
Allowed return on debt	
FQ1	Do you agree with our proposal to use the iBoxx Utilities 10yr+ index rather than the indices used in RIIO-1?
FQ2	With reference to paragraph 2.8, do you have a view on what debt allowance calibration should be used for business plan working assumption purposes, and why?
FQ3	Do you have any evidence to suggest ED networks should or should not have a debt allowance that has a different calibration to GD&T networks?
FQ4	Do you have any views on our analysis of additional costs of borrowing that may not be captured by an index of bond yields?
FQ5	Do you agree with our proposal to use the longest term OBR forecast for CPI to deflate nominal index yields to a real CPIH allowance and to switch to using OBR CPIH forecasts if these become available?
Allowed return on equity	
FQ6	In light of the equity methodology we set out in Draft Determinations for GD&T, do you have a view on how implementation could best be applied to the ED sector?
FQ7	Do you have suggestions on how we could estimate systematic risk for ED2 or any evidence to support a difference between ED and the other RIIO sectors, GD&T?
Financeability	
FQ8	Do you agree with our proposal to align the RIIO-ED2 financeability approach with the approach we have taken for GD&T?
FQ9	Are there any reasons why this approach should differ for RIIO-ED2?
FQ10	Do you have a view, supported by evidence, regarding the appropriateness of different measures to address any financeability constraints?
FQ11	Do you have any views on the proposed scenarios to be run for stress testing?
Financial resilience	
FQ12	Do you agree with our proposal to place additional requirements on licensees in RIIO-ED2 to provide Ofgem with a) published ratings reports, and b) a financial resilience report if their issuer credit rating falls below specified levels?
Corporation tax	
FQ13	Do you agree with our proposal to align the RIIO-ED2 tax approach with RIIO GD&T including; to pursue Option A; the approach to additional protections; the approach to capital allowances; and not to pursue the Fair Tax Mark certification as a requirement for RIIO-2?
FQ14	Are there any reasons why this approach should differ for RIIO-ED2?
Indexation of the RAV and allowed return	
FQ15	Do you agree with our proposal to implement CPIH inflation?
FQ16	Are there any reasons why this approach should differ for RIIO-ED2?
Regulatory depreciation	
FQ17	Do you have any specific views or evidence relating to useful economic lives of ED network assets that may impact the assessment of appropriate depreciation rates?
FQ18	During RIIO-ED1, the assumed asset life is being increased. Do you consider another change is required in RIIO-ED2 to reflect the expected economic

Annex 3: Finance	
	asset life? If so, do you have supporting evidence and proposals, at this stage?
Capitalisation rate	
FQ19	Do stakeholders support licensee specific rates for the ED sector?
FQ20	For one or more aggregations of totex, should we update rates ex-post to reflect reported outturn proportions for capex and opex?
Directly remunerated services	
FQ21	Are there any reasons why the RIIO-ED2 approach to directly remunerated services should differ from RIIO-ED1?
Disposal of assets	
FQ22	Do you support our proposal to continue the RIIO-ED1 approach to disposal of assets for RIIO-ED2?
Dividend policy	
FQ23	Do you agree that additional reporting on executive pay/remuneration and dividend policies will help to improve the legitimacy and transparency of a company's performance under the price control?
Return adjustment mechanism	
FQ24	Do you agree with our proposal to introduce a symmetrical RAMs mechanism?
FQ25	Do you agree with our proposal to introduce a single RAM threshold level of 300 basis points either side of the baseline allowed return on equity?
FQ26	Do you have any other comments on our proposals for RAMs in RIIO-ED2?

Appendix 7 - Consultation responses, data and confidentiality, and general feedback

Your response, data and confidentiality

You can ask us to keep your response, or parts of your response, confidential. We will 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.

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 will 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 may ask you to explain the reasons why you want your response, or parts of your response, to be kept confidential.

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.

We will publish the number (but not the names) of confidential responses we receive. We may publish a summary of confidential responses but if we do that we will not link those summaries to the respondents. We will evaluate each response on its own merits without undermining your right to confidentiality.

General feedback

We believe that consultation is at the heart of good policy development. We welcome any comments about how we have run this consultation. We would also like to get your answers to these questions:

- Do you have any comments about the overall process of this consultation?
- Do you have any comments about its tone and content?
- Was it easy to read and understand, or could it have been better written?
- Were its conclusions balanced?
- Did it make reasoned recommendations for improvement?
- Any further comments?

Please send any general feedback comments to stakeholders@ofgem.gov.uk

How to track the progress of the consultation

You can track the progress of a consultation from upcoming to decision status using the 'notify me' function on a consultation page when published on our website. Ofgem.gov.uk/consultations.

Notifications

Would you like to be kept up to date with *Domestic supplier-customer communications rulebook reforms*? subscribe to notifications: 

Email *

CAPTCHA

Check the box below to verify you're human

I'm not a robot 
reCAPTCHA
Privacy - Terms

Once subscribed to the notifications for a particular consultation, you will receive an email to notify you when it has changed status. Our consultation stages are:

- Upcoming
- Open
- Closed (awaiting decision)
- Closed (with decision).

Appendix 8 - Glossary

A

Allowed revenue

The amount of money that a network company can earn on its regulated business.

Asset stranding

Assets which have subsequently become either not used or underused as compared with initial expectations.

The Authority/Ofgem/GEMA

Ofgem is the Office of Gas and Electricity Markets, which supports the Gas and Electricity Markets Authority (GEMA or 'the Authority'), the body established by section 1 of the Utilities Act 2000 to regulate the gas and electricity markets in Great Britain.

B

Base revenue

Base revenue (also referred to as baseline revenue) is the amount of revenue network companies are allowed to recover as set up front at the beginning of the price control. Additional revenue may be allowed during the price control under certain, specified circumstances, for example, if it is triggered under an Uncertainty Mechanism.

Baseline Allowed Return

Our estimation, taking into account expectations, of the efficient return for debt and equity capital. Based on a weighted average of the pre-tax cost of debt and the post-tax cost of equity, adjusted for ex ante expectations if any. The weighting uses notional gearing.

Basis Points ('bps')

Used in finance to express small changes in rates. One basis point is 0.01% or one hundredth of 1%. 50bps is 0.5%.

Benchmarking

The process used to compare a company's performance (eg its costs) to that of best practice or to average levels within the sector.

Bond

A type of debt instrument used by companies and governments to finance their activities. Issuers of bonds usually pay regular cash flow payments (coupons) to bond holders at a pre-specified interest rate and for a fixed period of time.

Business carbon footprint (BCF)

A measure of the total greenhouse gas emissions (in tonnes of CO₂ equivalent) caused directly and indirectly by the reporting company. Direct and indirect emissions sources are categorised into scope 1, 2 and 3 emissions.

The greenhouse gases that may be reported include carbon dioxide (CO₂), methane (CH₄), sulphur hexafluoride (SF₆) and specified kinds of hydro fluorocarbons and perfluorocarbons.

Greenhouse gas emissions are measured as tonnes of carbon dioxide equivalence (tCO₂-e). This means that the amount of a greenhouse gas that a business emits is measured as an equivalent amount of carbon dioxide, which has a global warming potential of one. For example, in 2019–20, one tonne of SF₆ released into the atmosphere will cause the same amount of global warming as 23,500 tonnes of carbon dioxide over the next 100 years⁹². So, one tonne of SF₆ is expressed as 23,500 tonnes of carbon dioxide equivalence, or 23,500 tCO₂-e.

Business Plan Data Template (BPDT)

A set of data templates that the electricity distribution network companies will use when submitting both draft Business Plans to the RIIO-ED2 Challenge Group, and final Business Plans to Ofgem.

Business Plan Incentive (BPI)

A RIIO-2 incentive to encourage companies to submit ambitious Business Plans. Business Plans have been assessed under 4 stages in terms of their cost and quality, with rewards available for Business Plans representing genuine value for money and which provide information that helps Ofgem to set better price controls. Inefficient, low quality plans may be subject to a financial penalty.

⁹² https://www.ghgprotocol.org/sites/default/files/ghgp/Global-Warming-PotentialValues%20%28Feb%2016%202016%29_1.pdf

C

Capital Asset Pricing Model (CAPM)

A theoretical model that describes the relationship between risk and required return of financial securities. The basic idea behind the CAPM is that investors require a return for the level of risk in their investment.

Capital expenditure (capex)

Expenditure on investment in long-term distribution and transmission assets, such as gas pipelines or electricity overhead lines.

Capitalisation policy

The approach that the regulator follows in deciding the percentage of total expenditure added to the RAV (and thus remunerated over time) and the percentage of expenditure remunerated in the year that it is incurred.

Challenge Group (CG)

Ofgem has set up a central RIIO-ED2 Challenge Group that is independently chaired. It provided Ofgem with a public report on companies' Business Plans from the perspective of end consumers.

The Competition and Markets Authority (CMA)

A non-ministerial government department in the UK that considers regulatory references and appeals, conducts in depth inquiries into mergers, markets and aspects of regulation of the major regulated industries.

Competition Proxy Model (CPM)

The CPM is one of the late competition models that may be applied to projects that meet the Criteria for competition during RIIO-2. Under the CPM, Ofgem would utilise relevant benchmarks from other regimes, alongside other market information, to set a project-specific revenue for the incumbent network licensee that we consider would have eventuated from an efficient competitive process for construction and long-term operation (25 years) of a project.

Competitively Appointed Transmission/Distribution Owner (CATO/CADO)

The late CATO regime is one of the late competition models that may be applied to projects that meet the Criteria for competition during RIIO-2. Under late CATO build a 'preliminary works party' (most likely a network company's licensee) would complete all necessary preliminary works for a new, separable and high value

project. Ofgem or another appropriate party would then run a tender to determine a CATO responsible for construction and operation of the project. The CATO would bid a 'tender revenue stream' to construct, own and operate the asset for a long-term operational period (currently expected to be 25 years). CADO is the same premise applied in the distribution sector.

Consumer

Within the regulatory framework we consider consumers to be the end users of gas and electricity, whether for domestic or business use.

Consumer Prices Index (CPI/CPIH)

The CPI is an aggregate measure of changes in the cost of living in the UK. It differs from the RPI in that it does not measure changes in housing costs and mortgage interest repayments - whereas the RPI does. CPI and RPI are calculated using different formulae, and have a number of other subtler differences.

CPIH includes a measure of owner-occupiers' housing costs.

Consumer Value Proposition (CVP)

Consumer Value Proposition is stage 2 of the Business Plan Incentive, where a DNO could bid for reward by demonstrating the additional value its Business Plan will generate for existing and future consumers and consumers in vulnerable situations.

Coordinated Adjustment Mechanism (CAM)

A whole system focused re-opener to protect consumer interests by supporting the reallocation of project revenues and responsibilities to the network best placed to deliver the relevant projects.

Corporation tax

A UK tax levied on a company's profits.

Cost of capital

The cost of capital is the combined cost of debt and cost of equity.

Cost of debt

The effective interest rate that a company pays on its current debt. Ofgem calculates the cost of debt on a pre-tax basis with reference to a trailing average index of debt costs.

Cost of equity

The rate of return on investment that is required by a company's shareholders. The return consists both of dividend and capital gains (ie increases in the share price). Ofgem calculates the cost of equity on a post-tax basis.

Credit rating

An evaluation of a potential borrower's ability to repay debt. Credit ratings are calculated using a number of factors including financial history and current assets and liabilities. There are three major credit rating agencies (Standard and Poor's, Fitch, and Moody's) who use broadly similar credit rating scales, with D being the lowest rating (highest risk) and AAA being the highest rating (negligible risk).

Criteria for late competition

The Criteria for competition is the criteria used to identify projects that may be suitable for late model competition across the electricity transmission and gas sectors. These criteria are as follows:

- new
- separable
- high-value: projects of above £100m expected capital expenditure.

Customer Engagement Group (CEG)

For RIIO-ED2, DNOs are required to set up a Customer Engagement Group. These Groups provided Ofgem with a public report on their views and the companies' Business Plans from the perspective of local stakeholders.

Customer Interruptions (CIs)

A measure of the number of customers, per 100 connected customers, that are interrupted on a DNO's network over the course of a year. For example, 50 customers interrupted out of a total of 100 connected customers would result in a CI of 0.5.

Customer Minutes Lost (CMLs)

A measure of the average number of minutes a customer is without power over the course of a year. For example, if 50 customers are without supply for 10 minutes in a year, out of a total of 100 customers, this would result in a CML of 5.

D

Decarbonisation

In a network price control context, the role of network operators in facilitating the reduction or removal of carbon dioxide emissions from energy and other sectors of the economy, eg transport.

Depreciation

Depreciation is a measure of the consumption, use or wearing out of an asset over the period of its economic life.

Distributed generation (DG)

Any generation connected directly to the local distribution network, as opposed to the transmission network, as well as combined heat and power schemes of any scale.

Distribution Network Operators (DNOs)

A DNO is a company that operates the electricity distribution network, which includes all parts of the network from 132kV down to 230V in England and Wales. In Scotland 132kV is considered to be a part of transmission rather than distribution so their operation is not included in the DNOs' activities.

There are 14 licenced DNOs that are subject to RIIO price controls. These are owned by six different groups.

Distribution System

The system of low voltage electric lines and low pressure pipelines providing for the transfer of electricity and gas within specific regions of GB.

Distribution System Operation (DSO) roles

The development of distribution system operation roles is a live and evolving policy area with various workstreams currently in progress. In general, DSO roles refer to innovative techniques and use of market-based solutions as alternatives to network reinforcement, as well as greater coordination with other network and system operators to achieve efficient outcomes in a whole system context.

Distribution Use of System (DUoS)

DUoS is a cost paid by suppliers to DNOs for the building and maintenance of the local distribution network. Suppliers then pass this DUoS charge on to energy consumers.

E

Economic life

The period over which an asset performs a useful function.

Electricity System Operator (ESO)

The entity responsible for operating the electricity transmission system and for entering into contracts with those who want to connect to and/or use the electricity transmission system. National Grid Electricity System Operator Limited is the electricity system operator in Great Britain.

End-use energy efficiency

A reduction in the amount of energy required to provide equivalent energy services to consumers. For example, loft, cavity wall insulation and double glazing allows a building to use less heating and leads to a reduction in base heat demand.

Environmental Action Plan (EAP)

These are DNO plans to address the impacts of their business and network activities on the environment and set out their commitments to addressing these impacts.

Equity beta

The equity beta measures the covariance of the returns on a stock with the market return. The weaker this covariance, the lower the return that investors would require on that stock.

Equity risk premium

A measure of the expected return, on top of the risk-free rate, that an investor would expect for a portfolio of risk-bearing assets. This captures the non-diversifiable risk that is inherent to the market. Sometimes also referred to as the Market Risk Premium.

Ex ante

Refers to a value or parameter established upfront (eg at the price control review to be used in the price control period ahead).

Ex post

Refers to a value or parameter established after the event (eg following commencement of the price control period).

Exceptional Event

A circumstance beyond a DNO's control which, subject to the relevant thresholds being met/exceeded, results in an adjustment to the DNO's IIS performance.

There are two types of exceptional event: a Severe Weather Exceptional Event (SWEE) and an Other Exceptional Event (OEE).

F

Fast money

Fast money allows network companies to recover a percentage of total expenditure within a one-year period with the rest being capitalised into the RAV (slow money).

Financeability

Financeability relates to licence holders' ability to finance the activities which are the subject of obligations imposed by or under the relevant licence or legislation. Financeability is assessed using a range of different qualitative and quantitative measures, including financial ratios.

Flexibility

The ability to modify generation and/or consumption patterns in reaction to an external signal (such as a change in price, or a message).

Fuel poverty

In England, a household is considered to be fuel poor if it has above-average required fuel costs, in circumstances where, if it were to spend the amount needed to meet its energy needs fully, it would be left with a residual income below the official poverty line. As part of its new Fuel Poverty Strategy for England, the Department for Business, Energy and Industrial Strategy has consulted on amending this definition to refer to households living in a property with an energy efficiency rating of Band D, E, F or G, where disposable income after housing and energy costs is below the poverty line.⁹³

⁹³ <https://www.gov.uk/government/consultations/fuel-poverty-strategy-for-england>

In Wales, a household is considered to be fuel poor if it would have to spend more than 10% of income to maintain a satisfactory heating regime.

In Scotland a household is considered to be fuel poor if, after having paid its housing costs, it would need more than 10% of its remaining net income to pay for its reasonable fuel needs and, having paid for its reasonable fuel needs, its childcare costs and its housing costs, this then leaves the household unable to maintain an acceptable standard of living.

G

Gas Distribution Networks (GDNs)

GDNs transport gas from the National Transmission System to final consumers and to connected system exit points. There are eight network areas managed by four companies that are subject to RIIO price controls.

Gearing

A ratio measuring the extent to which a company is financed through borrowing. Ofgem calculates gearing as the percentage of net debt relative to the RAV.

Gilts

A bond issued by the UK government.

H

Headroom

A term in finance related to borrowing which has different meanings in different contexts. Here we use it to mean a safety margin of a borrower.

High-confidence baseline costs

Costs included in baseline totex allowances or forecasts for which Ofgem has a high level of confidence in its ability to independently set a cost allowance. See also 'Lower-confidence baseline costs'.

I

Indexation

The adjustment of an economic variable so that the variable rises or falls in accordance with index movements (eg inflation indices, bond indices).

Inflation index

This is a measure of the changes in given price levels over time. Common examples are the Retail Prices Index (RPI) the Consumer Prices Index (CPI) and the Consumer Prices Index including housing costs (CPIH), which are all measures of the aggregate change in consumer prices over time.

Interconnector

Equipment used to link electricity or gas systems across borders.

Intermittent generation

Electricity generation technology that produces electricity at irregular and, to an extent, unpredictable intervals, eg wind turbines.

Interruption

A loss of supply lasting three minutes or longer.

Interruptions Incentive Scheme (IIS)

An incentive on DNOs to improve overall the reliability of their networks by reducing the number and duration of interruptions. It sets target levels of performance for DNOs to achieve; rewards are provided for DNOs who beat their targets, and penalties apply for DNOs who fail to achieve their targets.

L

Licence conditions

These are the conditions under which a licensee holds its licence to operate as a gas transporter or electricity transporter and address various detailed matters including requirements to meet certain standards of performance, how the company's allowed revenue is to be calculated and procedures for modifying various documents.

Licence obligations (LO)

This is one of the RIIO building blocks, an output that is contained within the licence conditions of a network company. The Authority has the power to take appropriate enforcement action in the case of a failure to meet these obligations.

Load Related Capex

Capital expenditure on new assets to accommodate changes in the level or pattern of electricity or gas supply and demand.

Low carbon technology (LCT)

Low carbon technology is the term given to technologies that emit low levels of CO₂ emissions, or no net CO₂ emissions. Examples of LCTs include electric vehicles and heat pumps.

Lower-confidence baseline costs

Costs included in baseline totex allowances or forecasts that are not High-confidence baseline costs. See also 'High-confidence baseline costs'.

M

Market to Asset Ratios (MAR)

The MAR represents the ratio between the market enterprise value, ie the market valuation of a company, of a regulated network and its regulatory asset value (RAV).

N

Net Present Value (NPV)

NPV is the discounted sum of future cash flows, whether positive or negative, minus any initial investment.

Net Zero Advisory Group (NZAG)

A group set up but by Ofgem that is intended to strengthen strategic coordination among key government departments and public sector organisations involved in the energy system transition, including around the heat, power, and transport sectors.

Network Access Policy (NAP)

A policy that is designed to facilitate efficient performance and effective liaison between the ESO and the TOs in relation to the planning, management and operation of the National Electricity Transmission System (NETS) for the benefit of consumers.

Network charges

These are charges recovered for the use of network services.

Network Company

A transmission network owner or distribution network operator. The ESO does not fall under this term, see the term Electricity System Operator (ESO).

Network Innovation Allowance

A use-it-or-lose-it allowance to fund small projects focused on the energy system transition and vulnerable consumers.

Network Options Assessment (NOA)

The NOA is the process for assessing options for reinforcing the National Electricity Transmission System (NETS) to meet the requirements that the Electricity System Operator (ESO) finds from its analysis of the Future Energy Scenarios (FES).

Network users

Companies along the gas and electricity supply chain (ie producers and generators, transmission and distribution network companies, and energy suppliers) and consumers.

Non-Load Related Capex

The replacement or refurbishment of assets which are either at the end of their useful life due to their age or condition, or need to be replaced on safety or environmental grounds.

Notional company/business

A hypothetical, but typical, network company.

O

Offshore Transmission Owners (OFTOs)

OFTOs operate and maintain the offshore transmission assets.

Ongoing Efficiency

The reduction in the volume of inputs required to produce a given volume of output - ie the productivity improvements that we consider even the most efficient company is capable of achieving.

Operating Expenditure (opex)

The costs of the day-to-day operation of the network such as staff costs, repairs and maintenance expenditures and overheads.

Outputs

Services, requirements, and deliverables that network companies are funded or incentivised to deliver through the price control. These can be LOs, ODIs or PCDs.

Common outputs apply to all or some of the energy sectors, whereas bespoke outputs apply to one network company.

Output Delivery Incentives (ODIs)

In RIIO-2, ODIs will apply where service quality improvements beyond a level that is funded through base revenues may be in the interests of consumers. ODIs can be financial (ODI-F) or reputational (ODI-R).

P

Pass-through (of costs)

Costs for which companies can vary their annual revenue in line with the actual cost, either because they are outside network companies' control or because they have been subject to separate price control measures.

Price control

The control developed by the regulator to set targets and allowed revenues for network companies. The characteristics and mechanisms are developed by the regulator in the price control review period depending on network company performance over the last control period and predicted expenditure (companies' Business Plans) in the next.

Price Control Deliverables (PCDs)

In RIIO-2, we will use PCDs to capture those outputs that are directly funded through the price control and where the funding provided is not transferrable to a different output or project. The purpose of a PCD will be to ensure the conditions attached to the funding are clear up-front.

R

Real Price Effects (RPEs)

We set price control allowances which can include a general inflation measure (CPIH) and certain price indices that reflect the external pressures on companies' costs. We refer to the difference between CPIH and certain price indices as RPEs.

Regulatory Asset Value (RAV)

The value ascribed by Ofgem to the capital employed in the licensee's regulated business (the 'regulated asset base'). The RAV is calculated by summing an estimate of the initial market value of each licensee's regulated asset base at privatisation and all subsequent allowed additions to it at historical cost, and deducting annual depreciation amounts calculated in accordance with established regulatory methods. These vary between classes of licensee. A deduction is also made in certain cases to reflect the value realised from the disposal of assets comprised in the regulatory asset base. The RAV is indexed to allow for the effects of inflation on the licensee's capital stock.

Regulatory burden

A term used to describe the cost to regulated companies – both monetary and opportunity – of regulation.

Regulatory Instructions and Guidance (RIGs)

A document that is published as part of the price control settlement which sets out further detail on how the price control is to be implemented and how compliance with it will be monitored.

Reinforcement

The installation of new network assets to accommodate changes in the level or pattern of electricity or gas supply and demand.

Re-openers

An Uncertainty Mechanism used in certain limited and pre-defined circumstances, which may amend revenue allowances, outputs and/or delivery dates within the price control period.

Repex

Repex is the Health and Safety Executive enforced gas mains replacement programme.

Research and development (R&D)

Work undertaken in order to increase knowledge, and used to create new processes or technologies that will advance capabilities.

Retail Price Index (RPI)

The RPI is an aggregate measure of changes in the cost of living in the UK. It has a different formula to CPI; for example, it measures changes in housing costs and mortgage interest repayments, whereas the CPI does not.

Return Adjustment Mechanisms (RAMs)

Failsafe mechanisms to mitigate the future risk of companies earning materially higher or lower than expected returns in a changing system.

Return on Regulatory Equity (RoRE)

RoRE is the financial return achieved by shareholders in a licensee during a price control period from its actual performance under the price control. RoRE is calculated post-tax and is estimated using certain regulatory assumptions, such as the assumed gearing ratio of the companies, to ensure comparability across the sector. We use a mix of actual and forecast performance to calculate five-year average returns. These returns may not equal the actual returns seen by shareholders.

Revenue Driver

An Uncertainty Mechanism used to adjust allowed revenue during the price control if specific measurable events occurs. Revenue drivers are used by Ofgem to increase the accuracy of the revenue allowances. See also 'volume driver'.

RIIO (Revenue = Incentives + Innovation + Outputs)

Ofgem's regulatory framework, stemming from the conclusions of the RPI-X@20 project. It builds on the success of the previous RPI-X regime, but better meets the investment and innovation challenge by placing much more emphasis on incentives to drive the innovation needed to deliver a sustainable energy network at value for money to existing and future consumers.

RIIO-Electricity Distribution Price Control Review 1 (RIIO-ED1)

The price control applied to the electricity distribution network operators. It runs from 1 April 2015 to 31 March 2023.

RIIO-Gas Distribution Price Control Review 1 (RIIO-GD1)

The price control review applied to the gas distribution network operators. It runs from 1 April 2013 to 31 March 2021.

RIIO-Transmission Price Control Review 1 (RIIO-T1)

The price control review applied to the electricity and gas transmission network operators. It runs from 1 April 2013 to 31 March 2021.

Ring-fence

The Ring Fence Conditions in gas and electricity network operator licences provide assurance that network operators always have the financial and operational resources necessary to fulfil their obligations under legislation and their licences.

Risk-free rate

The rate of return that an investor would expect to earn on a riskless asset. Typically, government-issued securities are considered the best available indicator of the risk-free rate due to the extremely low likelihood of the government defaulting on its obligations.

RPI-X

The form of price control applied to regulated energy network companies before RIIO. Each company was given a revenue allowance in the first year of the control period. The price control then specified that in each subsequent year the allowance would move by 'X' per cent in real terms.

RPI-X@20

Ofgem's comprehensive review of how we regulate energy network companies, announced in March 2008.⁹⁴ Its conclusions, published in October 2010, resulted in the implementation of a new regulatory framework, known as the RIIO model.

S

Scope 1 emissions

Direct emissions from sources owned or controlled by the reporting company that release emissions straight into the atmosphere. Examples of scope 1 emissions include emissions from combustion in owned or controlled boilers, furnaces, vehicles; emissions from chemical production in owned or controlled process equipment.

⁹⁴ <https://www.ofgem.gov.uk/network-regulation-riio-model/current-network-price-controls-riio-1/backgroundrpi-x20-review>

Scope 2 emissions

Indirect emissions being released into the atmosphere associated with the reporting company's consumption of purchased electricity, heat, steam and cooling. These are indirect emissions that are a consequence of the reporting company's activities but which occur at sources they do not own or control. This includes losses of electricity for electricity transmission and distribution companies.

Scope 3 emissions

Other indirect emissions that occur that are a consequence of the reporting company's actions, which occur at sources they do not own or control and which are not classed as scope 2 emissions. Examples of scope 3 emissions are business travel by means not owned or controlled by the reporting company, waste disposal, or purchased materials or fuels.

Short interruption

A loss of supply lasting less than three minutes.

Slow money

Slow money is where costs are added to the RAV and therefore revenues are recovered slowly (eg over 20 years) from both existing and future consumers.

Special Purpose Vehicle (SPV) model

The SPV model is one of the late competition models that may be applied to projects that meet the Criteria for competition during RIIO-2. Under the SPV model, the incumbent network licensee would run a tender to appoint an SPV to finance, deliver and operate a new, separable and high value project on the licensee's behalf through a contract in effect for a specified revenue period. The allowed revenue for delivering the project would be set over the period of its construction and a long-term operational period (currently expected to be 25 years).

Storage (electricity)

Storage refers to any mechanism that can store energy, which has been converted into electricity. This can be primary (super-conducting and capacitor technologies), mechanical (pumped hydro, compressed air, flywheels) and electrochemical (batteries).

Strategic Innovation Fund (SIF)

A funding mechanism for strategic energy system transition innovation projects.

Supplier

Any person authorised to supply gas and/or electricity by virtue of a Gas Supply Licence and/or Electricity Supply Licence.

Supply chain

Refers to all the parties involved in the delivery of electricity and gas to the final consumer - from electricity generators and gas shippers, through to electricity and gas suppliers.

Sustainable energy sector

A sustainable energy sector is one that promotes security of supply over time; delivers a low carbon economy and associated environmental targets; and delivers related social objectives (eg fuel poverty targets).

System Operator (SO)

The SO is the entity responsible for operating the transmission system and for entering into contracts with those who want to connect to the transmission system. In relation to electricity and gas, this role is performed by National Grid.

T

Third party

Within the innovation context, third party refers to any person other than network companies. It may include, for example, private companies, academics, small and medium-sized enterprises, and trade bodies. It is often used interchangeably with non-network company.

Total expenditure (totex)

Totex includes both capital expenditure (capex) and operating expenditure (opex). It also includes replacement expenditure (repex) in gas distribution. Totex is made up of fast money and slow money.

Total Market Return (TMR)

The TMR is a measure of return that equity investors expect for the market-average level of risk.

Transmission Owner (TO)

Means, in the electricity sector, National Grid Electricity Transmission, Scottish Power Transmission or Scottish Hydro Electric Transmission and, in the gas sector, National Grid Gas Transmission.

Transmission system

The system of high voltage electric lines and high pressure pipelines providing for the bulk transfer of electricity and gas across GB.

U

Uncertainty Mechanisms (UMs)

Uncertainty mechanisms allow changes to the base revenue during the price control period to reflect significant cost changes that are expected to be outside the company's control. Common UMs apply to all or some of the energy sectors, whereas bespoke UMs apply to one network company.

V

Value of Lost Load

A measure of domestic and SME customers' value of the security of supply.

Volume driver

An Uncertainty Mechanism allowing revenue to vary as a function of a volume measure (eg number of new connections).

W

Whole system solutions

Solutions arising from energy network companies and system operators coordinating effectively, between each other and with broader areas, which deliver value for consumers.