Consultation

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Consultation on amendments to BP2 ESO Roles Guidance

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Contact:	Christopher Statham
Team:	ESO Regulation
Telephone:	020 7901 7000
Email:	ESOperformance@ofgem.gov.uk

The electricity system operator (ESO) has a central role in our energy system. It performs a number of important functions from the real time operation of the system, through to market development, managing connections and advising on network investment. We regulate the ESO to help ensure the actions it takes align with the interests of consumers. The ESO's regulatory and incentives framework aims to place wider system and consumer interests at the heart of its decision-making, create transparency around the ESO's performance and make the ESO more clearly accountable to its stakeholders.

This Guidance Document provides further explanation of the ESO's roles and the associated expectations, which underpin the ESO's regulatory framework. The purpose is to help to align expectations between the ESO, Ofgem and stakeholders, support the enforceability of the ESO's obligations and create a more transparent framework overall. Under the ESO's regulatory and incentives framework, the ESO must also provide evidence of how it has performed in relation to its roles.

This Guidance Document (version 7.0) builds on the previous Guidance Document (version 5.0). **The ESO Roles Guidance (version 7.0) will come into effect after the consultation process has been completed and apply from approval onwards until stated otherwise.**

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Version history

We first published this guidance in July 2017 and made changes to Role 1 before publishing again in December 2017. We have since made a number of small changes in this iteration. The table below summarises the changes made to the ESO Roles Guidance:

Version	Date published	To be applied	Summary of changes
1.0[1]	July 2017	July 2017 – March 2018	N/A
Consultation on changes[2]	December 2017	N/A	• Expanding Role 1 to better reflect the ESO's system operability role.
2.0[3]	February 2018	April 2018 - March 2019	• Clarifications on the status and purpose of the roles and principles. • Clarifications on how the roles and principles will be updated going forward. • Clarification to Principle 4 to include European Network Codes.
3.0[4]	March 2019	April 2019 onwards	• Clarifications and updates to introductory text. • Rewording the title of Principle 2. • Clarifications to supporting principle guidance for Principles 2, 3, 5, 6 and 7.
Consultation on change[5]	January 2020	N/A	• Streamlining the roles framework by moving from 4 to 3 roles.

[1] Available at: https://www.ofgem.gov.uk/system/files/docs/2017/07/future_so_reg_framework_july_2017_working_paper.pdf

[2] Available at: https://www.ofgem.gov.uk/system/files/docs/2017/12/eso_roles_and_principles_appendix.pdf

[3] Available at: https://www.ofgem.gov.uk/system/files/docs/2018/02/eso_roles_and_principles.pdf

[4] Available at: https://www.ofgem.gov.uk/system/files/docs/2019/03/eso_roles_and_principles_guidance_2019-20.pdf

[5] Available at: https://www.ofgem.gov.uk/publications-and-updates/call-input-2020-21-eso-regulatory-and-incentives-framework

4.0[6]	6 March 2020	1 April 2020 – 30 March 2021	• Streamlining the roles framework by moving from 4 to 3 roles. • New text on competition and FES.
Consultation on change[7]	September 2020 & December 2020	N/A	• Updated guidance to align with start of RIIO-2 price control.
5.0[8]	17 March 2020	1 April 2021	• Updated guidance to align with start of RIIO-2 price control.
Consultation on change	31 November 2022	N/A	• Updated guidance to align with the ESO's second business plan cycle[9] during the RIIO-2 price control.
6.0[10]	28 March 2023	1 April 2023	• Updated guidance to align with the ESO's second business plan cycle during the RIIO-2 price control.
Consultation on Change	25 May 2023	N/A	• Updated guidance to better align our expectations with the ESO's current role in industry.

[6] Available at: https://www.ofgem.gov.uk/system/files/docs/2020/03/eso_roles_and_principles_guidance_2020-21.pdf
[7] Available at: https://www.ofgem.gov.uk/publications-and-updates/consultation-eso-roles-guidance
[8] Available at: https://www.ofgem.gov.uk/sites/default/files/docs/2021/03/eso_roles_guidance_2021-23_1.pdf
[9] The business plan cycle is the period for which the business plan is applicable. The first business plan cycle (BP1) covers the incentive scheme starting on 1 April 2021 and ending on 31 March 2023. The second business plan cycle (BP2) covers the incentive scheme starting on 1 April 2023 and ending on 31 March 2025.
[10] Available at: https://www.ofgem.gov.uk/sites/default/files/2023-03/ESO%20Roles%20Guidance%202023-2025.pdf

ESO roles

Introduction

1.1. The ESO Roles Guidance provides further explanation of the ESO's roles and the associated expectations, which underpin the ESO's regulatory framework. The roles are a foundation of the ESO's regulatory and incentives framework. This guidance document outlines our current view of the activities and outcomes expected from the ESO in order to maintain an economic, efficient, and co-ordinated system. The ESO's roles were first introduced as part of our July 2017 Working Paper on the ESO's Future Regulatory Framework.[11] This document contains updated guidance (version 6.0). It builds on the previous guidance (version 5.0[12]) that was issued in March 2021 and our latest ESO RIIO-2 policy. This version of the ESO Roles Guidance (version 6.0) will continue to underpin the ESO's regulatory and incentives framework from April 2023 onwards.

1.2. Alongside the roles are the performance expectations, behaviours and the predominant licence conditions that they relate to. The guidance has been drafted with the intention that it should help to outline the types of activities that we would consider to be meeting expectations, or exceeding expectations with regard to the ESO's licence obligations. The ESO's licence conditions underpin the roles and remain the legal obligations that the ESO must fulfil.

1.3. In the rest of this chapter we set out further details of the three roles we have defined for the ESO. Throughout all of these roles are the cross-cutting themes of ensuring the ESO provides most value to consumers e.g. protecting consumers from undue costs, enabling secure cost-effective decarbonisation, being a trusted source of information and insight, transparency in its actions, and high levels of engagement with industry and other network operators. Although we have structured our incentive scheme around three overarching roles for the ESO, we acknowledge that, in reality, the roles have a degree of overlap and interaction.

[11] The original guidance can be found in our July 2017 Working Paper on the future regulatory framework: https://www.ofgem.gov.uk/ofgem-publications/118930

[12] Version 5.0 of the ESO Roles Guidance: eso_roles_guidance_2021-23_1.pdf

Status and purpose of the ESO Roles Guidance

1.4. This document provides updated guidance on the ESO's roles and the behaviours we expect to see when the ESO fulfils its roles. This guidance should be considered as a non-exhaustive list of examples of how we currently envisage the ESO should fulfil its roles when undertaking its day-to-day system operator functions. The roles are underpinned by the ESO's binding licence obligations – particularly the Standard Licence Condition (SLC) C28 (Functions for an efficient, co-ordinated and economic electricity system operator)[13], which sets out our expectations of an economic, efficient and co-ordinated ESO. We've also structured the guidance to show what we expect to see as evidence of the ESO's compliance with its obligations under paragraph 4 of (SLC) C28.

1.5. **This version of the ESO's Roles Guidance will come into effect after the consultation process has been completed and apply from approval onwards until stated otherwise.** Before then, the version of this guidance published in March 2023 will continue to have effect, and compliance with it may be taken into account from the date of its issue.

1.6. In the event that the ESO does not meet its licence obligations, it may be found to be non-compliant. This Guidance Document (in all its versions) will inform any future decisions taken by the Authority when considering possible investigation and enforcement issues arising out of non-compliance with the relevant licence obligations[14].

1.7. In the event of formal enforcement proceedings finding a breach of one or more relevant licence conditions, there may subsequently be made an order for payment of a financial penalty and/or consumer redress. The outcome of such procedures would be made publicly available.

[13] Our decision on the ESO's RIIO-2 licence: https://www.ofgem.gov.uk/publications-and-updates/decision-proposed-modifications-riio-2-transmission-gas-distribution-and-electricity-system-operator-licences.

[14] All decisions taken by the Authority relating to enforcement matters are subject to its Enforcement Guidelines and Penalty Policy.

Updating the ESO's Roles Guidance

1.8. We recognise that the transition in the energy system may mean that this guidance may need to change in future. We will therefore keep this under review. Where we believe changes are needed, we would consult with impacted parties, including the ESO.

1.9. For the purposes of the ESO incentives process, this guidance will only apply from the start of the 2023-24 regulatory year, and we will not use the updated changes to retrospectively assess the ESO's performance as part of the incentives scheme in RIIO-1.

Role 1: Control centre operations

1.10. Balancing the National Electricity Transmission System (NETS) in a safe, reliable and efficient way is a core function for the ESO. The Electricity National Control Centre (ENCC) performs the day-to-day, short-term (within day and day-ahead) operational activities for the NETS.

1.11. The ENCC carries out real-time system balancing by contracting and trading with energy market participants (e.g. generators, storage providers and third-party providers of aggregated flexibility). This is achieved primarily via the Balancing Mechanism (BM) and utilisation of contracted balancing services. The ENCC also requests that transmission network owners (TOs) optimise physical network configurations using network assets, e.g. flexing voltage tolerances or amending specific circuit ratings or planned outages and maintenance.

1.12. Alongside the real-time operation of the NETS, other key control centre functions include:

- Coordinating with other network operators on operational decisions and outage changes and network planning out to one-year;
- Short-term energy forecasting;
- Managing and sharing system data and information; and
- Restoration and emergency response (to system instability events).

1.13. Regarding data and digitalisation, the ESO is responsible for providing information to market participants to facilitate informed decision-making, and for ensuring efficient operation of the system. The ESO is expected to do this transparently and in a user-friendly manner.

Activity 1a: System operation

Meets expectations predominantly underpinned by licence conditions:
C28 4(a) taking the most efficient actions to operate the national electricity transmission system based on all of the relevant information the licensee had available at the time;
C28 4(b) taking into account the impact such actions have on competition in the wholesale electricity market and on economic, efficient and coordinated operation and development of the total system;
C28 4(c) considering the impact any action would have on the total system;
C28 4(d) optimising the timing of transmission outages under the outage plan on the national electricity transmission system;
C28 4(h) procuring balancing services to ensure operational security;
C28 4(j) monitoring balancing services markets for potential breaches of the grid code, investigating where necessary and raising concerns to Ofgem where appropriate;
C28 4(l) facilitating an economic and efficient transition to a zero carbon energy system; and
Special Condition 2.11. Digitalisation.

Output	Meets expectations	Exceeds expectations
Immediate and ongoing		
Balancing efficiently	• Balancing economically and efficiently, in line with the 'meets expectations' benchmark of performance metric 1A (Balancing costs). Including by: ➢ taking actions that minimise consumer costs irrespective of provider type or size. ➢ planning ahead to accurately forecast reserve, foot room requirements and system constraints.	• Implement a comprehensive plan to proactively mitigate any projected material increases to balancing costs, in line with the 'exceeds expectations' benchmark of performance metric 1A (Balancing costs). Including by: ➢ acting early and proactively to reduce drivers of higher costs. ➢ continually refreshing and upgrading control room processes to deliver a demonstrable improvement in

	➢ using the full range of available balancing services and options (e.g. from both market parties and network companies).	the accuracy of forecasting contingency needs and system constraints (evidenced, for example, through robust back-casting). ➢ proactively exploring, developing and utilising improvements to existing balancing services and new innovative types of services.
Maintaining system frequency and voltage	• Maintain system frequency and voltage within statutory limits (including the Security and Quality of Supply Standard (SQSS)). • Demonstrably minimise any increases in the number of instances where the system frequency is outside operational limits but within statutory limits (for example, excursions beyond 0.3Hz) or transparently demonstrate why tolerating increases in these excursions strikes an appropriate between security and cost-efficiency. • Respond swiftly to any event (expected or unexpected), on the NETS or otherwise, to secure stable frequency across the NETS. • Assess existing, emerging, and potential risks (including risks materialising from distribution networks) to the maintenance of stable frequency and security of supply across the NETS. Managing those risks	• Maintain stable system frequency and maintain or decrease the number of instances where the system frequency is outside operational limits but within statutory limits (for example, excursions between 0.3Hz and 0.5Hz). • Develop innovative operability solutions to unexpected events that maintain system security and minimise costs in a fair and transparent way.

	appropriately to minimise associated costs and occurrence of unexpected events.	
Facilitating electricity security of supply	Support Ofgem, Government, and industry as a technical expert by: • Proactively identifying, assessing and communicating existing, emerging, and potential future risks to electricity security of supply through continuous assessment, horizon scanning and industry engagement. For example by developing adequate methodologies and relevant scenarios informed by energy market developments and intelligence. • Managing those risks appropriately and transparently to minimise associated costs and maintain safe operation, including (but not limited to) by: ➢ Improving forecasting of and situational awareness to those risks in terms of scope, accuracy and timeliness. ➢ Improving existing and developing new solutions that maintain, in so far as reasonably practicable, electricity security of supply whilst being cost-effective, and enhancing industry participation in these tools.	•

	• Establishing and maintaining strategic working-level relationships with all interconnected TSOs. • Supporting Government and Ofgem in delivering relevant legislative or regulatory changes by providing expert advice.	
Making trade-offs across time horizons	• Consider the appropriate trade-offs between short-term costs and longer-term market developments in the interests of consumers now and in the future.	• Evidence of new processes, or innovative balancing actions, that reduce costs (compared to the counterfactual) in the short-term and facilitate market developments that provide longer-term cost reductions.
Ensuring future operability	• Development of plans to ensure known/expected future operability challenges can be managed once the challenges materialise (for example through the continued production of the System Operability Framework and Operability Strategy reports[15]). • Produce and transparently share an assessment of the most material risks to system operability.	• Proactive testing of plans to manage future operability challenges and evidence of taking necessary steps to reduce the severity before these challenges materialise. • Produce and transparently share an assessment of the risks to system operability, with consideration of how these are likely to develop in future and identify mitigation measures.
Coordinating with other network operators	• Coordinate with other network/system operators to optimise the use of balancing resources.	• Coordinate with DNOs through ensuring ESO dispatch of DER and DNO network management

[15] More information about the Operability Strategy reports can be found at the following address: https://www.nationalgrideso.com/news/operability-strategy-report-our-insight-zero-carbon-electricity-system

	Including by: ➢ identifying and progressing changes to outage plans in order to minimise constraint costs (e.g. through the effective use of System Operator Transmission Owner Code (STC) processes), ensuring the costs put forward by TOs are reasonable. ➢ exchanging information and data with distribution network operators (DNOs) to ensure efficient dispatch of distributed energy resources (DER).	actions deliver whole system[16] benefits. • Facilitate the development and implementation of innovative services from network operators in order to achieve significant reductions to overall operational costs (compared to the counterfactual) across the whole system. Including by: ➢ Providing network operators with a high degree of visibility of the transmission constraint cost savings that can be achieved through enhanced network services and conducting robust analysis on any services offered. ➢ Developing improved, integrated systems and processes that optimise whole system dispatch decisions.
Minimising outage changes caused by error	• A small proportion of short notice changes to planned outages are caused by ESO error, in line with the 'meets expectations' benchmark of performance metric 1D (Short notice changes to planned outages).	• No or only a very small proportion of short notice changes to planned outages are caused by ESO error, in line with the 'exceeds expectations' benchmark of performance metric 1D (Short notice changes to planned outages).

[16] Also referred to as 'total system' in standard licence condition C28 for RIIO-2. For the purposes of this ESO Roles Guidance, Whole System means the national electricity transmission system and the distribution systems of all authorised electricity operators which are located in the national electricity transmission system operator area.

Oversight of balancing services markets	• Effective systems for proactive surveillance of balancing market activity and monitoring the quality / accuracy of information received from market participants. Effective engagement with Ofgem on any concerns that come to light. • Ensures balancing actions and related processes and communications do not create significant inefficiencies and distortions in the balancing or wholesale markets or create perverse incentives with respect to market participants' behaviour or decision making.	• In-depth and independent market surveillance and data analytics to anticipate credible risk of anticompetitive behaviours or actions that may undermine wholesale energy market integrity. Swift and comprehensive engagement with Ofgem to support compliance investigations.
Maintaining effective and reliable IT systems	• Continual and responsive development of IT systems. • High IT system availability and reliability compared to historical averages, with reduced unplanned outages from RIIO-1. • Timely completion of ongoing and incremental upgrades to IT systems delayed from RIIO-1. • Regular engagement with industry on design of ESO IT systems.	• Proactive development of innovative IT systems capable of adapting to future operational requirements. • High IT system availability and reliability compared to historical averages, with progressive step change reductions in unplanned outages from RIIO-1. • Proactive engagement with industry on all types of potential IT system solutions. Acting on stakeholder feedback, and any burdens imposed on stakeholders, to inform future IT development.
By the end of RIIO-2		

Operating the network carbon free	• In a majority of settlement periods where the electricity markets deliver a carbon free solution, the ESO can efficiently and economically operate the system carbon free (i.e all ESO actions are also carbon-free). To underpin this ➢ ESO has replaced legacy IT systems with systems that are fit for purpose in the future energy system, shaped through good engagement with industry. ➢ The ESO's control centre engineers have fit for purpose training and simulation tools that enable them to efficiently operate a zero carbon network in most situations.	• In all settlement periods where the electricity markets deliver a carbon free solution, the ESO can efficiently and economically operate the system carbon free (i.e all ESO actions are also carbon-free). To underpin this: ➢ ESO has engaged extensively with all types of energy industry stakeholders and IT solution providers to deliver high quality, flexible and future proofed IT systems. These are capable of being updated ahead of system developments and interoperating with the digital systems of other related organisations in the sector and in other sectors. ➢ The ESO's training and simulation tools equip highly skilled control room engineers to achieve the outcomes and benefits expected in the RIIO-2 plan.
Coordinating with other network operators	• ESO ensures its processes and systems facilitate close operational coordination between different electricity network operators. To underpin this:	• ESO has proactively led the development and implementation of frameworks and processes that ensure the optimal real time operation of the whole energy system. To underpin this:

	➢ ESO exchanges all necessary real-time operational information with other network operators. ➢ ESO has regularly engaged with DNOs to inform DNOs' operability plans and process development and, where appropriate, has adapted its own plans and processes in light of DNO insights.	➢ ESO IT systems capable of interoperating with the systems of other related organisations in the sector and in other sectors wherever this would provide overall benefit. ➢ The ESO has shared guidance and expertise (e.g. training) to DNOs to ensure common practices (e.g. through joint simulator training) are in place that maximise whole system benefits and facilitate seamless and efficient system operation across voltage levels.

Activity 1b: System Restoration

Meets expectations predominantly underpinned by licence conditions:
C28 4(a) taking the most efficient actions to operate the national electricity transmission system based on all of the relevant information the licensee had available at the time;
C28 4(b) taking into account the impact such actions have on competition in the wholesale electricity market and on economic, efficient and coordinated operation and development of the total system;
C28 4(c) considering the impact any action would have on the total system;
C28 4(e) publishing easily accessible information which the licensee holds to generate value for consumers and stakeholders, including but not limited, to ensuring information services are designed to meet the needs of the service users;
C28 4(h) procuring balancing services to ensure operational security;
C28 4(i) ensuring the effective and non-discriminatory participation of all qualified market participants in the provision of balancing services, including not unduly restricting new and existing service providers from competing for the provision of such services;
C28 4(k) anticipating future national electricity transmission system requirements by using and developing competitive approaches to procuring balancing services wherever this is in the best interests of current and future electricity consumers in Great Britain; and
C28 4(l) facilitating an economic and efficient transition to a zero carbon energy system.

Output	Meets expectations	Exceeds expectations
Immediate and ongoing		
Restoration plans and tools	• Maintain fully-tested plans and processes to support incident management and system restoration.	• Develops and progresses future restoration plans and tools that can continuously adapt to network changes in advance of, and during, real time system operation or system restoration.
Restoration policy	• Publish an assurance framework for the system restoration standard in line with Special Condition 2.2 of the ESO's licence.	• Activities that lead, organise, convene and build consensus with Government, regulators and industry to drive improvements to the system restoration strategy for the future.

	• Timely implementation of the system restoration standard in line with obligations set by Government. • Publish an ex-post annual report detailing the total costs that the ESO has incurred whilst procuring system restoration services during the year as part of the C16 process. • Build consensus with Government, regulators and industry to drive improvements to the system restoration strategy for the future. • Determine an appropriate implementation framework to enable a system restoration standard to be met in a fair and non-discriminatory way. • Demonstrable awareness and understanding of risks to restoration processes outside of its current modelling capabilities. Risks are raised with relevant stakeholders rapidly and transparently.	• High quality implementation of the system restoration standard by leading, organising, and building consensus with industry on the most appropriate implementation framework that enables the system restoration standard to be met, whilst satisfying the majority of stakeholders and ensuring maximum value for money for consumers. • Development of a holistic plan for managing all risks and identification of new risks to system restoration, providing surety for the Authority and Government in the ESO's system restoration strategy.
Restoration services procurement	• Provide accessible information to market participants on system restoration service requirements, costs and current and future needs.	• Actively maximises the ability for non-traditional sources of generation at all voltage levels to participate in restoration plans (and any restoration activities) to minimise restoration times in Great Britain (GB). • Achieves a significant continual, and overall, increase in the level of restoration services that are

	• Full implementation of RIIO-1 commitments in the Product Roadmap for Restoration[17]. • Conclude the ESO's Distributed ReStart project[18] to establish a pathway to enabling the full participation of DER in restoration services, with evidence of findings being included in BAU processes. • Achieves a continual increase in the level of restoration services that are competitively procured, that are consistent with meet expectations benchmarks performance metric 2A (Competitive procurement).	competitively procured, that are consistent with exceed expectations benchmarks performance metric 2A (Competitive procurement).
By the end of RIIO-2		
Restoration plans and tools	• Plans and processes to support incident management and system restoration that are fit for purpose for a zero carbon electricity system.	• ESO has dynamic restoration tools that are able to advise control centre engineers on the best route for restoration at any point, enabling them to manage potentially hundreds of restoration providers, and demonstrably reducing potential restoration times. To underpin this:

[17] The ESO's Roadmap for Restoration can be found at the following address: https://www.nationalgrideso.com/sites/eso/files/documents/National%20Grid%20SO%20Product%20Roadmap%20for%20Restoration.pdf

[18] More information about the project can be found at the following address: https://www.nationalgrideso.com/future-energy/projects/distributed-restart

		➢ Successful development and implementation of the necessary IT to enable such a decision-making tool, in close collaboration with other relevant parties.
Restoration service procurement	• Competitively procure the majority of system restoration services. • Ensures that procurement is fair and accessible to all market participants and technologies at transmission and distribution voltage levels if they can meet the technical criteria.	• Develop liquid markets for system restoration services such that all providers, from transmission and distribution voltage levels, can be procured competitively at an economic price in all restoration zones if they can meet the technical criteria.

Activity 1c: Transparency, data and forecasting

Meets expectations predominantly underpinned by licence conditions:
C28 4(e) publishing easily accessible information which the licensee holds to generate value for consumers and stakeholders, including but not limited to ensuring information services are designed to meet the needs of the service users;
C28 4(g) producing and publishing accurate and unbiased forecasts;
C28 4(l) facilitating an economic and efficient transition to a zero-carbon energy system;
C28 4(p) exchanging all necessary information and co-ordinating with holders of a distribution licence in so far as is necessary to ensure the optimal utilisation of resources, to ensure the economic and efficient operation of the system and to facilitate market development; and
Special Condition 2.11. Digitalisation.

Output	Meets expectations	Exceeds expectations
Immediate and ongoing		
Provision of market information	• The ESO ensures that information it publishes is well-organised, accessible and shared proactively. • Provide user-friendly, comprehensive and accurate information, including transparency on control room decision making. • Develop processes to identify and meet stakeholder needs. • Consistent messaging across documentation and stakeholder engagement such that there are no contradictions or omissions that lead to misunderstanding • Engage market data participants/data users to establish needs and data value and publish outcomes	• Proactive information provision that shares valuable information to market participants and network companies before this is requested, and ensures they have a high degree of understanding of the ESO's operations and decision-making. • Develop mechanism to share real time system state data in accordance with stakeholder needs

Driving the energy sector digitalisation	• Make available a Digitalisation Strategy and Action Plan, with the Digitalisation Strategy and Action Plan[19] updated at least once every two years, and the Action Plan updated at least once every six months. Demonstrate progress against that plan and how it is driven by the needs of stakeholders and market expectations, such as the recommendations made by the Energy Data Task Force.[20] • Collate and publish feedback on ESO DSAP. • Identify and progress code modifications to enable digitisation. • Develop and publish a digital dashboard showing progress against digital actions	• In addition to the required actions to meet expectations the ESO will: ➢ Set an example to the whole sector for the pace of change and progress made delivering the Energy Data Task Force recommendations and beyond (e.g. by demonstrating that the ESO is ahead of other parties in delivering those recommendations, and has actively encouraged broader up-take). ➢ Participate in and lead cross-sectoral initiatives for UK infrastructure and Net Zero, such as the Centre for Digital Built Britain's Information Management Framework.[21]
Using and exchanging data	• The ESO ensures that its data is well-organised, accessible and shared proactively (where data collected by one team can benefit and inform the work of another team) by its teams within the organisation.	• ESO collaborates actively with DNOs to promote data sharing solutions and platforms that maximise consumer benefits. Collaboration should inform the development of DNO RIIO-2 Business Plans to ensure future platforms are fully interoperable.

[19] More information about the Digitalisation Strategy and Action Plan can be found at the following address: https://www.ofgem.gov.uk/publications-and-updates/early-draft-digitalisation-strategy-and-action-plan-guidance-available

[20] More information about the Energy Data Taskforce can be found at the following address: https://www.gov.uk/government/groups/energy-data-taskforce

[21] More information can be found at the following address: https://www.cdbb.cam.ac.uk/news/pathway-towards-IMF

	• Use of data by the ESO complies with the expectations of Data Best Practice, such as making available robust and reliable processes for exchanging operational information with DNOs. • Treating energy system data as open for all to use by default,[22] only restricting access in accordance with a published data triage policy where there is evidence of a good reason to do so (e.g. if the data contains sensitive information). The rationale for withholding information is made clear to industry. • Creates a data portal user group and publishes material associated with groups.	• Making data (and its associated methods for data processing) widely available and easy to work with in open collaboration to give market participants opportunity for greater contributions to the decision-making processes related to system operation. • Treating energy system data, processing methods and algorithms as open to all by default. If data is withheld, the reason for doing so should be published for transparency. • Develops and publishes metadata standards to enable the discovery of data. • Creates reference renders for market data information to create visualisations for users without the necessary tools.
Forecasting	• Provide accurate forecasts with continuous incremental improvements to forecasting accuracy, in line with the 'meets expectations' benchmark in performance metrics 1B (Demand forecasting) and 1C (Wind generation forecasting).	• Step-change improvements in forecasting accuracy each year through improvements to forecasting models and processes, in line with the 'exceeds expectations' benchmark in performance metrics 1B (Demand forecasting) and 1C (Wind generation forecasting).

[22] The Data Triage programme would be a good starting point to contribute towards this expectation, including publishing data triage process, although we expect the ESO to explore and implement other ways in which it can make energy system data open by default without waiting for stakeholders to request it.

	• Full implementation of Energy Forecasting Project Roadmap commitments for 2018-21.[23] • Forecasts are accurate at both national and regional level and methodologies used are regularly updated to reflect changes at each Grid Supply Point (GSP). • Model and understand developments on the distribution system which impact transmission-level demand.	• Dynamic forecasting processes which utilise machine learning to ensure forecasts are highly accurate for each half hour period, at both the national and regional level. • Undertakes activities that lead, organise, convene and build consensus to ensure all network operators are sharing and using consistent information to create accurate, whole system forecasts. • Publish forecasting models where practicable.
By the end of RIIO-2		
Data use and exchange	• ESO has implemented a data and analytics platform (and an associated data portal) which achieves most of the outcomes in its RIIO-2 Business Plan but may still require some additional functionality to achieve all planned outcomes.	• ESO has integrated all tools and systems within its data and analytics platform, achieving all outcomes set out in its RIIO-2 Business Plan, and receiving highly positive stakeholder feedback • Data and analytics platform enables the seamless real time exchange of information with DNOs and other system users to enable efficient whole system operation.

[23] The ESO's Energy Forecasting Project Roadmap is available at the following address: https://www.nationalgrideso.com/document/145941/download

Role 2: Market development and transactions

1.14. The ESO operates the balancing mechanism and develops and procures a number of additional balancing services to balance and operate the system in a safe, reliable and efficient way. The ESO's regulatory framework for procuring balancing services provides the ESO with significant scope and flexibility in the design of these services. The design of these services and approach to procurement are important as these can have significant impacts on the revenues available to different providers of these services and the ability for new entrants to compete with existing providers. This can also have a further impact upon short-term price signals and revenues in the wholesale traded electricity markets.

1.15. The ESO also has a number of additional roles related to market rules. The ESO administers the Connection and Use of System Code (CUSC), the Grid Code, the SO-TO Code (STC), and the Security and Quality of Supply Standard (SQSS). It is also a party to the Balancing and Settlement Code (BSC) and the Distribution Code. The ESO is able to propose changes to these codes, provide its expertise and analysis to aid industry discussions, and influence the final recommendations that go to the Authority. It is also the Electricity Market Reform (EMR) delivery body and has transmission system operator (TSO) responsibilities related to implementing European network codes and regulations.

Activity 2a: Market Design

Meets expectations predominantly underpinned by licence conditions:
C16 (2) accounting for price and technical differences, no discrimination between participants in procurement or use of balancing services
C28 4(h) procuring balancing services to ensure operational security;
C28 4(i) ensuring the effective and non-discriminatory participation of all qualified market participants in the provision of balancing services, including not unduly restricting new and existing service providers from competing for the provision of such services;
C28 4(k) anticipating future national electricity transmission system requirements by using and developing competitive approaches to procuring balancing services wherever this is in the best interests of current and future electricity consumers in Great Britain;
C28 4(l) facilitating an economic and efficient transition to a zero carbon energy system;
C28 4(n) co-ordinating and cooperating with transmission owners and holders of a distribution licence to identify actions and processes that advance the efficient and economic operation of the networks; and
C28 4(p) exchanging all necessary information and co-ordinating with holders of a distribution licence in so far as is necessary to ensure the optimal utilisation of resources, to ensure the economic and efficient operation of the system and to facilitate market development.

Output	Meets expectations	Exceeds expectations
Immediate and ongoing		
Competitive, market-based procurement	• Procurement of balancing services through market-based competitive approaches, consistent with the 'meets expectations' benchmark in performance metric 2Ai (Phase out of non-competitive balancing services).	• Procurement of balancing services through market-based competitive approaches, consistent with the 'exceeds expectations' benchmark in performance metric 2Ai (Phase out of non-competitive balancing services).
Close to real time procurement	• Procurement of balancing services in timeframes compliant with relevant GB policy and UK regulations – the proportion of	• Clear plans and demonstrable progress towards maximising the procurement of all balancing services at day-ahead (or closer

	balancing services procured in these timeframes does not drop below that seen in BP1[24] and is in line with Metric 2X (Day-ahead procurement). • Close to real time procurement displaces volumes procured at earlier than day-ahead timeframes.	to real time), with a clear and transparent explanation of the circumstances in which this is not in consumers' overall interest.
Delivering accessible markets	• Simplified suite of balancing services with participation requirements that provides opportunities for revenue-stacking[25], ensures a level playing field, and maximises participation regardless of provider type or size. Including by: ➢ Transparent completion of all balancing market reform commitments[26] with justification of any necessary changes to priorities or plans. ➢ Ensuring fit for purpose, reliable procurement, communications and settlement systems that do	• Works extensively with industry to implement a complementary and fully integrated suite of balancing services, with no material barriers to participation (evidenced through stakeholder feedback). Including by: ➢ Implementation of a single integrated platform for ESO markets (in line with RIIO-2 Business Plan timescales) in a joined-up manner with wider IT system changes and with positive user feedback. ➢ The majority of ESO markets being accessible through this platform, with clear reasoning

[24] The proportion of balancing services procured in these timeframes should not drop below 30%, in line with the ESO's legal obligation following our approval of a derogation for certain products from this requirement. Our derogation letter can be accessed here: https://www.ofgem.gov.uk/publications/decision-grant-eso-derogation-requirements-article-69-electricity-regulation-and-exemption-requirements-article-323-ebgl-mandatory-and-firm-frequency-response

[25] Revenue-stacking is the ability to derive revenue from the provision of multiple services.

[26] Including those contained in the Product Roadmaps for Response, Reserve, Reactive, and Wider Access to the BM (https://www.nationalgrideso.com/research-publications/future-balancing-services)

	not present any material barriers to participation, with the ESO clearly demonstrating how it has responded, or is responding to previous issues raised. • Markets introduced have a 'compliant first' design approach, following the principles set out in retained EU legislation. In doing so, allow market participants to prepare for ESO markets more easily, with knowledge of the design principles and receive the correct procurement signals. ➢ Where derogations from these principles and rules are required, it is by exception and only where the ESO sees significant consumer and market value from doing so, and / or system security requires it. • Using lessons learned from pathfinders and related NIA projects, create a detailed plan for implementing enduring	for those markets not included. ➢ The single markets platform should integrate with all necessary up/downstream processes, ensuring a 'one-stop shop' for service providers to the ESO.[27] ➢ A year on year step change in the satisfaction levels of industry parties, with greater numbers and types of parties responding positively about the accessibility of platforms, and fewer reporting issues and delays in market access. • Establishes routine process for market introduction and development that allows market participants to engage more easily, and relieves pressure on market parties and the ESO itself.[28] • Using lessons learned from pathfinders and related NIA projects, demonstrate clear progress in implementing

[27] We note that there could be instances where adding a service to the single markets platform might not add consumer value. In such cases, we would not expect the ESO to do so, but would expect a clear rationale to be provided for these instances, and expect such instances to be uncommon and by exception. If such instances arise, it would not be at a detriment to the ESO's performance, subject to providing that rationale.

[28] For example, the ESO has created and communicated an annual development, engagement, and approval process for its suite of response services, and we envisage ESO moving all services onto a similar process. This cycle allows for the ESO to continually improve and develop services as markets evolve. This should not detract from our expectation that the ESO introduces efficient markets for day-1 launch.

	markets for solutions to stability, voltage and thermal constraints. • Development of market-based, competitive balancing services that allows appropriate time for design (or co-design), regulatory consideration, and market parties to prepare for delivery.	enduring markets for solutions to stability, voltage and thermal constraints. • Development of market-based, competitive balancing services that allows appropriate time for efficient design (or co-design), regulatory consideration, and market parties to prepare for delivery.
Signalling procurement needs	• Transparent and clear communication to market participants on current and future system challenges and ESO balancing service needs, in line with the objectives of the Operability Strategy Report. • Procuring services from market participants based on clear and transparent needs which, wherever possible, the market understands ahead of procurement activity.	• Proactive, transparent development of balancing services markets to solve foreseen future system challenges (before the ESO would need to incur significant costs to address these challenges). • Notice of procurement rounds signalled to stakeholders sufficiently in advance to enable optimal participation.
Coordinated procurement across the whole system	• Collaborates with other network operators to ensure that balancing services procurement is coordinated and where beneficial for consumers (e.g. contract terms, service requirements and frequency of procurement) standardised across networks. • Active participation in projects and forums that drive improved coordination in procurement,	• Inputting proactively into the development of distribution network ancillary services (including inputting actively to DNO RIIO-2 plans) to enable integration with ESO markets and facilitate the future efficient, whole system procurement of balancing / ancillary services. • Organises, convenes and builds consensus with other network / system operators to drive changes that will optimise

	including relevant data sharing (such as Open Networks).	balancing service procurement across the whole electricity system, using high quality information / analysis to support the process.
Developing technical procedures specified in the GB-EU Trade and Cooperation Agreement (TCA)[29]	• Fulfils its obligations in line with the TCA and / or as instructed by the Specialised Committee on Energy (SCE).[30] • Review of the barriers and opportunities for interconnectors (ICs) in all ESO balancing markets and develop plan to remove / take advantage of these. • Facilitate cross border trade over ICs. • ESO is proactive in setting GB rules for ICs that maximise flows and works in the interests of all stakeholders, while ensuring system security / operability.	• ESO plays a leading role in coordinating and progressing actions in line with the TCA and SCE instruction. • Removes the barriers (or significant progress made toward this) for entry for ICs in majority of ESO balancing markets, providing opportunity to take advantage of potential benefits. Where barriers cannot be removed, this is explained clearly and plans are in place to address (either directly or indirectly). • ESO is proactive and forwardlooking when considering GB rules for IC, with a view of the impact of future interconnected capacity.
By the end of RIIO-2		
Competitive procurement	• ESO has introduced market-based, competitive procurement in most balancing services, with	• ESO has introduced full competition everywhere, in all balancing services with a

[29] The Trade and Cooperation Agreement between GB and the EU sets out (under Title VIII) requirements for TSOs to establish technical prodceudres for the exchange of energy over interconnectors at the day-ahead, intra-day and balancing timeframes.

[30] The Specialised Committee on Energy is a joint forum between the UK and the EU. This Committee oversees the majority of the provisions agreed between the UK and EU in the energy title (Title VIII) of the Trade and Cooperation Agreement and sets out further detail (including timelines) for how TSOs should establish their technical procedures. Details on the SCE, including minutes of their meetings, can be accessed at: https://www.gov.uk/government/groups/specialised-committee-on-energy

	few, and only minor, examples of non-competitive procurement remaining.	transparent and well evidenced explanation of the circumstances in which this is not in consumers' interest.
Close to real time procurement	• Significant phase out of earlier than day-ahead procurement of balancing services.	• Significant phase out of earlier than day-ahead procurement of balancing services, with a clear plan for achieving total compliance where appropriate. • Consideration of 'within-day' procurement, where this adds value.
Delivering accessible markets	• ESO has incorporated procurement of most services within a user-friendly single market platform. • Few and only minor issues with market access, with the ESO acting quickly to improve functionally and address any issues as they arise. • Introduction of enduring markets for solutions to stability, voltage and thermal constraints. • Markets introduced or developed such that they provide for efficient system operation at best value to consumer, while maintaining investment signals and revenue streams for providers. • ESO has established routine process for market introduction and development that allows market participants to engage more easily, and relieves	• ESO has developed and implemented well-constructed markets that have incorporated procurement of all services within a single, highly accessible market platform, which is praised routinely by market participants. In particular, the platform would: ➢ minimise cost and complexity for users, enabling them to easily capture the value they provide to the system across multiple services. ➢ maximise participation from all different types and sizes of participants or business models. ➢ be flexible, future proofed and easily adaptable to enable a quick response to feedback or changes in the wider system. ➢ Interact with all necessary up/downstream processes,

	pressure on market parties and the ESO itself.	ensuring a 'one-stop shop' for service providers to the ESO • Market design enables ESO to progress to its zero carbon operability targets. • Creation of competitive, fully-functioning, enduring markets for solutions to stability, voltage and thermal constraints, which provide appropriate, dependable investment signals for market participants.
Coordinated procurement across the whole system	• ESO run markets are coordinated with distribution-level flexibility markets, providing minimal complexity for providers looking to maximise the value from their services.	• When in consumers' interests, service providers have a single, consistent set of procurement requirements when looking to provide services to the ESO or DNOs. • Providers have a single interface point (or consistent standardised interface points) for providing services to the ESO and DNOs.
Develop cross-border markets	• Significant progress made toward removing barriers to interconnectors entering balancing markets.	• Interconnectors able to provide services to ESO as appropriate to allow system operability. • Evidence ESO is accounting for future IC volumes and multi-purpose interconnectors when developing cross-border markets.

Activity 2b: Electricity Market Reform

Meets expectations predominantly underpinned by licence conditions:
C28 4(e) publishing easily accessible information which the licensee holds to generate value for consumers and stakeholders, including but not limited to ensuring information services are designed to meet the needs of the service users;
C28 4(g) producing and publishing accurate and unbiased forecasts; and
C28 4(m) providing accurate and timely guidance to all industry parties on the relevant rules for the Contracts for Difference (CfD) and Capacity Market (CM) prequalification and auction processes.

Output	Meets expectations	Exceeds expectations
Immediate and ongoing		
User experience with the EMR portal	• An evident improvement in the user experience (e.g. existing issues are resolved, resulting in lower barriers to entry for providers). Underpinned by: ➢ Timely completion of the refreshed EMR IT portal with positive user feedback, which ensures the ESO and the IT portal have the ability to respond to change quickly and cost efficiently.	• Extensive engagement with industry with a view to maintaining a highly accessible EMR portal.
Implementation of policy and rule changes	• Policy changes, or system workarounds, should be implemented continuously in a timely and cost efficient way to ensure compliance with legal obligations, and no later than 12 months following identification of the relevant Rules or Regulations, unless	• Developing and implementing a proactive process so that the ESO actively initiates, captures and assesses policy, rule and process improvements and, when necessary, feeds into the Capacity Market Advisory Group.

	otherwise stated by Ofgem or DESNZ.	
Providing support to EMR parties	• Supports industry parties through the CfD & CM prequalification and auction processes through provision of accurate & timely guidance to parties on relevant rules and changes to those rules. • Ensure fair provision of guidance and support. This may require a targeted strategy depending on the type of Capacity Provider and eligible generator to ensure a level playing field. For example, smaller parties should not lose out due to lack of resource, with a variety of communication channels allowing for this.	• Delivery of an evidenced step change in query management with demonstrable improved feedback from Capacity Providers[31] and eligible generators[32].
Making accurate prequalification decisions	• Accurate CM prequalification and agreement management decision making, based on compliance with the Capacity Market Rules and The Electricity Capacity Regulations 2014. • Accurate CfD qualification decision making, based on compliance with the Rules and Regulations. • Very few errors made or decisions overturned by Ofgem	• Evidence of exceptional decision making for Tier 1 disputes, resulting in zero overturns by the Authority at the Tier 2 stage.

[31] Market participants that have a capacity market agreement.

[32] As defined in the Contracts for Difference (Definition of Eligible Generator) Regulations 2014 (as amended).

	in the Tier 2 process following CM and CfD qualification.	
Improving EMR processes	• Readily, regularly and accurately present information demonstrating the ongoing effective operation of the Capacity Market processes with Delivery Partners. • Ensure that auction recommendations assessments are accurate and responsive to recommendations for improvements.	• Evidence of continuous improvement to prequalification and auction delivery, resulting in improved user experience for Capacity Providers. Lessons learned implemented demonstrably and result in an increase in the effectiveness of applicants applying to prequalify and participate in the auctions.
Monitoring compliance with rules	• Proactive engagement with delivery partners when issues are identified and alerts Ofgem of any potential instances of non-compliance with their licence within a working day from discovery of the issue. Other issues are communicated in a timely fashion.	
Capacity Adequacy modelling	• Endorsement from the Panel of Technical Experts (PTE) on annual modelling approach. • Proactively engages with connected TSOs, as well as pan-European bodies such as ENTSO-E where appropriate, and effectively consults GB TSOs with respect to medium- and long-term security of supply modelling. • Engages with stakeholders on how to improve new longer term capacity adequacy studies	• Step change improvements in medium term demand forecast accuracy, through the proactive identification of changes to the methodologies and input data. • Evidence of excellent value added to industry on security of supply risks from capacity adequacy reporting.

	and enhance modelling from this engagement.	
By the end of RIIO-2		
User experience with the EMR portal	• An EMR IT portal with a user-friendly and accessible interface – backed up by feedback with a consistent, high degree of satisfaction. • Full integration of the EMR portal with the Digital Engagement Platform	• Full integration of the EMR portal with other ESO markets within a single market platform, subject to necessary regulatory amendments. • Evidenced positive step change in user experience.

Activity 2c: Industry codes and charging

Meets expectations predominantly underpinned by licence conditions:
C28 4(i) ensuring the effective and non-discriminatory participation of all qualified market participants in the provision of balancing services, including not unduly restricting new and existing service providers from competing for the provision of such services;
C28 4(l) facilitating an economic and efficient transition to a zero carbon energy system;
C28 4(q) proposing and supporting code arrangements that promote the relevant code objectives in a timely manner;
C28 4(r) developing, managing and maintenance of the process for the methodologies for use of system charging; and
C28 4(s) managing connection applications for access to the national electricity transmission network in a fair, consistent and timely manner.

Output	Meets expectations	Exceeds expectations
Immediate and ongoing		
Managing codes changes	• Quality code administration service in line with other industry codes. • Provide a code change process that supports widest participation of industry participants as possible and integrates effectively with changes to other codes. • Provides unbiased, detailed analysis or modelling to support code modifications.	• Exemplary code administration service compared to other code administrators (demonstrated through comparative surveys and stakeholder feedback). • Proactively works with Ofgem and government on improvements to energy code governance, including providing robust evidence and thought leadership into the Energy Codes Review. • Proactively considers, identifies and addresses any unintended consequence(s) of code modification prior to submission of final report to Ofgem.
Improving GB rules and standards	• Proactive identification of the most necessary changes to GB frameworks to remove	• Continuous and frequent activities that organise, convene, listen and build

	distortions and to ensure a level playing field. • Propose and support code modifications that promote the relevant code objectives, in the interests of GB consumers. • Contributes views and analysis to aid the development of distribution-level rules and frameworks. • Be as open and transparent as possible, sharing insights, comparisons of alternative proposals and robust analysis that can inform workgroup deliberations. • Provide assessment of areas of GB legislation that might be improved under arrangements following GB's exit from the European Union, and engage relevant parties where improvements for the better can be achieved.	consensus to ensure the GB electricity market framework develops in the best interests of consumers. • Insights, analysis and change proposals that consider the links and dependencies between balancing, wholesale and capacity markets ie taking account of the potential impacts on areas outside of the discrete change proposal. • Ensure change proposals evaluate effectively trade-offs between options, in the context of the broader reform environment (e.g. consideration of changes taking place in other energy codes and the sector more broadly). • Proactively shapes and provides system operation expertise and insights into the development of distribution-level operational frameworks. • ESO takes a leading role in explaining the virtue of the rules in place, and how they provide a framework which benefits markets and consumers of today and the future.
Coordinating and Influencing Cross Border rules	• Remain aware of changes to rules in connected regions, and assess impacts with a view to maximising positives and minimising negatives for GB consumers.	• ESO retains a position of influence and maintains strong working relationships with connected regions, and where possible, influences

		arrangements for betterment of all consumers. • Engage strongly through official fora, such as providing leadership and input under TCA activities.
Promoting efficient charging and access arrangements	• Competent and responsive development, management and maintenance of the charging process. • Providing insight, clarity and transparency through role as Charging Futures lead secretariat. • Chair relevant workgroups through Charging Futures. • Take a leading role in the Access Significant Code Review (SCR) Delivery Group.[33] This should include providing modelling of transmission-level tariff options, analysis of the merits of different transmission options, comment on interactions with distribution-level changes and developing plans for option implementation. • Ensures forecasts of industry charges are as accurate as possible by maintaining fit for purpose forecasting models and processes, consistent with the	• Undertake activities that organise, convene and build consensus to contribute directly to the development of new approaches to transmission network charging, which maximise long-term benefits for consumers. This could include providing views on any links and dependencies between charging matters and its other works areas. • Undertake activities that utilise the ESO's technical understanding of the transmission system and charging methodologies to provide additional insight and qualitative and quantitative policy inputs, such as modelling or analysis to show system benefits of options.

[33] More information about the Access SCR Delivery Group can be found at the following address: http://www.chargingfutures.com/charging-reforms/access-forward-looking-charges/resources-2/scr-delivery-group/

	methodologies set out in the various Codes (e.g. the CUSC). • Shares the information needed by other parties (where these are onshore TOs, this information should be in accordance with the STC) to enable them to understand and manage their financial exposure to changes in expected charges.	
By the end of RIIO-2		
Managing code changes	• ESO has successfully introduced a single digitalised grid code, with positive user experience. Some discrepancies between transmission and distribution code change processes may remain.	• ESO has introduced a single, accessible technical code for transmission and distribution which achieves the user functionality and benefits set out in its RIIO-2 plan. This includes the ESO successfully transforming the Grid Code to incorporate existing transmission and distribution codes into an IT system with artificial intelligence enabled navigation and, document and workflow management tools that provides users with a more user-friendly, inclusive and tailored experience.
Improving GB rules and standards	• ESO has progressed a number of key changes to technical standards to facilitate a zero carbon energy system, in line with government recommendations. • ESO has ensured compliance with relevant GB legislation.	• ESO has proactively influenced, comprehensibly reviewed and (subject to DESNZ conclusions) successfully implemented necessary changes to the Security and Quality of Supply Standard (SQSS) and other technical standards to ensure

		they are fit for purpose for a zero carbon energy system.

Role 3: System insight, planning and network development

1.16. The ESO performs a variety of insight, planning and network development activities. It publishes key insight documents that include credible long-term pathways for the energy sector through its Future Energy Scenarios (FES), it identifies long-term electricity system needs in the Electricity Ten Year Statement (ETYS) and also provides GB input, based on the FES, into the development of the pan-European Ten Year Network Development Plan (TYNDP).

1.17. The ESO's annual Network Options Assessment (NOA) is a central part of it network development activities. The NOA assesses and recommends solutions to electricity onshore and offshore transmission system needs and provides an analysis of optimal interconnector capacity growth. The wider NOA methodologies also provide a foundation for the ESO to contract for long-term operability solutions (e.g. to solve network constraints and stability issues) via its NOA pathfinding projects.

1.18. The ESO network development activities also include improving the coordination of offshore network development through the wider network benefit investment (WNBI) mechanism and working with DNOs to ensure that its efficient and coordinated network development activities maximise whole system benefits across network boundaries. In addition, the ESO carries out network development cost-benefit or impact assessments to inform Ofgem's decision-making, such as decisions on major new investments in the onshore transmission networks proposed by TOs.

1.19. At present, the ESO is undertaking further work to develop a plan to introduce Early Competition in network development and an assessment of options for a more coordinated approach to offshore transmission network planning and delivery. We expect to update this guidance with additional expectations in these areas once this existing work concludes.

1.20. The ESO is also responsible for the connections process to use the electricity transmission system and for managing the impacts on the NETS from new connections of new offshore generation as well as at distribution level, through liaison with developers and DNOs to ensure that offshore/onshore networks are planned holistically.

Activity 3a: Connections and network access

Meets expectations predominantly underpinned by licence conditions:
C28 4(d) optimising the timing of transmission outages under the outage plan on the national electricity transmission system;
C28 4(l) facilitating an economic and efficient transition to a zero carbon energy system;
C28 4(n) co-ordinating and cooperating with transmission owners and holders of a distribution licence to identify actions and processes that advance the efficient and economic operation of the networks;
C28 4(o) using best endeavours to implement actions and processes identified and proposed through its activities under paragraph C28 4(n) of this condition that are in the interest of the efficient and economic operation of the total system;
C28 4(p) exchanging all necessary information and co-ordinating with holders of a distribution licence in so far as is necessary to ensure the optimal utilisation of resources, to ensure the economic and efficient operation of the system and to facilitate market development;
C28 4(s) managing connection applications for access to the national electricity transmission network in a fair, consistent and timely manner; and
C28 4(t) ensuring coordination with other network operators and interested parties and identifying and delivering the most efficient network planning and development of solutions to meet future transmission network needs. These solutions should include, but are not limited to, solutions that cost-effectively alleviate the need to upgrade or replace electricity network capacity.

Output	Meets expectations	Exceeds expectations
Immediate and ongoing		
Managing connections	• Competent, effective and proactive development, management, maintenance and improvement of the whole electricity network connections process, in order to facilitate a timely and efficient transition to a Net Zero electricity system. Including by:	• Provides and supports a seamlessly efficient connections experience to electricity networks across GB (including both transmission and distribution networks). Including by: ➢ Processing connection requests in a timely manner so as to significantly reduce backlog of connection requests.

	➢ Supporting all parties fairly, providing visibility, transparency and understanding of connection processes along with continuous improvement of applicable pre-application information and processes, building on the Connections Portal. • Provide appropriately targeted support, guidance and information with dedicated account functions for customer groups such as DER where required. • Producing timely and accurate connection offers, with efficient and timely connection dates providing transparency and certainty over connection completion dates. This should display marked improvements supported by Regularly Reported Evidence (3X (Timeliness of Connection Offers) and 3Y (Percentage of Right First Time Offers)) and associated reporting. • Where the ESO identifies works as being necessary and additional to the TO design, they should request these to be costed by the TO. Assessment of TO design by the ESO for such works shall be done inclusive of this information.	• Performance displays step change improvements, supported by Regularly Reported Evidence 3Y (Percentage of Right First Time Offers) and achieves 100% of offers within the required period, supported by 3X (Timeliness of Connection Offers), as well as substantial, rapid and sustained improvements in the scale of the queue and reductions in connection dates offered (once relevant industry processes are in place), as evidenced by reporting on these indicators. • Where industry processes allow, proactively identifying connection applications which can provide services that would mitigate other system costs. • Working with connecting parties to understand early whether there are services they can provide to the system that would mitigate other system costs. • Leading industry thinking by developing economic and efficient conceptual solutions to enable coordinated development of NETS offshore along with the pan-European network. • Helping to deliver a high degree of coordination between connections and network access processes across transmission and distribution networks. • Near term reforms (particularly the ESO's 5 point plan) have been

	• Scrutinising connection offers put forward by TOs to ensure system designs consider the wider impacts on the NETS and are in the interests of consumers. • Considering the Whole Life Optimal Cost of connection system and layout designs, including any resulting wider network reinforcement costs, and not just the lowest costs for the connection works when considering connection designing solutions. • Undertaking proactive horizon scanning, identifying potential future challenges and planning ahead for longer-term responses to ensure integration and resilience to developments in the system and market, including considering changes in regulation and government policy, such as wider network charging reforms, network investment and planning developments and connections reforms, e.g. other strategic planning processes such asOffshore Transmission Network Review (OTNR), Holistic Network Design (HND), HND follow-up exercise, Accelerated Strategic Transmission Investment	implemented driving significant improvements in connection offered dates and processes, underpinned by appropriate resourcing and systems and well-integrated with system planning and operational approaches (including outage planning).

	(ASTI), and the Centralised Strategic Network Plan (CSNP). • Having processes in place to allow efficient and timely support for connections, taking into account the need to respond quickly and efficiently to anticipated changes, for example in application volumes, which may impact on workload or process requirements identified through horizon scanning activities above. • Efficient, collaborative and timely delivery and implementation of near- and long- term connections reforms, showing clear and consistent benefits supported by evidence under Regulary Reported Evidence 3X (Timeliness of Connection Offers) and 3Y (Percentage of Right First Time Offers) and evidenced by a step change improvement in the scale of the queue and reduction in connection times offered to customers to better meet customers' needs in line with net zero pathways, including other beneficial improvements, eg to transparency of data to support informed connection applications and decisions,	

	which can be implemented in the near term, including any identified through Connections Reform.	
Outage and medium- and long-term access planning	• Coordinate with all TOs and significant sources of generation to implement efficient outage plans that minimise costs to consumers. • Provide visibility on the costs and / or benefits associated with changing network outages, through system analysis and cost assessments. • Transmission access programmes planned on a whole system basis using open data where appropriate. • Works with DNOs to coordinate and collectively optimise network access and planning through exchanging all relevant data in consistent formats, including but not limited to the sharing of detailed transmission asset level data, including operational status, contracted background and available headroom at GSPs.	• Facilitates an optimal, whole system approach to network access and planning by coordinating seamlessly with all network operators via common data exchange systems (with use of open data where appropriate) to shape the future development of network access polices. • Works with network operators to identify and bring forward innovative, medium-term network solutions that drive significant constraints savings for consumers (e.g. through Joint Works projects).
Connections Reform	• Leading a holistic and comprehensive, collaborative, industry-wide programme to review connections arrangements and develop and implement Connections Reform in close collaboration with other network operators, industry,	• Taking collaboration and coordination further, where the ESO looks beyond its own processes to support substantial and aligned process improvements are delivered across the whole energy system, including connections for electrolysis plants

	developers and stakeholders including Ofgem and Government.[34] This should have a whole system approach, to support efficient outcomes for all customers interacting with the transmission system and processes. • Reforms should be fast-paced, based on a clear and robust case for change, and ensure connections arrangements enable a timely transition to net zero in line with relevant pathways, delivering improvements at pace to connection offer dates and processes, to be fit for purpose for now and resilient and adaptable to the evolving energy system and wider future reforms. These should deliver value to consumers and significant improvements in customer experience, enabling higher quality applications, where possible, with reduced impact of speculative applications. This includes but is not limited to: ➢ Collaborative and transparent option	and other vectors where required for efficiency. • Identify and, where applicable, recommend and take forward improvements identified to associated aspects of system arrangements, such as investment planning where these will work in tandem with improvements to connections arrangements to deliver reform objectives and Ofgem outcomes as signalled through Ofgem's Open letter and reform programme. • Draw on thinking on longer term models and assessment to inform wider reform programmes, such as the REMA, future system planning approaches and others as applicable. This includes, but it is not limited to: ➢ Proactive and collaborative work with TOs and DNOs, including through the ENA's SCG, to develop and implement aligned proposals for managing connections as needed across system boundaries, delivering a step change in improvements and substantial, rapid and sustained improvements in associated reporting of the

[34] While we understand there are dependencies, we anticipate this can be completed by 2025. ESO performance will graded against this expectation, accounting for delays due to reasons outside of their control.

	development and assessment underpinned by effective and wide-ranging stakeholder engagement and consultation to support identification, testing and validation of options, and robust analysis supported by the Case for Change. ➢ Effective governance and coordination arrangements in place to support timely and well-developed conclusions, informed by rigorous assessment and a robust understanding of expected impacts, input from relevant parties including TOs and DNOs, including via effective coordination with and participation in the ENA's Strategic Connections Group, with robust implementation plans and processes. ➢ Timely delivery of review conclusions with design of solutions, a clear roadmap for delivering Connections Reform, and planned implementation stages,	scale of the queue and reduced connection times. ➢ Proactively providing other parties (including Ofgem and Government) clear and timely direction in what is required to enable the reforms identified, giving sufficient notice to enable productive responses and consideration in all cases.

		in line with timeframes communicated to broader industry and deliverables updated by the end of 2023, with improvements brought forward more quickly where possible and beneficial to enable early, rapid improvements in connection times. This should include early and clear identification of any questions which may require strategic regulatory or policy direction, which should be identified and brought forward to relevant parties for consideration (including Ofgem or Government). ➢ Continuous identification, development and implementation of any required changes, considering implications for regulatory, code and contract frameworks and the introduction of new processes to give effect to conclusions to achieve all objectives of the reform work.	

	➢ Iterative and coordinated series of improvements to connection processes, in tandem and close coordination with the wider work already underway to accelerate network planning and investment, to ensure learnings can inform improvements on both connections process and network (including outage) planning and investment processes, demonstrating marked improvements for Regularly Reported Evidence 3X (Timeliness of Connection Offers) and 3Y (Percentage of Right First Time Offers), with clear forecast benefits and associated reporting on projected and actual improvements. ➢ To ensure a complete and holistic set of reforms across the whole system. ➢ Improved data and monitoring on the status of connections arrangements for customers across GB,	

	the expected impacts of identified near term improvements and longer-term reforms, demonstrating substantial improvements and a clear view of where further action is needed.	
Connections Portal	• Develop and implement consistent and coordinated connection processes for customers, which facilitate efficient connection and access to the system with improved data, information and service provision via the connections portal and enabling efficiencies to better manage increasing complexity and volume in connection requests. • This includes beneficial improvements identified through the Connections Reform work or elsewhere, such as: ➢ Substantially improved data and information for customers from the pre-application stage, such as current and future projected capacity and relevant information to understand the demand for capacity in different parts of the system, and	• Make proactive improvements to the Connection Portal beyond any planned improvements or recommended changes identified through the Connections Reform work, through an iterative and continuous process informed by seeking feedback and learning from industry stakeholders.

	interactions with network development plans. ➢ Allow customers the ability to track and monitor all their projects, provide direct feedback, easy access to self-service tools, access to information which includes consistent data and quality insights. ➢ Works towards having standardised (and digitalised) application processes such that if the necessary industry processes are in place the interface across distribution and transmission is better managed, underpinned by greater collaboration between them. ➢ Iterative improvement process to respond to further improvements identified as part of the connection Portal trial and Connections Reform work.	
By the end of RIIO-2		
Managing connections & Outage and	• Near- and long-term reforms have been implemented at pace, against required	• Beyond the Connection Reform work, ESO has actively improved coordinated connection and network access planning approaches across

medium- and long-term access planning	timelines[35] driving significant improvements in connection offered dates and processes, underpinned by appropriate resourcing and systems. • Reforms are integrated with system planning and operational approaches (including outage planning), as evidenced through reporting on improvements in the scale of the queue, and demonstrating significant reductions in connection dates offered as well as being supported by Regularly Reported Evidence 3X (Timeliness of Connection Offers) and 3Y (Percentage of Right First Time Offers). • ESO has helped to deliver a high degree of coordination between connections and network access processes across transmission and distribution networks. • Substantially improved pre-application information, customer experience and efficient process through the Connection Portal and other near-term improvements.	the whole electricity system. There are clear points of contact, and the processes are run in coordination with other network operators, ensuring a seamless experience and efficient and timely connections service for all types of parties and facilitates efficient planning. • Network development and investment plans are well informed and underpinned by a forward look of anticipated connections volumes and requirements, through effective collaboration with TOs and DNOs, such that preparatory work can be identified and undertaken in a timely way and strategic approaches to network development enable reduced connection dates, in line with customers' requirements and a timely transition to a net zero.

[35] Following discussions with the ESO, we understand that these reforms can be delivered within BP2 timescales, and so this is our expectation. We further understand that the timeline could be delayed for reasons outside of the ESO's control, if such risks materialise then our expectation would be for the ESO to be able to implement reforms at the early stage possible once those barriers are removed.

Connections Reform	• Connection Reforms are implemented to have a meaningful difference to the connections process, while accelerating progress towards net zero and delivering benefits for consumers. The reform project delivering on all its objectives and outcomes For example transparent and consistent data, improved quality of connection applications with efficient progress, reforms being delivered with improvements and greater coordination across system boundaries. • Achieve marked improvements in connections performance, evidenced by Regularly Reported Evidence 3X (Timeliness of Connection Offers) and 3Y (Percentage of Right First Time Offers) and associated reporting of improvements to the scale of the queue and connection times. • Reforms should be delivered as early as possible[36] to deliver rapid improvements in connection timescales to allow long lead time activities which	• As needed, proactive consideration and preparations underway for how the connections and access framework may need to develop in the longer term to align with and inform wider market and system developments, identifying and taking appropriate steps to enable coordinated and timely delivery of any further future changes. • The Regularly Reported Evidence shows a rapid, substantial step change and sustained and consistent improvements across the relevant Regularly Reported Evidence 3X (Timeliness of Connection Offers) and 3Y (Percentage of Right First Time Offers) and associated reporting on improvements in the scale of the connections queue and connection times. • Robust, data-based understanding and monitoring of connections trends and performance, horizon scanning effectively embedded in BAU processes on an enduring basis ensuring any potential emerging issues and opportunities for further future improvements are identified and resolutions or improvements swiftly brought forward to deliver improvements or address potential

[36] We anticipate that this should be by 2025, subject to delays for reasons outside of the ESO's control. Where possible, aspects of the Reform should be delivered earlier, particularly if value-adding.

	contribute to 2035 zero carbon operations. • Connection offers are made to applicants with shorter connection dates which better meet customers' needs and enable a timely transition to net zero. Customers are provided with efficient processes, improved experience, timely and accurate connection offers, through a transparent and auditable process, supported by accessible and standardised data. • Reforms account for the diversity and complexity of connections within an evolving whole energy system, and are resilient and adaptable as needed to wider reforms (for example to system planning and market arrangements) and avoiding recurrence of any issues or delays in future. • Reforms should be well integrated with system planning arrangements and enable improved outcomes and processes across system and organisational boundaries to deliver improve and more consistent whole system outcomes, improving coordination and alignment of processes where this can	emerging challenges before they escalate in scale or severity. •

	deliver benefits and accelerate progress towards net zero. • Robust, granular, data-based understanding of the status of connections across GB, providing a clear picture to Ofgem, government and stakeholders, allowing the impact of reforms and other trends to be projected and tracked, and informing planning and investment processes. For example by improving information on where new network capacity may have value and using these to inform planning and investment processes to enable future connections.	
Connections Portal	• The connections portal is well established, bringing data and process improvements, allowing customers to receive and provide direct feedback and enable efficiencies to partly offset the increasing complexity and volume in connections, and delivers the outcomes described in the ESO's RIIO-2 plan, for example an enhanced understanding for all parties of the available capacity and the costs of connecting to different parts of the whole network. Including, but not limited to:	• The ESO has contributed to the implementation of a central highly accessible connections portal, which is fully interoperable with the systems of other network operators • The portal advises customers of capacity opportunities on both the distribution and transmission networks and acts as a one stop shop for all connection-related information .

	➢ Improved access to data and information from the preapplication stage onwards providing clarity on the available and expected capacity and associated costs across the system. ➢ Providing customers easy access to signed agreements, charges, operational notifications and tracks the progress of their connection applications. ➢ Improves support to connections project that require increased level of engagement and support. ➢ Further enhance the customer connection experience, including broader support for smaller parties. ➢ Efficient management of connection contracts programmes, where industry processes allow, to secure timely delivery of connections.	

Activity 3b: Operational strategy and insights

Meets expectations predominantly underpinned by licence conditions:
C28 4(e) publishing easily accessible information which the licensee holds to generate value for consumers and stakeholders, including but not limited to ensuring information services are designed to meet the needs of the service users;
C28 4(f) publishing reliable scenarios of the long term development of the energy system and its needs under different scenarios;
C28 4(g) producing and publishing accurate and unbiased forecasts;
C28 4(l) facilitating an economic and efficient transition to a zero carbon energy system
C28 4(n) co-ordinating and cooperating with transmission owners and holders of a distribution licence to identify actions and processes that advance the efficient and economic operation of the networks; and
C28 4(p) exchanging all necessary information and co-ordinating with holders of a distribution licence in so far as is necessary to ensure the optimal utilisation of resources, to ensure the economic and efficient operation of the system and to facilitate market development.

Output	Meets expectations	Exceeds expectations
Immediate and ongoing until the end of RIIO-2		
Providing energy insights	• Informs the future development of the electricity and gas systems through the production of clear, accessible and timely insight documents, which are informed by robust stakeholder engagement. • Ensure due consideration is given in any long-term forecast to cross border infrastructure and a coordinated European energy system, and to work holistically with European neighbours to support the development of holistic and robust scenarios.	• Uses expertise to produce timely, trusted and highly valued insights that shape and inform policy decisions on the energy transition and support decision making for the UK's 2050 net zero commitment.

Producing analytically robust scenarios and long-term forecasts	• Competent and responsive development, management and maintenance of the Future Energy Scenarios (FES) process, with evidence for assumptions and decisions through a record of data inputs and the cross section of stakeholders views gathered. • Provide justifiable and credible long-term scenarios (updated at least annually) covering a sufficiently wide range of outcomes, both in terms of future energy system development and the associated costs of operating the electricity system in those scenarios. • Stress-testing of scenarios, analysis and assumptions and consideration of whether scenarios and forecasts remain fit for purpose at least on an annual basis. • Invites and proactively facilitates collaboration from all interested stakeholders to drive forward the improvement of industry data to achieve more reliable forecasting capabilities. • High degree of engagement, transparency and justification of decision making to stakeholders throughout the development process. • Actively utilise data from industry to inform energy modelling.	• Through the FES, monitors and evaluates previous analysis / scenarios, including by analysing forecast vs. actual outcomes as part of the EMR demand forecasting incentive (e.g. to include supply as well as demand elements for this five year period), to improve accuracy in future publications and explain clearly the reasons for shorter-term deviations between forecast and realised outcomes. • Exceptional stakeholder engagement which, for example, demonstrates greater and/or more diverse participation than previous years, embracing best practice and new innovative approaches in engaging with stakeholders. • Continually expands the functionality of demand models to provide step changes in accuracy, in particular by better taking into account profiles across the year, changes at the regional level and developments across vectors. This may include evidence of effective and timely stakeholder engagement to inform, and communicate, developments in this area.

	• Work collaboratively with other parties to improve industry data (where possible and relevant) to support the development of scenarios.	
Ensuring coordinated scenario development	• Engages and coordinates with stakeholders (e.g. Ofgem, national and devolved government, Committee for Climate Change, industry, other licensees (e.g. Gas System Operator, DNOs) to ensure regional and cross-sectoral interactions are clearly taken into account in the scenario development processes. • Provides inputs and produces outputs which consolidate network planning, including across borders,[37] where appropriate. • Continues supporting DNOs with Distribution FES ("DFES") processes, for example through timely sharing of data, to provide a coherent set of whole-system scenarios.	• Proactively brings together as many relevant industry parties as possible, both directly and through working with open data, to produce consistent factual data that can be used to identify pathways to achieving scenarios that meet decarbonisation targets, across the whole energy system. • All insight and scenarios documents (including the FES, ETYS, Operability Strategy Reports, HND, and the System Operability Framework Report) work together seamlessly (toward a centralised strategic network planning process) to present a clear, coherent, and coordinated view of all future needs across the whole electricity system (evidenced through stakeholder feedback). This includes sharing all data, where appropriate, and sharing FES models where possible. • Proactively brings together industry parties, including European neighbours, to produce

[37] Including with future connections

		consistent robust data that can be used to support scenario development in the future, across the whole energy system. • Considers and implements ways in which more data can be made 'open' to stakeholders.

Activity 3c: Optimal network investment

Predominantly underpinned by current, as well as proposed, licence conditions:
C28 4(l) facilitating an economic and efficient transition to a zero carbon energy system;
C28 4(n) co-ordinating and cooperating with transmission owners and holders of a distribution licence to identify actions and processes that advance the efficient and economic operation of the networks;
C28 4(o) using all best endeavours to implement actions and processes identified and proposed through its activities under paragraph C28 4(n) of this condition that are in the interest of the efficient and economic operation of the total system;
C28 4(p) exchanging all necessary information and co-ordinating with holders of a distribution licence in so far as is necessary to ensure the optimal utilisation of resources, to ensure the economic and efficient operation of the system and to facilitate market development; and
C28 4(t) ensuring coordination with other network operators and interested parties and identifying and delivering the most efficient network planning and development of solutions to meet future transmission network needs. These solutions should include, but are not limited to, solutions that cost-effectively alleviate the need to upgrade or replace electricity network capacity.

Output	Meets expectations	Exceeds expectations
Immediate and ongoing		
Identifying network needs and solutions	• Make recommendations to other parties and take ESO procurement decisions that lead to the economic and efficient design and operation of the transmission network (including onshore, connections for offshore wind and interconnection).	• Conducting exemplary analytical assessments, including by: ➢ Identifying all material transmission network needs[38] in advance of additional costs being incurred. Introducing timely, significant improvements to the analytical tools underpinning the

[38] At present we understand that thermal constraints, voltage and stability issues are the most material network needs. We expect the ESO to keep all network needs under review and, if necessary, expand upon this.

	• Demonstrate the number and types of solutions available and take into consideration the system needs associated with Net Zero. • Conducting fit-for-purpose analytical assessments, including by: ➢ Ensuring that all commitments made in previous Network Development Roadmaps are completed in a transparent, timely manner with justification of any necessary changes to priorities or plans. ➢ Identifying future high-cost network issues in advance of the additional costs being incurred and providing recommendations to mitigate these issues. ➢ Where appropriate, identifying additional solutions not proposed by other parties, recommending optimised combinations of solutions to target a known issue, or identifying a solution that may address multiple issues. ➢ Identify options which are eligible under Early and Late Competition models. ➢ Assess all options based on a high quality, robust and transparent cost benefit	assessment processes (for example: developing tools to allow Optimal Power Flow (OPF) analysis to perform circuit-based thermal assessment considering market actions; introduction of year-round assessment considerations; and a stability tool for SQSS transient analysis). • Ensure maximum possible participation in assessments and tenders, including by: ➢ Proactively facilitating and encouraging all types of providers (network and non-network, transmission and distribution connected) to provide solutions to all material transmission network needs Ensure that all assessments and tenders are accessible to all potential providers of commercial alternative solutions, facilitating effective competition against traditional network reinforcement based solutions. ➢ Data system improvements are implemented and provide demonstrable new insights.

	analysis that provides a high degree of confidence that the ESO has recommended the optimal solution(s). ➢ Assessing all options fairly, based on robust and transparent cost benefit analysis, including by ensuring that TO delivery dates are robustly assessed and sufficiently understood to allow for fair CBA comparison of both TO and non-TO options. ➢ Producing clear, accessible and timely NOA publications. ➢ Regular engagement with Ofgem, industry and interested stakeholders on NOA methodology development to ensure that the year-on-year system planning process is fit for purpose. Approaches to stakeholder engagement and outcomes will be transparent and published on the ESO website. ➢ Building upon past learning to continually improve the models, methodologies and analytical tools underpinning the assessment process of the NOA and NOA pathfinders (renamed as Network Services Procurement for BP2).	

	➢ Widen Network Services Procurement participation by making assessment and outcomes more transparent to stakeholders (e.g. Ofgem and industry). • Using medium-term market solutions as a cost-effective approach to keep network investment options open against uncertainty. • Ensure wide participation in assessments and tenders, including by: ➢ Inviting all types of providers (network and non-network, transmission and distribution connected) to provide solutions to network issues. ➢ Seeking and inviting potential commercial alternative solutions to compete against traditional network reinforcement-based solutions. ➢ Improve data systems to ensure the NOA (and transitional and enduring CSNP) considers current and future connections to support system planning and proactively prevent network constraints. ➢ Prepare people and processes required to facilitate transformation to the Future System Operator (FSO)	

	➢ Develop processes for the performance of future whole system activities, and establish internal framework that enables those activities	
Coordination between network assessments	• Ensuring proactive coordination between the different assessments of solutions to transmission network needs (e.g. ensuring coherence between the annual NOA assessment, the pathfinder assessments and offshore wind connections). Including by: ➢ Setting out and meeting a clear and coherent timetable / calendar for when the different assessments are to take place. Ensuring that it is easily accessible to all that wish to engage with the NOA, Network Services Procurement and any new assessment / tender processes. ➢ Identifying barriers to achieving greater coordination (both technical and regulatory), making these barriers clear to all parties, and proposing solutions to overcome these barriers.	• Demonstrate value that has arisen from development of a co-optimised assessment for all transmission network needs. This should be regularly reported to Ofgem. Including by: ➢ Developing a clear future vision and strategy for an optimal network assessment process (or suite of integrated processes with harmonised timings) capable of addressing Net-Zero system needs. ➢ Implementing solutions for addressing any barriers when these are within the ESO gift.
Procurement of network solutions	• Share well-defined, timely, clear needs specifications for all tenders.	• Share well-defined, timely, clear needs specifications for all tenders, which contain requirements that do not limit

	• Continual improvements made to the procurement process informed by stakeholder feedback. • Work with Ofgem and undertake stakeholder engagement to finalise an Early Competition model. • Develop contractual arrangements for Early competition and work with Ofgem to appropriately determine which elements should feature in contract vs. licence. • Development of a new Cost Benefit Analysis tool which fairly compares licensee options against third party alternatives. • Continue to implement Network Services Procurement methodology for stability, voltage and thermal constraints.	the participation of any viable technologies or potential commercial solutions (or transparently demonstrate why requirements that limit participation are in consumers' interests). • Use of the methodologies and lessons learned through developing the Network Services Procurement and is implementing regular, dependable, bankable markets for stability, voltage and thermal constraints (to be implemented under Activity 2a). • Develop contractual arrangements for Early competition and recommend to Ofgem how best to appropriately determine which elements should feature in contract vs. licence.
Transitional CSNP	• Publish a transitional CSNP, (which includes as a minimum the HND Follow Up Exercise (FUE) and NOA8) in 2023, and similar outputs beyond 2023 as required. A Transitional CSNP should: ➢ clearly and transparently identify investments on the onshore and offshore transmission network to facilitate the efficient connection of 50GW of offshore generation by 2030.	• ESO develops new capability and produces its own network reinforcement solutions to strategic system needs, that are above and beyond any requirement on it through existing workstreams such as the OTNR Pathway to 2030 (PT2030) HND and HND FUE. • ESO develops the capability to make recommendations of whole system solutions, that span beyond electricity transmission network, for example electricity distribution, gas transmission, or

	➢ Be based on transparent, plausible future energy demand and supply scenarios ➢ Be based on all capacity and operational constraints that might occur (including those beyond transmission boundary thermal constraints). ➢ Be based on the ESO scrutinising and challenging inputs from other parties, and coordinating network needs and developments.	the wider energy system such as optimising the development of existing or new loads and/or generation, to solve needs identified for the whole system.
Supporting the development of the CSNP	• Develops a methodology (with Ofgem and stakeholders) for producing the CSNP, based on the latest CSNP policy requirements or guidance as developed by Ofgem.[39] • Aid Ofgem in stakeholder engagement to ensure fair and appropriate roles and responsibilities for licensees in network planning e.g. to prevent bias in future competitive tenders. • Leads on developing the methodology for Future Energy	• Work with stakeholders to develop data sharing procedures which ensure third parties can easily provide network investment options. • Development and implementation of interoperable data and digital infrastructure which enable data transfer between the SO and TOs/DNOs. • Leads on developing a methodology together with stakeholders, to enable the development of whole energy system modelling and

[39] At a minimum we expect the ESO to consider the criterion, proposals, potential approaches and decisions relating to CSNP stages, that are set out in all the publications (consultations and decisions, including appendices) relating to the Electricity Transmission Network Planning Review (ETNPR).

	Estimates (or the outputs under stage 1 of CSNP as described within Ofgem's "Consultation on the initial findings of our Electricity Transmision Network Planning Review") that are anticipated to meet the future objectives of the CSNP (as they may develop), in conjunction with stakeholder engagement to inform electricity and gas transmission network planning.[40] • Supporting the development of all stages of CSNP. For example, by leading workshops with stakeholders and developing potential alternative approaches to various aspects and stages of CSNP, providing recommendations on a preferred approach, and licence drafting. • Working iteratively with Ofgem in developing and agreeing potential alternative approaches to modelling demand and supply and its use in analysis and decision making to inform electricity and gas transmission network planning. For example, considering the use of a single short term 'central estimate', followed by multiple scenarios for the longer term and how they	recommended solutions, that span beyond electricity transmission network, eg electricity distribution, gas transmission and gas distribution network, or the wider energy system such as optimising the development of existing or new loads and/or generation, to solve needs identified for the whole system. • Utilise lessons learned from development of demand and supply modelling from electricity and gas transmission to, where appropriate, improve accuracy of regional scenario development. • Develop capabilities in options identification of non-network solutions such as batteries, demand side response and electrolysis to produce Hydrogen to co-optimise the network and wider energy system. When developing capabilities, utilise stakeholder engagement and consider third party solutions at option identification stage.

[40] At a minimum we expect the ESO to have considered the criterion set out in pages 64-66 of Consultation on the initial findings of our Electricity Transmission Network Planning Review | Ofgem

	could be used to inform network investments. • Develop an agreed methodology (with Ofgem and stakeholders) for robust and credible long-term scenarios (updated to reflect the latest CSNP guidance) covering awide range of outcomes, both in terms of future energy system development and the associated costs of operating the electricity and gas system. This should ensure greater transparency e.g. providing information on how stakeholder engagement is undertaken, areas of modelling that have been altered due to this engagement and sectors/bodies that have been engaged within this process. • Leads on developing the methodology for the identification of system needs stage of CSNP. This should include assessing the needs of the system against all electricity system constraints, including capacity and operational constraints, that might occur because of the modelled future supply and demand. It should also include identification of strategic system needs, such as those which enable meeting government policy and targets. • Leads on developing the methodology (working with	

	stakeholders) for the identification of options to address system needs. This should consider all the possible economic and efficient solutions to address system needs, including innovative, non-network or commercial solutions as well as enduring capital-intensive solutions. It should include identification of strategic investments. ➢ It should include a methodology for developing a clear role for the FSO to identify or originate network solutions for meeting network needs identified in stage 2 of CSNP, such that these solutions are developed sufficiently through the stage 4 assessment for CSNP. ➢ It should include a methodology for a minimum standard of option development by transmission owners and third parties such that options put forward for consideration in CSNP are consistently developed to a minimum level of detail so as to ensure a robust analysis of investments and a clear role for the	

	FSO in identifying solutions. • Develop capabilities in GB wide gas planning for methane and hydrogen. • Leads on developing the methodology for stage 4 of CSNP such that the FSO can perform robust analysis and decision making appraisals to form a strategic plan that resolves future network needs to meet net zero. Work with Ofgem and other stakeholders in developing a cost benefit analysis tool and methodology which enables efficient assessment of the costs and benefits of different types of solutions, and considers technical and economic aspects community and environmental impacts. • Assist Ofgem or lead (as applicable) in the development of code modifications to enable new roles and functions within CSNP. • Assist Ofgem or lead (as directed) in determining appropriate timing and style of CSNP publications and outputs within it. • Leads on developing a methodology, together with Ofgem and stakeholders on integrating planning of offshore networks within CSNP. This should include the methodology	

	for enduring arrangements for designing coordinated connection solutions for offshore connections (including to multipurpose interconnectors where applicable) and any associated onshore and offshore network reinforcements. • Leads on developing a methodology, together with Ofgem and stakeholders on how CSNP will include a strategic advisory output for future interconnectors. • Regular engagement with Ofgem, industry and interested stakeholders on future changes to CSNP methodology to ensure that the system planning process is fit for purpose. Approaches to stakeholder engagement and outcomes should be transparent and published on the ESO website.	
By the end of RIIO-2		
Identifying network needs and solutions	The ESO has ensured that a wider range of types of solutions, to transmission network needs are fully and equally assessed in all of its long-term network development work. • The ESO has ensured that its network planning processes enable a long-sighted, strategic planning function at the onshore	• The ESO methods and analytical tools (including IT systems) ensure that all different types of solutions, to all material transmission network needs are fully and equally assessed and the most efficient solutions are brought forward. • The ESO has implemented new processes to identify the optimal

	/ offshore boundary (subject to the outcomes of the Offshore Coordination Project[41]). • The NOA process and tools have been progressively extended year-on-year to facilitate the submission of innovative solutions to transmission network needs.	combination of options to address the full range of year-round challenges over the medium and long-term. • The ESO has implemented tools and processes that ensure that different types of solutions to all material transmission network needs are fully assessed, using all FES scenarios, which cover a full range of within-year conditions ("year-round assessments") and ensure the optimal solutions are brought forward. This includes: ➢ high-quality, fully tested, year-round tools for: voltage optimisation; OPF analysis for thermal assessments; stability assessments and analysis of dynamic stability, RoCoF, new technology challenges and load model impacts. ➢ Improvements to model outage planning in year-round.
Coordination between network solutions	• The ESO's long-term network development process ensures that all assessments and tenders are part of a complementary and coordinated set of processes	• The ESO's network planning process ensures that all relevant different types of solutions, to all stability, voltage and thermal constraints needs, are fully and equally assessed in a co-

[41] More information about the Offshore Coordination Project can be found at the following address: https://www.nationalgrideso.com/future-energy/projects/offshore-coordination-project

	which ensures the efficient solutions are brought forward. • The ESO has produced, and continually updated, one overarching methodology and timetable that clearly shows how the different assessments of solutions to different transmission network needs interact.	optimised[42] manner to ensure the optimal whole-system solutions are brought forward.
Consistency with distribution network planning	• The ESO has assisted the DNO's in developing network planning processes and methodologies which are consistent with those at the transmission level, engaging at regular intervals to share expertise, with the ESO having supported and proactively made recommendations to shape the DNO's RIIO-2 ongoing network planning and re-opener submissions as required.	• Network planning processes and assessments at the transmission level are fully coordinated with those at the distribution level (e.g. apply consistent processes and methodologies and are timed such that they take account of their respective outputs), with the ESO having supported and proactively made recommendations to shape the DNO's RIIO-2 ongoing network planning and re-opener submissions as required to ensure optimal whole system network development.

[42] See footnote 31.

Quality of Outputs

1.21. In order to strengthen our expectations in the Roles Guidance document, we have decided to integrate our Quality of Outputs criteria into this document. This section of the Roles Guidance captures our expectations that underpin all the activities the ESO undertakes.

1.22. This not only ensures the ESO has met our expectations in terms of delivering activities and outcomes to maintain an economic, efficient, and co-ordinated system but also sets expectations as to how the ESO undertakes these activities.

1.23. This set of criteria also gives the ESO the opportunity to demonstrate that their activities meet, or even exceed, our expectations for the ESO's day-to-day undertakings or any activities that may not be explicitly captured by the main body of the Roles Guidance document found above.

1.24. These criteria also form a minimum standard of delivery for the ESO's activities referenced in the main body of the Roles Guidance document. If the ESO has not delivered its activities in line with the relevant criteria, we may deem that the ESO has not met our expectations for delivery of those activities.

1.25. These criteria are not role specific and may underpin several of the ESO's expected activities.

Area	Meets expectations	Exceeds expectations
Publications	• Timely publication of external facing documents. Any delays to expected publications have clear reasoning. Where the ESO delays publications stakeholders are made aware at the earliest opportunity. This should include an explanation of the reasons for the delay where appropriate.	• Publications are fit for purpose and contain the optimal depth of detail and analysis to benefit and inform industry. • Publications are targeted and advertised to the appropriate stakeholders. • Evidence of step-change improvements in any iterative documentation, showing the ESO is actively seeking to improve the quality of its

	• Publications are fit for purpose and contain sufficient detail and analysis to benefit and inform industry. • Publications are advertised such that stakeholders are aware of publication. • Evidence of continual improvement in any iterative documentation, showing the ESO is improving the quality of its publications based on experience and stakeholder feedback. • Publications are easy to find and available in an accessible format for all stakeholders. • A structure for published documents such that stakeholders can easily navigate ESO documents.	publications based on experience and stakeholder feedback. • A structure for published documents, consistent in approach where suitable, such that stakeholders can easily navigate ESO documents.
Stakeholder Engagement	• ESO ensures it engages with all relevant stakeholders when it is undertaking its activities. • ESO ensures the full range of stakeholders are appropriately represented, including non-traditional stakeholders. • ESO takes a leading role in industry fora.	• ESO ensures it tailors its engagement for all relevant stakeholders when it is undertaking its activities. • ESO actively seeks to conduct stakeholder surveys where appropriate to improve its performance. Where these are conducted, the ESO builds on constructive feedback.

	• Where stakeholder surveys are conducted, the ESO builds on constructive feedback.	
Submissions to the Authority	• Submissions are fit for purpose, clearly articulating the needs case and rationale behind the decision made in the submission. The submission includes information addressing concerns raised during any formal consultation. Minimal clarifications are required by the Authority. • Timely submission of required documentation to the Authority, in line with relevant obligations or needs of the wider industry and consumers. • Where clarifications are required, the ESO provides the necessary information to the Authority as soon as practicable.	• Submissions are fit for purpose, clearly articulating the needs case and rationale behind the decision made in the submission. The submission includes high quality analysis and answers to questions or concerns raised by stakeholders during any engagement. Minimal clarifications are required by the Authority. • Proactive engagement with industry and the Authority to ensure timely submission of required documentation to the Authority, in line with relevant obligations or needs of the wider industry and consumers, mitigating the risk of submission or decision delay. • Where clarifications are required, the ESO provides high quality information to the Authority as soon as practicable.
Proactivity	• Knowledge of current and future risks to delivery of the business plan activities and evidence of mitigations implemented where appropriate.	• Strong knowledge of current and future risks to delivery of the business plan activities and evidence of optimal mitigations implemented

	• Proactive testing of plans and regular refresh of internal information to ensure all knowledge is up to date. • Continuously reassesses plans proactively to ensure that the ESO continues to deliver value. • Flexible approach to delivery. The ESO will act appropriately where evidence suggests that additional benefit would be gained through a change in deliverable or approach.	expediently where appropriate. • Proactive testing of plans and regular refresh of internal information to ensure all knowledge is up to date. Clear evidence that this has been embedded in systems and decisions. • Continuously reassesses plans proactively to ensure that the ESO is maximising value to the consumer. • Flexible approach to delivery. The ESO will act appropriately to deliver optimal benefit through a change in deliverable or approach.
Data and Information	• ESO's data is easy to find and navigate and is considered open by default and provided to stakeholders in an accessible format. • Where the ESO withholds data from industry, there should be coherent reasoning and this reasoning should be published in its stead. • Consistent messaging across documentation and stakeholder engagement such that there are no contradictions or omissions that lead to misunderstanding.	•

ESO Policy	• ESO ensures all relevant stakeholders are considered when undertaking its activities and ESO can evidence this consideration. • Policy outcomes and assumptions are revisited and reviewed as appropriate. • Decisions and policy are underpinned by a proportionate level of evidence and analysis.	• ESO ensures all relevant stakeholders are considered when undertaking its activities. ESO can evidence high quality consideration of impacts of policy on stakeholders. • Completed policy undergoes high quality review at an appropriate timeframe to ensure policy continues to deliver optimal output for consumers.