Consultation on our minded-to decision and draft impact assessment on the initial findings of the Electricity Transmission Network Planning Review

Subject	Details
Publication date:	8 July 2022
Response deadline:	18 August 2022
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This document sets out our minded-to decision to implement a new approach to transmission network planning to deliver a Centralised Strategic Network Plan (CSNP) so that the electricity transmission network is planned holistically and coherently. The delivery of the CSNP should be led by the Future System Operator (FSO). In this document we are seeking views on our minded-to decision. We also explain that until the FSO is established we intend to put in place transitional arrangements and next steps in the development of the processes for delivering a CSNP.

This document outlines the scope, purpose and questions of the consultation and how you can get involved. Once the consultation is closed, we will consider all responses. We want to be transparent in our consultations. We will publish the non-confidential responses we receive alongside a decision on next steps on our website at Ofgem.gov.uk/consultations. If you want your response – in whole or in part – to be considered confidential, please tell us in your response and explain why. Please clearly mark the parts of your response that you consider to be confidential, and if possible, put the confidential material in separate appendices to your response.

Contents

1. Introduction

What is in this document?

1.1. This document sets out our minded-to decision to implement a new process for transmission network planning, that will deliver a Centralised Strategic Network Plan (CSNP). We expect this process to build upon or, where appropriate, replace the existing processes summarised in Figure 1 below and that it should be led by the Future System Operator (FSO). However, as the FSO may not be in place until 2024, we will work with stakeholders to make reasonable enhancements to, and through, the existing processes to ensure the network is planned efficiently between now and the establishment of the FSO.

What is not in this document?

1.2. In our initial consultation in November 2021, we set out the potential stages of delivering a CSNP and what those stages might look like.[1] This document does not set out a minded-to decision for this next level of detail albeit some of the responses do relate to that next level of detail. We expect to consult on the stages of the CSNP, and what they might look like later this year and will return to responses at the relevant point. Moreover, we expect to revisit some of the analysis in this document (such as the impact assessment, referred to below) to reflect more detailed policy development as we go through the consultation process and develop further levels of detail.

Context

1.3. In October 2021, the UK Government published the Net Zero Strategy,[2] which sets out policies and proposals for decarbonising all sectors of the UK economy to meet the Government's net zero target by 2050. As part of achieving its 2050 target, the Government also intends to fully decarbonise the power system by 2035.

[1] Appendix 2 - Consultation on the initial findings of our Electricity Transmission Network Planning Review | Ofgem
[2] Net Zero Strategy: Build Back Greener - GOV.UK (www.gov.uk)

1.4. The challenges posed by decarbonisation will also affect the transmission network which acts as a key enabler for the changes required. While the level of generation connected to the distribution networks is growing, we also expect significant volumes of large new generation to be connected to the transmission system – this means the transmission network will still be required for the bulk transfer of power. The transmission system will require significant reinforcement to move power from where it is produced, to where it is used. Since new electricity transmission networks generally take a long time to develop, any reinforcements to the existing network must be planned well in advance.

Electricity System Operator (ESO) and Future System Operator (FSO)

1.5. We refer to the ESO and FSO throughout this document. To aid readers understanding, when we refer to the ESO we are referring to National Grid ESO[3], the organisation that currently operates the electricity transmission system and that we expect to develop the methodologies for the CSNP. When we refer to the FSO, we are referring to a future operator of the transmission system that will have a broader role than the ESO, and we expect it to deliver the CSNP. As a trusted and expert body at the centre of the gas and electricity systems, the FSO will play an important role in coordinating and ensuring strategic planning across the sector. It will have an ambitious long-term vision and provide independent advice to government and Ofgem. Further information about the establishment of the FSO is available on our website.[4]

The Electricity Transmission Network Planning Review (ETNPR)

1.6. In May 2021, Ofgem commenced a review into network planning arrangements for electricity transmission networks.[5] We explained we were undertaking the review because of the radical changes that the system is expected to facilitate and experience. We want to make sure the network planning processes are appropriate given the level of change anticipated. We have focused on planning for new demand and generation connecting to the system – load related planning. We wanted to understand whether the existing network planning processes of the transmission owners (TOs) and tools as well as the GB wide processes led by the ESO, including those summarised in Figure 1 below, could be enhanced

[3] Welcome to National Grid ESO | National Grid ESO
[4] Future System Operation (FSO) | Ofgem
[5] Consultation on the initial findings of our Electricity Transmission Network Planning Review | Ofgem

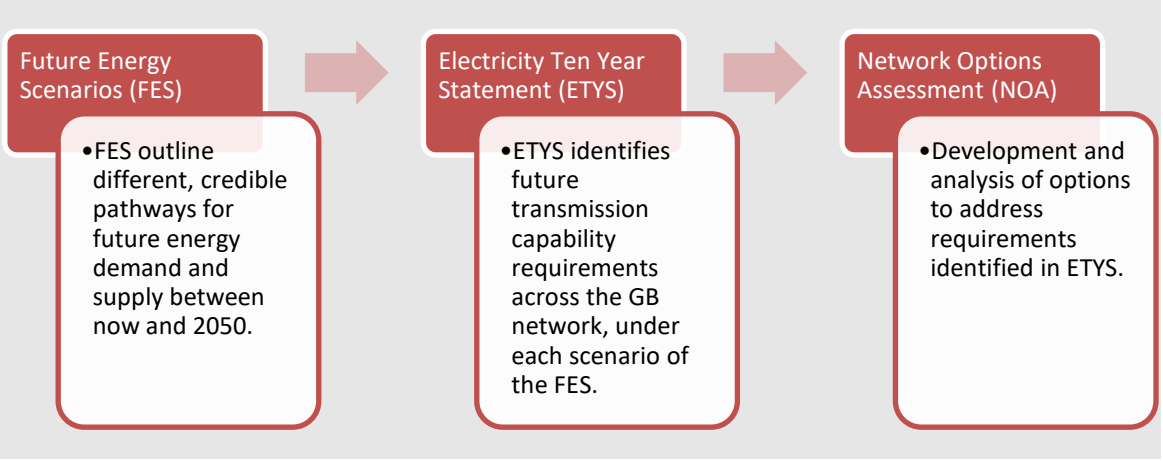
to address the challenges decarbonisation will pose. In our work to date we have focused on processes currently led by the ESO and set out proposals for a new output, the CSNP.

1.7. This document sets out our minded-to decision to establish this new process. This minded-to decision is conditional upon responses to this consultation.

Load related network planning

1.8. Load related planning processes go beyond the scope of the documents summarised in Figure 1. Each of the TOs also considers where new capacity is required or where there are other constraints that do not impact upon boundary capacity as a result of new load. While developing the detail of the CSNP we intend to consider what planning needs to be undertaken on a GB-wide basis by the FSO and what activities can continue to be undertaken by the TOs; we intend to consult on this in due course.

Figure 1: Current ESO Led, GB wide network planning arrangements



Non-load related network planning

1.9. In addition to the processes identified above, which focus on load related planning, network operators also undertake non-load related network planning. These activities are intended to maintain or enhance the condition or health of network assets. These activities do not always create new capacity; however, where an investment would address a shared need, ie it is load related and improves asset health, then it should be within scope of the new CSNP processes. Where planning is only related to non-load drivers, we would expect this to remain entirely within the remit of TOs.

Where we think the existing network planning processes can be enhanced

1.10. The current network planning processes, particularly the FES (first implemented in 2011), ETYS (first implemented in 2012) and NOA (first implemented in 2015/16), have helped coordinate plans for major investment in the network over the last several years. However, they were established at different times with their own separate drivers and whilst they have facilitated significant investment, the challenges that decarbonisation poses necessitate a change.

1.11. The current processes lack an overarching GB-wide strategic outlook. Further, the existing processes are limited by the classification of assets, eg Electricity Transmission, Offshore Transmission and Interconnection each have their own definitions in the Electricity Act 1989 and investment in each has their own drivers. The current processes also emphasise the delivery of new capacity, but do not consider system operability or stability to the same degree. The generation mix of the future will require a holistic approach to planning the network which considers all of the challenges together, to the extent that it is feasible to do so.

Clustering of large projects

1.12. In our previous consultation[6] we noted that one reason for undertaking ETNPR was to understand the advantages of 'clustering' the regulatory processes for large investments, eg as part of the Large Onshore Transmission Investment (LOTI) re-opener. It is our view that in principle there are no regulatory barriers to 'clustering' or dealing with multiple linked LOTI submissions.

Impact assessment

1.13. Where appropriate, regulatory proposals are accompanied by impact assessments (IAs) which assess and estimate the likely associated risks, costs and benefits that have an impact on business, individuals and the environment.

[6] Page 54 - Consultation on the initial findings of our Electricity Transmission Network Planning Review | Ofgem

1.14. Section 5A of the Utilities Act 2000[7] imposes a duty on the Authority (its 'Section 5A duty') to undertake an impact assessment in certain circumstances. In particular, that applies where it appears to the Authority that a proposal is important. A proposal is important for these purposes if its implementation would be likely to, among other things, "have a significant impact on persons engaged in commercial activities connected with […] generation, transmission, distribution or supply of electricity." Where this applies, the Authority is obliged to carry out an impact assessment.

1.15. We consider that we have carried out the required impact assessment in line with the Green Book [8] and our guidance,[9] and that it meets our obligations under the Utilities Act 2000 in a proportionate and transparent manner. To aid navigation, avoid repetition and improve readability, we have integrated the IA within this document, as opposed to producing a separate IA document. We consider this IA to be within scope of Public Sector Equality Duties and consider this proposal to be a non-qualifying measure for the Business Impact Target.[10]

1.16. With regard to the IA components, we have already identified the need we are addressing in our November 2021 consultation and rationale for change. We have repeated a number of these later in this document. In brief, improvements are required that will enable GB's ET networks to efficiently meet decarbonisation targets. Later in this document, we describe our objectives, the scale of load related investment, and the parties impacted (Table 7) in more detail. At this stage, the costs, benefits and risks of the CSNP (the single "do something" option in economic terms) can only be described qualitatively because the detail of the CSNP has not been developed. Therefore, in the IA we place emphasis on the logical change process (Theory of Change) described in the Green Book.

[7] Utilities Act 2000 (legislation.gov.uk)
[8] The Green Book (2022) - GOV.UK (www.gov.uk)

[9] Impact Assessment Guidance | Ofgem
[10] In broad terms, the duties set out in S.149 of the Equality Act 2010 require a public authority to have regard to a number of provisions that advance equality and avoid harms toward and between individuals with a range of protected characteristics. There are some overlaps between these duties and our statutory duties as set out in other legislation. The Small Business, Enterprise and Employment Act 2015 (SBEE Act 2015) creates a legal obligation on the Government to publish a Business Impact Target, and regulators are required to transparently report on the cost to business of qualifying changes to their regulatory policies and practices.

Related publications

Net Zero Strategy: Build Back Greener (October 2021)

https://www.gov.uk/government/publications/net-zero-strategy

The Climate Change Act 2008 (2050 Target Amendment) Order 2019 (June 2019)

https://www.legislation.gov.uk/uksi/2019/1056/contents/made

The Sixth Carbon Budget (December 2020)

https://www.theccc.org.uk/publication/sixth-carbon-budget/

Energy White Paper: Powering our net zero future (December 2020)

https://www.gov.uk/government/publications/energy-white-paper-powering-our-net-zero-future

The Ten Point Plan for a Green Industrial Revolution (November 2020)

https://www.gov.uk/government/publications/the-ten-point-plan-for-a-green-industrial-revolution

Proposals for a Future System Operator role (July 2021)

https://www.gov.uk/government/consultations/proposals-for-a-future-system-operator-role

Consultation on changes intended to bring about greater coordination in the development of offshore energy networks (July 2021)

https://www.ofgem.gov.uk/publications/consultation-changes-intended-bring-about-greater-coordination-development-offshore-energy-networks

Offshore Transmission Network Review: proposals for an enduring regime and multi-purpose interconnectors (September 2021)

https://www.gov.uk/government/consultations/offshore-transmission-network-review-proposals-for-an-enduring-regime

Consultation on our views on Early Competition in onshore electricity transmission networks (August 2021)

https://www.ofgem.gov.uk/publications/consultation-our-views-early-competition-onshore-electricity-transmission-networks

Future Energy Scenarios (July 2021)

https://www.nationalgrideso.com/future-energy/future-energy-scenarios/fes-2021

Digest of UK Energy Statistics (DUKES) 2021: Chapters 1-7 (July 2021)

https://www.gov.uk/government/statistics/digest-of-uk-energy-statistics-dukes-2021

Consultation on the initial findings of our Electricity Transmission Network Planning Review

https://www.ofgem.gov.uk/publications/consultation-initial-findings-our-electricity-transmission-network-planning-review

Network Options Assessment (January 2021)

https://www.nationalgrideso.com/research-publications/network-options-assessment-noa

Electricity Ten Year Statement (November 2020)

https://www.nationalgrideso.com/research-publications/etys-2020

Consultation stages

1.17. We consulted on the initial findings of our Electricity Transmission Network Planning Review in November 2021 and received 22 responses. We have provided a summary of responses to each question in the appendices to this document, see Appendix 1.

1.18. Now we are consulting on the Impact Assessment of the proposed changes, together with our 'minded-to' decision on the initial findings of our Electricity Transmission Network Planning Review.

Figure 2: Consultation stages

Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Consultation on the initial findings of our Electricity Transmission Network Planning Review open	Consultation on Impact Assessment and our minded-to decision open	Consultation closes (awaiting decision). Deadline for responses	Responses reviewed and published	Consultation decision
05/11/2021	08/07/2022	18/08/2022	09/09/2022	14/10/2022

How to respond

1.19. We want to hear from anyone interested in this consultation. Please send your response to the person or team named on this document's front page.

1.20. We've asked for your feedback in each of the questions throughout. Please respond to each one as fully as you can.

1.21. We will publish non-confidential responses on our website at www.ofgem.gov.uk/consultations.

Your response, data and confidentiality

1.22. You can ask us to keep your response, or parts of your response, confidential. We will respect this, subject to obligations to disclose information, for example, under the Freedom of Information Act 2000, the Environmental Information Regulations 2004, statutory directions, court orders, government regulations or where you give us explicit permission to disclose. If you do want us to keep your response confidential, please clearly mark this on your response and explain why.

1.23. If you wish us to keep part of your response confidential, please clearly mark those parts of your response that you *do* wish to be kept confidential and those that you *do not* wish to be kept confidential. Please put the confidential material in a separate appendix to your response. If necessary, we will get in touch with you to discuss which parts of the information in your response should be kept confidential, and which can be published. We might ask for reasons why.

1.24. If the information you give in your response contains personal data under the General Data Protection Regulation (Regulation (EU) 2016/679) as retained in domestic law following the UK's withdrawal from the European Union ("UK GDPR"), the Gas and Electricity Markets Authority will be the data controller for the purposes of GDPR. Ofgem uses the information in responses in performing its statutory functions and in accordance with section 105 of the Utilities Act 2000. Please refer to our Privacy Notice on consultations, see Appendix 4.

1.25. If you wish to respond confidentially, we'll keep your response itself confidential, but we will publish the number (but not the names) of confidential responses we receive. We won't link responses to respondents if we publish a summary of responses, and we will evaluate each response on its own merits without undermining your right to confidentiality.

General feedback

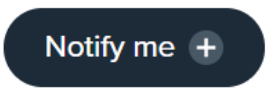
1.26. We believe that consultation is at the heart of good policy development. We welcome any comments about how we've run this consultation. We'd also like to get your answers to these questions:

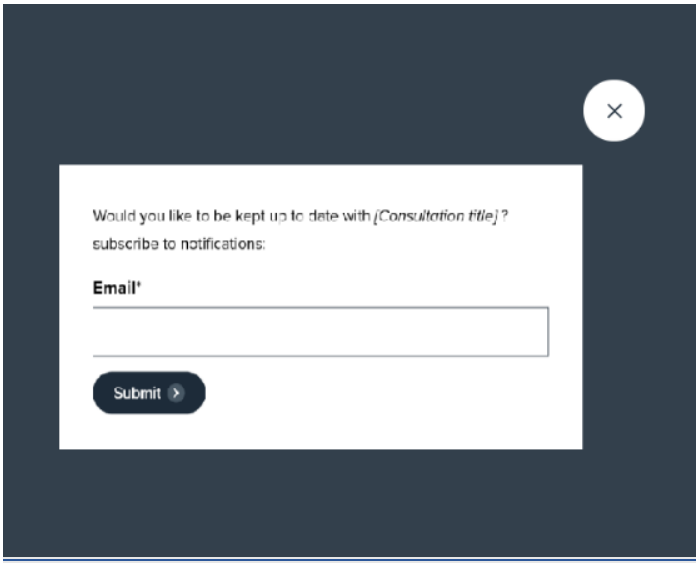
1. Do you have any comments about the overall process of this consultation?
2. Do you have any comments about its tone and content?
3. Was it easy to read and understand? Or could it have been better written?
4. Were its conclusions balanced?
5. Did it make reasoned recommendations for improvement?
6. Any further comments?

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

How to track the progress of the consultation

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





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

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

2. Minded-to decision: Centralised Strategic Network Planning (CSNP)

Section summary

This chapter sets out our minded-to decision relating to the creation of a new network planning process, the CSNP.

Questions

Question 1: Do you have any concerns with our minded-to decision?

New planning process to be led by the Future System Operator

What we said in our initial consultation

2.1. We proposed the creation of a new network planning output, called the CSNP. We intend for this new process to deliver the objectives below:

- "Facilitate proactive identification and progression of low regret 'strategic investments' in the network that are key to delivering the [2050] Net Zero target and the government's plans to decarbonise the UK power system by 2035.
- Facilitate strategic planning of the energy system such that networks and the energy system more generally, are planned alongside each other to maximise efficient utilisation of electricity networks.
- [As part of the above,] ensure that the onshore networks, offshore networks, and interconnectors are planned together.

- Provide viable routes for fair and transparent assessment and delivery of innovative and/or non-network solutions developed by third parties competing against other options."

2.2. We said that the CSNP should address all load related planning of the transmission network and the FSO would be best placed to lead it. To ensure timely investment by giving clear signals we said that our initial expectation is that a new CSNP should be produced every 2-3 years.

What respondents said

Centralised Strategic Network Planning

2.3. Whilst TOs generally disagreed with the need for the CSNP, some TOs were supportive of certain aspects of our proposals such as improved certainty and removal of the 'stop/start' annual process within network planning.

2.4. While TOs were generally supportive of the objectives of the CSNP, some felt that our detailed proposals would not address the primary objectives. Other respondents felt that making improvements to the existing arrangements, rather than a wholesale change, would better achieve our objectives.

2.5. Some stakeholders stated that we had not clearly articulated the problems within current network planning processes. These include, the need for a single entity to design strategic investments, the barriers in place to anticipatory investments and the design of GB-wide investment solutions.

2.6. One respondent noted it would be difficult for any one party to take a system wide view. A number of factors contribute to this including the aspiration to increase the number of licensees through competition.

2.7. Offshore transmission owners (OFTOs) generally supported our proposals.

FSO as the central planner

2.8. All TOs are opposed to our proposal that the FSO should be responsible for leading the centralised planning process, although the extent to which they disagreed varied. Some TOs saw value in the FSO having a coordinating role in the development of a strategic plan. One

TO felt that the TOs should retain all responsibility for the development of options for strategic investments. One TO also flagged the risk that centralised planning risked stifling innovation as one body would be responsible for leading planning.

2.9. A number of stakeholders said that the ESO in its current form does not have the required resources or competence to undertake the centralised planning process. At the same time, some stakeholders felt that the proposed process would be too reliant on the FSO in the future.

Our Minded-to Decision

2.10. Our minded-to decision is that there should be a new planning process called the CSNP that will incorporate all aspects of load related planning for the entire National Electricity Transmission System (NETS) (including offshore), as well as the incorporation of interconnection.

2.11. Our minded-to position is that the delivery of the CSNP should be led by the FSO. We acknowledge that there are skills and expertise the FSO will need to have to sufficiently deliver all aspects of the CSNP. Gaining this experience is a process that will require time. However,we expect that the potential timeline for an enduring process will allow for this to happen in time without diminishing the benefits of making enhancements to the existing processes in the meantime.

2.12. While we have reached a minded-to decision that there should be a new planning process to deliver the CSNP and it should be led by FSO, we have not decided on how the process should work. We set out potential steps for delivering a CSNP in our initial consultation, but these were not definitive. While we intend that the FSO leads the overall process of delivering a CSNP, within it there may beelements where it has a coordinating role, eg TOs and third parties generating options for non-strategic investments. Our minded-to decision, is to develop a more detailed process between now and the establishment of the FSO. We explain in Chapter 5 of this document how we intend to approach this work.

Reasons for our minded-to decision

2.13. There are multiple reasons to justify wide-ranging changes to the existing planning processes. If only one or two of the issues identified below were driving change, a more iterative approach to evolve existing network planning processes may be appropriate.

However, given the scale of the decarbonisation challenge and the level of change in processes envisaged, wider ranging reform is required.

The need to consider the transmission system as a whole

2.14. The NETS is defined in the Connection and Use of System Code (CUSC).[11] It is "the system consisting (wholly or mainly) of high voltage electric wires owned or operated by transmission licensees within Great Britain and Offshore". However, onshore and offshore elements have thus far been treated separately from a planning and regulatory perspective, ie offshore transmission was consideredakin to a connection asset until the ESO began to undertake the development of a Holistic Network Design (HND).[12]

2.15. With the Department for Business Energy and Industrial Strategy we commissioned the ESO to deliver the HND as part of the wider Offshore Transmission Network Review. The HND is a plan for connecting the offshore generation expected to be delivered as a result of Leasing Round 4[13] and ScotWind[14] leasing rounds, as well as a limited number of projects from other leasing rounds.

2.16. To ensure the optimum network is delivered, it is key that there is an overarching plan for the transmission system in its entirety – offshore and onshore. This plan should not distinguish between ownership or asset classification boundaries. It should focus on delivering the optimum technical solution for the energy system. For this reason, a new process and output that has a system wide view is required. The HND was an ad hoc arrangement and not the enduring solution we expect the CSNP to be.

The need for an overarching plan for developing the transmission system

2.17. The changes that the transmission system will experience, and facilitate, pose several challenges. Addressing these system wide challenges, in our view, requires a single overarching plan for the whole transmission system.

[11] Connection and Use of System Code (CUSC) | National Grid ESO
[12] download (nationalgrideso.com)
[13] Offshore Wind Leasing Round 4 | Offshore Wind Leasing Round 4 (thecrownestate.co.uk)
[14] ScotWind offshore wind leasing delivers major boost to Scotland's net zero aspirations - News - Crown Estate Scotland

2.18. An example of these challenges is the recent ScotWind leasing round, which awarded options to lease up to 25GW of wind around the coast of Scotland. Given that ~10GW of offshore wind generation is currently connected in GB, if all the planned generation connects, developing the required infrastructure will be a substantial challenge even with an overarching plan.

2.19. The ESO recently published a plan for facilitating the connection of this generation (and generation from the Crown Estate's Leasing Round 4) through new connection and reinforcement assets. This has been done through a bespoke process, HND and an update to the most recent NOA.[15] The ESO has worked collaboratively with TOs and developers in developing this plan and is likely to propose solutions that may not have been realised without one entity leading the process.

2.20. The HND includes onshore electricity transmission and offshore transmission assets as they are defined in the Electricity Act. We are currently undertaking a review of the HND to determine how different assets should be classified for the purposes of licensing. To date, these assets have been clearly distinguishable with network companies focused on their own assets only. . In the future, , we want planners to think about all the assets that make up the transmission system.

Providing clear and timely investment signals

2.21. Strong investment signals are required to ensure that the network capacity is ready when it is needed. The current annual planning process may risk timely investment, as a signal provided one year may be changed within the next iteration. This dilutes the efficiency of the existing processes as TOs may wait before developing proposals for new infrastructure in case a recommendation within the NOA changes.

2.22. The anticipated growth of certain types of directly connected generation means the risk of stranded assets may be relatively small compared to likely constraint costs. However, the risk of stranding still needs to be managed and mitigated. Therefore, a balance needs to be struck between an annual process which may delay investment, with a process that gives TOs or third parties a stronger signal for a longer period, but which may increase the risk of asset

[15] Network Options Assessment (NOA) | National Grid ESO

stranding. It is our view that the delivery of a new CSNP every two to three years achieves this balance.

Planning for the challenges of a changing system

2.23. The changing generation mix, and the increasing distances between where power is generated and where it is consumed, pose challenges to the system. These are not new problems; but could be exacerbated by the anticipated future generation mix. Some of the technical challenges that are heightened by a rapidly changing system are described briefly below.

2.24. The current GB-wide planning processes focus on thermal constraints at transmission boundaries. However, there are several other types of constraints: these can impact specific parts of the network (thermal and voltage constraints), be system wide (inertia) or are associated with network configuration (eg sub-synchronous resonance or sub-synchronous tortional interactions). We have described these briefly below.

2.25. Voltage constraints occur where:

- There is insufficient generation in a particular part of the network to support the local demand, or;
- There is too much generation and not enough demand which causes voltage to rise.

2.26. Another challenge posed to the system is an inherently lower level of inertia[16] than in the past. This is a result of the replacement of large conventional synchronous generators, eg coal-fired and gas-fired power stations, with non-synchronous generators, eg wind generation connected to the distribution or transmission system.

[16] Traditional conventional synchronous generators produce electricity with the help of rotating parts, and they rotate at the right frequency to help balance supply and demand and can spin faster or slower if needed. The kinetic energy 'stored' in these spinning parts is what is called system inertia. If there's a sudden change in system frequency, these parts will carry on spinning – even if the generator itself has lost power – and slow down that change while the system balance is restored by the ESO through intervention.

2.27. Oscillations and resonance can occur when the system frequency falls below 50Hz and the network is in a particular configuration - generators, overhead lines, system controllers or HVDC converter controllers may interact and cause oscillations or resonance. The system needs to be planned in such a way to ensure these events either do not occur or the risk of such events are mitigated.

2.28. There is a physical limit to the amount of power which can be transmitted through any piece of equipment on the network and often that limit is set to ensure that equipment does not become overloaded and overheat. Where this would occur the network is thermally constrained.The ETYS process identifies system boundaries that are thermally constrained and the NOA process results in recommendations for reinforcements.

2.29. While the ESO has started to procure services that help resolve the issues above, like the lack of system inertia through its Pathfinder projects, there is no single plan. The CSNP should make it more transparent how these issues are addressed within the network planning processes.

2.30. Given that the generation mix of the future is likely to pose several challenges, taking a system-wide view to addressing them is essential. By having a single planning process that considers all aspects of system planning, including operability, the central plan should be able to address all the challenges the system faces in the optimal way.

2.31. By considering all issues together, there may be an opportunity to use innovative solutions that a TO would not be naturally incentivised to consider, but that the FSO, with its different perspective, can consider. This could include non-network build or commercial solutions which could be facilitated by early or late competition models. The successful implementation of the CSNP aims to ensure all plausible options are available to address the challenges that the network will face.

Considering innovative, time-limited and non-network solutions

2.32. BEIS and Ofgem intend to require the FSO to carry out its functions in a way that it considers best to promote security of supply, which includes system operability. However, unlike the TOs that develop proposals for consideration in today's NOA, the FSO will not own network assets. Thus, it may be less likely to see a network build solution as the starting point for mitigating a constrained system.

2.33. Constraints may be temporary, and addressed through a time-limited, or innovative solution, rather than through building new network infrastructure. The FSO is likely to consider a wider range of solutions than may currently be the case, as they will be independent of other energy sector interests so should not have a natural bias towards one type of solution (eg network build) over another (eg a commercial solution).

2.34. Rather than stifling innovation, as one respondent noted, we see the CSNP as an opportunity to drive further innovation. By proposing that responsibility for leading the delivery of the CSNP sits with the FSO, we are increasing the likelihood that innovative and flexible solutions are considered.

Co-optimising the development of the transmission network with the wider energy system

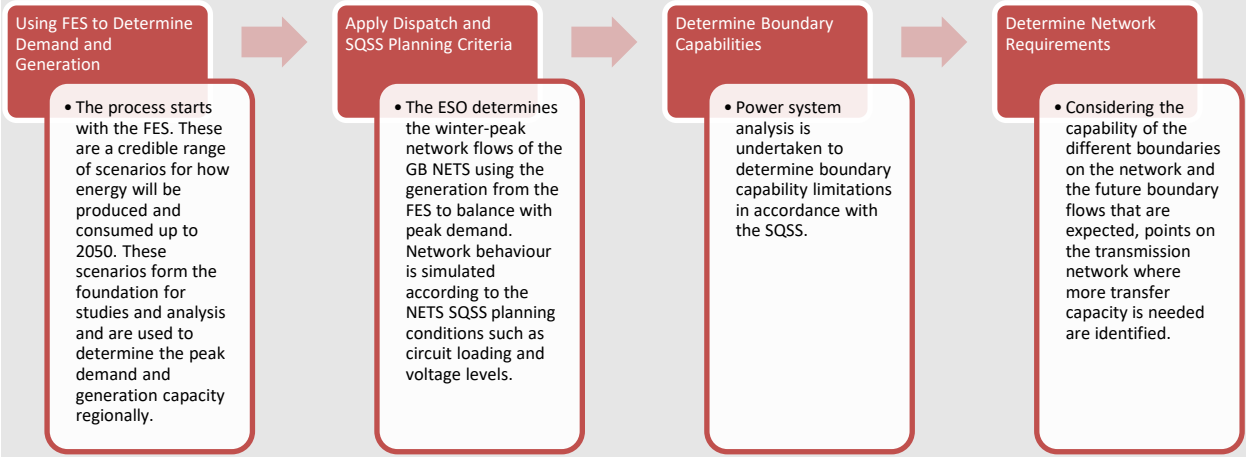
2.35. Not all users of the system (eg offshore wind, or new nuclear) will be able to choose where to connect. However, other users (eg operators of storage or electrolysers) will have more scope to do so. By providing signals within the network planning process, we may be able to mitigate the need for reinforcing the transmission network. If the network is constrained because of excess generation in a particular location, and there is some scope for additional demand to be in that part of the network, this may reduce the requirement to reinforce the network. In addition to this, the energy system is becoming more interconnected. Interactions between the different energy vectors are increasing, so it is important to consider wider energy system issues when thinking about the development of the electricity transmission network.

2.36. While developers of offshore wind, or new nuclear, may not be able to choose where to locate, decision-makers such as the Crown Estate or Government can be given advice by the FSO on where best to site new generation or demand.

2.37. Even if some network reinforcement is avoided because of cooptimisation, there is still likely to be a need for strategic reinforcements to the network in the future to facilitate the energy system's decarbonisation.

Facilitating strategic investment in the transmission system

Figure 3: Electricity Ten Year Statement Process

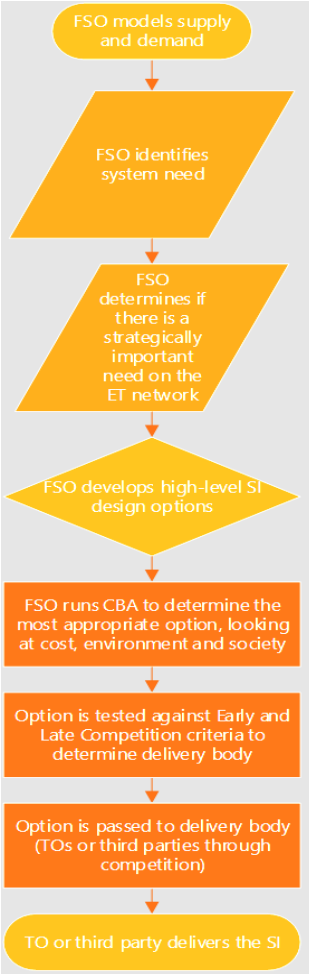


2.38. The current network planning processes identified within Figure [1] focus on planning for reinforcing constrained boundaries. The ETYS process summarised above within Figure [3] provides further detail on how constrained boundaries are identified today.

2.39. As we noted in our consultation (paragraph 4.12), while the term has yet to be defined, strategic investments are likely to focus on bulk transfer of power across GB, but they could also include investments intended to facilitate large new demand or generation. In other words, investments of a strategic nature are not only those which mitigate constraints. Investments that contribute to the delivery or connection of pieces of large infrastructure or facilitate the delivery of Government strategy could also be strategic. As an example, investments to facilitate the connection of the Hinkley Point C, a new nuclear power station may be considered a strategic investment.

2.40. It is our view that the FSO will be best placed to identify strategic system requirements given that it will take the ESO's current roles operating the system, identifying constrained boundaries, as well as managing the connections process. The FSO will have GB-wide visibility of the transmission system and its constraints. This will give the FSO the ability to consider whether to address several constraints together and develop initial options for addressing strategic requirements. The process by which the FSO could do this is summarised in Figure 4.

Figure 4: Strategic Investment identification process



2.41. We intend to consult separately on a means for determining what definition, criteria, or framework the FSO should apply when determining whether an investment is strategic or not.

Considering the environmental and community impacts of new infrastructure

2.42. New infrastructure will be required to decarbonise the energy system. The TOs (and other developers in the energy system) need to take account of community and environmental constraints (eg the valid concerns of communities impacted by proposed new infrastructure and areas of outstanding natural beauty respectively) when developing proposals, if they do not, proposed developments will not receive consent.

2.43. Developing a new process for network planning that includes consideration of environmental and community impacts will facilitate demonstrable, transparent consideration of environmental and community impacts by network licensees at an earlier stage than occurs today. As a result of the CSNP, TOs and other delivery bodies should be able to demonstrate

consideration of the cumulative impact of new infrastructure if they can reference a single strategic plan which addresses all load related investments.

2.44. When developing new network-wide planning methodologies, we expect the FSO will have due regard to the appropriate planning and consenting processes when undertaking the earliest stages of spatial network planning.

2.45. Whilst the output of a new planning process may give visibility of the cumulative impact, this may not be enough to secure the support of impacted communities. To ensure the outputs of the new CSNP process stand up to challenge, we are seeking to address concerns around transparency at earlier stages in the planning process, such as when estimating future load.

Transparency in all stages of the network planning process

2.46. Several stakeholders have noted that the existing processes lack transparency. Concerns were raised about all stages of the GB-wide planning processes, ie FES, ETYS and NOA. However, the stages of planning undertaken by TOs (prior to non-statutory consultations on consenting) are likely to be even less obvious to stakeholders. Given that the CSNP should encompass all load related planning and inform a central plan, it is important that stakeholders have visibility of how that plan is developed. This includes potential decision-makers such as Ofgem, the Department for Business Energy and Industrial Strategy (BEIS) or planning bodies, but also impacted communities who may have concerns about proposed infrastructure. Ensuring transparency means that the justification for infrastructure should be more easily defended than if stakeholders do not know why one solution is preferred over another.

2.47. It is our view the fact the FSO is intended to be an independent public corporation means it is best placed to develop a transparent process. Moreover, the FSO's GB-wide role should provide the body with the visibility required to implement this process and supports our view that they should be responsible for leading the implementation of the CSNP.

FSO as the central network planner

2.48. In some respects, the CSNP would be a development of the ESO's current duties and obligations, constituting a core part of the FSOs future role. This is due to its future role operating the GB transmission system and its significant capability in power system

engineering, economic forecasting, and assessments that it utilises to carry out its existing duties. Thus, we consider it is best placed to be the network planner. However, we recognise that it will need to build upon its existing competencies to deliver the CSNP.

2.49. Furthermore, as illustrated at various points in this chapter, the independent nature of the FSO and the intention that it be a public corporation make it an appropriate body to lead the CSNP. It should not have a natural incentive towards a particular type of solution as it will not commercially benefit from recommending more network capacity be built. This means that it may be more likely to consider innovative solutions such as procuring a service than recommending new network be built. As an independent public corporation which should also be responsible for strategic planning of the gas network and have a statutory duty to have regard for whole system impacts, it should also be better placed to advise Government on the development of the wider energy system than a privately owned organisation might be.

3. Impact Assessment: Scale of load related investment

Section summary

This section describes how we have estimated the scale of load related investments in the electricity transmission network between 2025 and 2040 that could be impacted by the CSNP. We also explain the qualitative impacts of the CSNP.

Questions

Question 2: Do you agree with how we have estimated the scale of load related investments?

Question 3: Do you agree with the impacts of introducing the CSNP that we have identified? Do you think there are other impacts not currently addressed?

CSNP Impact Assessment

3.1. By including Sections 3 and 4, this document also provides an IA as well as explaining our minded-to decision. At this point we do not provide a quantitative assessment of the potential impacts of the CSNP. This may be possible in future iterations as further detail on the CSNP is developed.

Estimated scale of load related expenditure

3.2. As noted earlier in this document, the detailed methodology for the CSNP is yet to be developed. Once this is done, we expect to be able to show examples of network planning outcomes that demonstrate the potential savings due to the CSNP. However, we do not think it will be possible or feasible to estimate the full cost reduction compared to existing arrangements.

3.3. In this chapter, we have provided an estimation of the scale of future load related expenditure that will be in the scope of early iterations of the CSNP, so that stakeholders can get a view of the magnitude of future investments that may be in scope of the CSNP. We

have done this for a period for which we are reasonably confident we can make an accurate estimate.

3.4. We expect that the CSNP will be implemented by 2024/25. This means that investment decisions could begin to take place from April 2025. To estimate the potential load related investment, we have included:

- Approved investments that are part of the RIIO 2 baseline allowances.
- Known or proposed investments that may come forward via RIIO 2 'reopener' uncertainty mechanisms.
- Investments in offshore transmission:
    - Investments which may come forward because of the Holistic Network Design (HND) or its follow-on exercise – this includes the connection of up to 32GW of new offshore wind generation by 2030.
    - As well as other investments in connecting 14GW of offshore generation which are outside the scope of the HND because they are later in their development cycle.

3.5. We have only estimated the scale of load related investment until 2040, as it is likely that similar levels of expenditure may be required between 2030 and 2040 as will be required between now and 2030. Due to greater uncertainty around the future for the demand and supply of energy beyond 2040 and any policy decisions that might be made about achieving decarbonisation we have chosen not to estimate the scale of load related expenditure beyond this point.

3.6. The estimates used in this document are purely for the purposes of giving stakeholders a view of potential future load related capex that the CSNP may impact. This document does not seek to endorse or approve any potential future expenditure, and the figures in this chapter should not be used for any purpose, other than for providing an estimate of the potential monetary impact of the CSNP.

Onshore Load Related Capex

Load Related Capex – baseline funding approximation

3.7. As part of our RIIO 2 Final Determinations, we have set baseline allowances for load related capital expenditure for the three onshore TOs in Great

Britain.[17] This allowance is equal to £2.71bn for the three TOs for the period of April 2021 to March 2026. We would expect network investment due to the first CSNP to be incurred from April 2025, as such, we have calculated the annual average of the total RIIO 2 allowance and used this as the basis for CSNP driven expenditure in the final year of RIIO 2.

3.8. For this exercise we have assumed that baseline allowances between now and 2040 will be equivalent to those in RIIO 2. We cannot be definitive about the revenues licensees will be allowed to recover until the relevant price control review has been completed. Table 4 below shows an estimate of potential load related baseline expenditure if we assume similar levels of expenditure as RIIO 2 for the period from 2025 to 2040.

Table 4: CSNP Impact Assessment - potential load related baseline expenditure from 2025 to 2040 (2021/22 price base, £bn)

Price Control Time Period	Potential Expenditure
2025 - 2026	0.59
2026 - 2031	2.94
2031 - 2036	2.94
2036 - 2040	2.94
2025 - 2040	**9.42**

Reopeners

3.9. In our RIIO 2 Final Determinations, we said that due to uncertainty when the price control was set we would use uncertainty mechanisms to fund further upgrades during the period. This would allow decisions to be made when more information was available.

Medium Sized Investment Projects

3.10. The Medium Sized Investment Projects (MSIP) re-opener, for example, provides TOs with an annual opportunity to request additional funding for sub-£100m projects, many of which may be critical for achieving Net Zero.

[17] RIIO-2 Final Determinations for Transmission and Gas Distribution network companies and the Electricity System Operator | Ofgem

3.11. We don't currently have an accurate indication of how much funding may be requested in RIIO 2 through the MSIP process. For this reason, we have chosen to exclude this potential investment from our estimate. However, we may include further data regarding MSIP in a future iteration of the impact assessment if more information is available.

Large Onshore Transmission Investments

3.12. The LOTI re-opener provides TOs with an opportunity to request funding for projects with a value greater than £100m.

3.13. As a result of NOA 7, we understand that further LOTI funding requests are likely to be made. While we expect further requests in this price control period, we have not included these within our estimate. We expect TOs to request an additional £14bn[18] in the period from 2025 to 2031 (which would be the end of another five-year price control period). As we would expect the CSNP to have an impact on investment decisions from 2025, this is the portion of potential expenditure from possible upcoming LOTI submissions that we will use for the purposes of this document.

3.14. Table 5 below shows an estimate of potential load related expenditure related to LOTI reopeners that will be incurred from 2025 to 2040, assuming that similar levels of expenditure may be required between 2031 and 2040 as will be required between 2025 and 2031.

Table 5: CSNP Impact Assessment - potential load related LOTI expenditure from 2025 to 2040 (2021/22 price base, £bn)

Price Control Time Period	Potential Expenditure
2025 - 2026	1
2026 - 2031	12.5
2031 - 2036	12.5
2036 - 2040	12.5
2025 - 2040	**38.5**

[18] This figure is the potential forecast estimated expenditure from NOA 7 for the period from 2025 till 2031, for all projects with a value greater that than £100m. This is provided to Ofgem by National Grid ESO. Funding decisions have not been made for these, and these estimates are subject to change.

Offshore Load Related Capex

3.15. The government has set an ambition to deliver up to 50GW of offshore wind generation by 2030.[19] Approximately 11GW of this is already connected to the network. A further 23GW have been planned for through the first iteration of the HND. This includes all of the Leasing Round 4 Projects and 11GW of ScotWind, as well as some projects from earlier leasing rounds. A further circa 14GW of the ScotWind projects will be planned for in a second HND exercise in 2023.

3.16. It is estimated that the 23GW that has been planned for through the first HND will cost £32bn to connect.[20]

3.17. To estimate the cost to connect the remaining 14GW of ScotWind projects, we've used the same assumptions here as for Ofgem's Impact Assessment of the OTNR's Pathway to 2030 workstream's minded-to decision on the Delivery Model. This estimates a capex of £0.8m per MW of offshore wind generation. Using this £ per MW 'unit cost', we estimate that around a further £11bn capex will be incurred by 2030 to connect the remainder of ScotWind in a second HND.

3.18. Table 6 below shows an estimate of potential expenditure related to Offshore Load Related Capex that will be incurred from 2025 to 2040, assuming that similar levels of expenditure may be required between 2030 and 2040 as will be required between now and 2030.

[19] British Energy Security Strategy - https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy
[20] This figure is provided to Ofgem by National Grid ESO and is subject to change.

Table 6: CSNP Impact Assessment - potential Offshore load related expenditure from 2025 to 2040 (2021/22 price base, £bn)

Time period	HND 1 Capacity	HND 2	CSNP
2025 - 2030	32	11	
2030 - 2040			43

3.19. From our above estimate of the various types of future load related expenditures, we have estimated that the CSNP is likely to impact a potential £134bn of future load related expenditure.

Qualitative Impacts of the CSNP

Impacts

Ofgem

3.20. We expect that there will be minimal costs associated with the regulatory oversight of the CSNP. However, we may have to develop arrangements to allow decisions relating to approving strategic investments. This may be via existing processes, eg LOTI or new regulatory processes that are yet to be developed.

ESO/FSO

3.21. Should the FSO take on the role of leading the CSNP, there will be a substantial increase in the FSO's roles and responsibilities compared to the ESO today. Investment will be required to establish dedicated teams comprised of experts in areas such as power system engineering, economics and planning. This investment is required to ensure the FSO has the skills, knowledge and capabilities to successfully execute this role. However, we believe that these costs are small in comparison with the potential benefits and so the benefits of creating a robust network planning process will outweigh any cost from increased resource requirements for the FSO. The CSNP also aligns with wider policy objectives of Ofgem and Government, e.g. decarbonisation of the energy system and the establishment of the FSO.

TOs

3.22. We expect that TOs will work to support the FSO through the development of investment options, sharing knowledge and data across organisational boundaries. Whilst some of these requirements will be a continuation of existing arrangements, there may be

additional costs which arise from an increased necessity for joint working or considering additional types of constraints within the CSNP compared to the status quo.

3.23. There is a potential that TOs costs will change (increase or decrease) because of the CSNP. This may emerge through the loss of expertise within TO businesses as the FSO grows and is required to upskill with key professionals, such as system planning engineers, to successfully deliver a CSNP. This may result in the TOs and FSO competing for staff, where a capability is required within the TO and the FSO. However, we do not expect this will negatively impact consumers overall. Alternatively TO could scale back some of their planning activities depending on the roles and responsibilities decided upon.

OFTOs

3.24. In the future the distinction between what is considered onshore electricity transmission and offshore transmission may not be as clear as it has been historically, where offshore transmission has largely involved a radial link from an offshore windfarm to shore.

Generators

3.25. Due to efficiencies created by holistically planning generation and transmission together, and strategically planning the network across GB, we anticipate that generators could benefit from more timely connections to the network.

Consumers

3.26. The introduction of the CSNP process should result in reduced consumer cost through reduced constraint payments (lower balancing use of system charges) and a more economic and efficient, or innovative network (lowering transmission network use of system charges) than might be the case under the status quo. Table 7 showcases an overview of the potential impacts upon consumers and stakeholders from introducing the CSNP.

Table 7: Overview of stakeholder impacts

Stakeholder	Qualitative range	Comments
Ofgem	-	Limited costs
FSO	--	Cost of inhouse expertise, however, in line with broader government policy
TOs	-	Potential for some additional costs
Offshore TOs	+	Potential for increased revenue through competition
Generators	++	Quicker connections
Consumers	+++	Reduced cost through innovation in network solutions and reduced constraint costs

--- Significant cost relative to business as usual (BAU

-- Moderate additional cost relative to BAU

- Low additional cost relative to BAU

+ Small benefit

++ Moderate benefit

+++ Significant benefit

Risks

3.27. We have summarised the potential risks associated with the development of CSNP in Table 8 below.

Table 8: Overview of stakeholder impacts

Stakeholder	Likelihood of risk arising	Impact of risk arising
Reliance on single organisation (eg, FSO) which may fail to deliver quality outputs.	Low	Medium
Innovative solutions are not considered by the FSO.	Low	Medium
FSO fails to source the right skills in sufficient quantity.	Medium	High
Options and decision making are worse as a result of only one organisation leading the process.	Low	Low
Network planning lacks transparency.	Low	Low
Risk of FSO being unduly influenced by industry.	Low	Medium

4. Impact Assessment: Theory of change

Section summary

This chapter explains our Theory of change for the CSNP. It outlines the various policy steps and responsibilities in developing the CSNP process.

Questions

Question 4: Have we omitted any inputs, activities, outputs, or impacts that should be included?

Question 5: Have we included any inputs, activities, outputs, or impacts that should be omitted?

Theory of change

Overview

4.0. This chapter includes an explanation of our initial Theory of Change (ToC) for developing the frameworks for delivering the CSNP. This model is shown in Figure 5 below. This diagram shows the proposed inputs, activities, and short, medium and long-term outcomes of replacing the current network planning processes with the CSNP. Within Figure 5, the key shows the different bodies responsible for individual, or shared activities within the ToC model. This is illustrated through the first stage of the ToC.

4.1. As the methodology is still to be developed, the ToC is in draft form, and will be developed further to display additional resources and expertise utilised, or further stages of policy development required.

Inputs

4.2. Figure 5 shows that there are three key bodies who are proposed to be responsible for the inputs of the CSNP. These include Ofgem, ESO and BEIS internal resources; however, it is expected that each body may also utilise external consultancy in the next 1-2 years.

Activities

4.3. Jointly, Ofgem and BEIS should work together on establishing the roles and responsibilities of the FSO so that it can take on its proposed role as the Central Network Planner of the CSNP.

4.4. We intend to develop a definition of strategic investment which will be utilised to identify those investments we currently expect the FSO will develop solutions for.

4.5. We will continue to work on identifying interdependencies with related areas or work and to overcome any potential barriers to implementation. This will aid in ensuring cohesion across programmes and developing a more robust output. Related areas of work include, but are not limited to OTNR, interconnectors, competition in networks, charging and electricity distribution.

4.6. As part of our work, we will also seek to determine roles and responsibilities for bodies such as the FSO, TOs, third parties and any additional roles that Ofgem may be required to take forward when implementing the CSNP, e.g. for approving strategic investments.

4.7. Throughout this process, Ofgem and ESO should conduct extensive stakeholder engagement through internal and external consultations, webinars, working groups and strategic advisory groups. These actions should guide policy development, aimed at achieving buy-in from external bodies and more informed decision-making. Together, both bodies should develop internal and external implementation plans and activities, ensuring cohesion across Ofgem and ESO and proactively preventing any potential unintended consequences within policy and practice. Furthermore, Ofgem and BEIS should work collaboratively to determine key areas of system need. This will consider the feasibility and practicability of the expansion of current analytical processes, for example including factors such as voltage and inertia within the network planning process to create more holistic outputs.

4.8. Drawing upon their expertise and skills, the ESO should lead on the development of key areas of the CSNP such as development of an alternative future supply and demand model (eg replacement of, or enhancements to, the FES) and a cost benefit analysis (CBA) tool which takes into account financial cost, environmental, and societal impacts (while ESO will develop the tools, FSO will be responsible for using them after it is established). Ofgem intends to approve these tools once they are produced to ensure they address our

requirements and the objectives set out within our initial consultation, e.g. the need for transparency and stakeholder engagement. We will consult before making any final decisions.

Outputs

4.9. From the activities set out above, there are a range of key short-term outputs which will emerge from the CSNP. Firstly, through implementation of the FSO, and agreement of roles and responsibilities, the ESO will have new duties.

4.10. The ESO should identify strategic investments and create a new network planning process called the CSNP. Within the CSNP there should be transparent and robust energy modelling, a new CBA tool and the CSNP will advise government on siting of a range of energy vectors such as hydrogen or nuclear energy to improve efficiency within whole system energy planning.

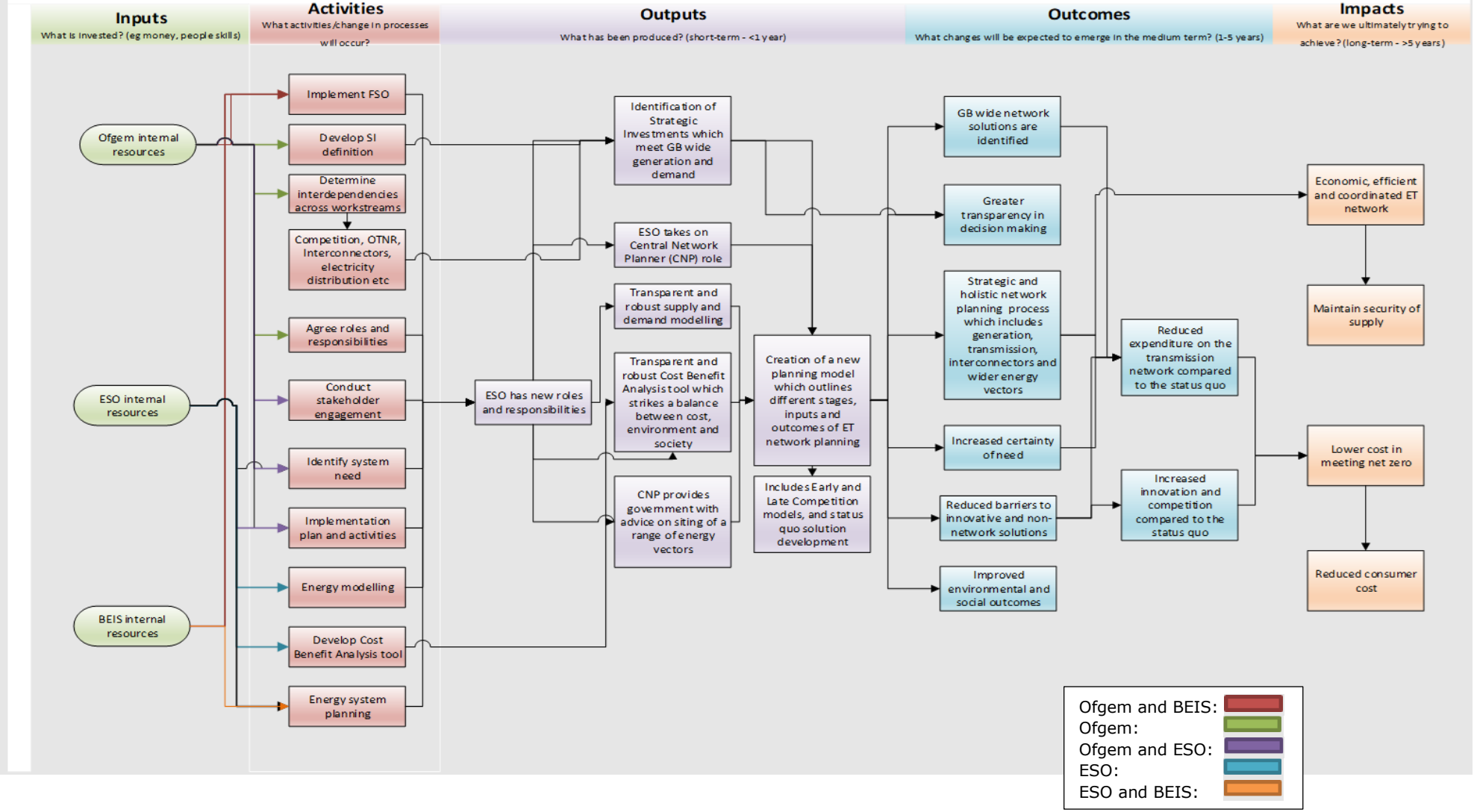
Outcomes

4.11. In the medium-term, there will be a range of key outcomes which follow the initial development and implementation of the CSNP. These include the high-level design of strategic investments and the creation of a strategic and holistic network planning process. Thereafter, mitigating the risk of delays to obtaining Net Zero targets because of network planning.

Impacts

4.12. From developing and implementing the CSNP, it is expected the key impacts will be a more economic, efficient, and coordinated network which will maintain security of supply within GB, and reduced consumer cost in decarbonising the network and meeting Net Zero relative to the existing frameworks.

Figure 5: Theory of Change



5. Transitional CSNP

Section summary

In this chapter, we provide an update on transitional CSNP arrangements, the work that has already been done and the next steps between now and the establishment of the FSO.

Transitional CSNP

What we said in our consultation on Transitional CSNP

5.1. In our consultation, we recognised that developing the detailed policy, methodology, and relevant code and licence changes to deliver all the objectives of the CSNP may take some time. We also recognised that the FSO would likely have to be in place before a CSNP could be fully delivered. Therefore, our consultation proposed putting in place transitional arrangements.[21]

5.2. We said the primary purpose of the first transitional CSNP arrangements would be to ensure that the ESO identifies key investments on the onshore network that can integrate the offshore wind generation aspirations expected by 2030, in a timely manner such that the onshore transmission network isn't a 'blocker' to the to achieving Government's targets.

5.3. As such we proposed the ESO should work with key stakeholders to develop transitional arrangements in 2022 that, as a minimum:

5.3.1. Clearly and transparently identify low regret required investments on the onshore and offshore electricity transmission network that is key to delivery of the HND, ie strategic investments on the onshore network that are key to integrating 40GW of offshore wind generation that is expected by 2030.

5.3.2. Are based on transparent, plausible future energy demand and supply scenarios.

[21] See sections 4.37 – 4.43 of our initial consultation.

5.3.3. Assess options for addressing system needs based on a robust cost benefit assessment methodology that strikes an appropriate balance between cost and environmental and community impact.

5.4. We considered that there should be strong leadership from the ESO to scrutinise and challenge inputs from other stakeholders and to coordinate network needs and developments. In practice, we anticipate that the ESO would need to work with TOs and other key stakeholders to ensure that analysis is robust and appropriate and deliverable strategic investment options are identified.

What Respondents said on our initial consultation on Transitional CSNP

5.5. Most respondents supported our proposals for transitional CSNP outputs to improve clarity and certainty when integrating onshore and offshore network planning prior to the implementation of our longer term 'enduring' CSNP proposals, and the need to establish skills and capabilities within the ESO as it evolves to become the FSO.

5.6. TOs raised concern that the timeline for a 2022 output was not realistic or deliverable, with one TO stating that it was a distraction from the 2030 offshore wind targets. One respondent, whilst supporting the transitional arrangements, stated that this stage should be utilised to reduce TO responsibilities within network planning. Moreover, another stakeholder showed support for the proposal, outlining that the transitional arrangements mitigate economic risk upon consumers.

Transitional CSNP 2022

5.7. The ESO will shortly publish a suite of documents that together address the objectives set out in paragraph [5.2] above and those of the Offshore Transmission Network Review Central Design Group. The HND provides a blueprint for the offshore transmission infrastructure required for 2030, while the updated NOA indicates where onshore reinforcements are required.

Transitional CSNP 2023

5.8. We will work with the ESO to learn from the initial HND and the updated NOA so that lessons can be applied in a second transitional CSNP in 2023. The HND will need to be updated to incorporate the full scale of ScotWind – this will lead to consequential changes to the onshore reinforcements required in 2023. The HND published this year incorporates a first

tranche of 11GW of ScotWind projects, the remainder will be included in work to be concluded in 2023.[22] Lessons from both the 2022 and 2023 processes can then be applied to the enduring frameworks. Any formal changes to the existing processes will be made through the appropriate change control processes.

[22] https://www.nationalgrideso.com/document/239686/download

6. Next steps

Section summary

This section outlines how we intend to structure our work as we move into the next stages of the review, as well as explaining how we intend to engage with stakeholders moving forward.

Structuring the next stage of our work

6.1. As outlined in our initial consultation, we structured the ETNPR to focus on the following key topics to try and deliver the objectives of the review. To date, our work has focused on the first topic. The remainder of this chapter explains how we will address the outstanding topics. We explain the topics in more detail within the initial consultation.[23]

1) Strategic clustering of large projects and centralisation of planning.

- Consider clustering or grouping together two or more large, related projects for purposes of the regulatory approval and planning consent processes.

- Develop a more centrally planned approach to planning and developing the strategic network investments.

2) **Analysis and decision-making methods for network planning against uncertainty**.

- Consider decision-making processes where there is uncertainty about the future. This includes reviewing the existing FES, ETYS and NOA tools to understand whether they effectively deal with uncertainty. This includes consideration of long- versus short-term solutions given the changing nature of the system.

[23] Consultation on the initial findings of our Electricity Transmission Network Planning Review | Ofgem

- Ensure efficient, accurate and robust data exchange between parties, including the need for transparency and quality assurance of data.

3) **Breadth of solutions, covering whole system solutions and innovation**.

- Considers how network planning arrangements can enable adoption of whole system solutions across regulated networks and beyond, for example by considering the broader energy system.

- Ensure that all potential electricity transmission network investment options are considered so that innovative alternatives are taken into account, or so that a short-term solution can be used to address a short-term challenge.

4) **Roles and responsibilities in network planning, including the early development of solutions and designs**.

- Considers the current division of roles and responsibilities in ET network planning.

- Take forward changes to codes and licences to implement new roles and responsibilities.

Outstanding areas of work

6.2. In the next steps of review, we will focus on topics 2-4 above. However, the immediate outstanding action from the first topic is to define strategic investment as noted previously.

Topic 1: Strategic Investment

6.3. We provided initial views on what could form a strategic investment in our consultation. Our initial view is that strategic investments, at least at first, should relate to investment covering 'key' parts of the GB network that are necessary for the bulk transfer of electricity and/or that are strategically important to the GB energy system for other reasons.

We are currently developing our thinking on how to define strategic investment for the purposes of the CSNP. We intend to publish a further consultation on this topic later this summer.

Topics 2, 3, and 4

6.4. To allow us to focus on specific aspects of the review more easily we have broken the topics in to different work streams. These are illustrated in the table below. We will consult on specific policy proposals at the relevant time as our work progresses.

Table 9: ETNPR Workstreams

Workstream	Summary of issues	ETNPR Topics
Modelling future demand and supply	How future energy demand and generation can be identified robustly and used in network planning.	2
Investment planning under uncertainty	Put in place arrangements so that all aspects of load related network planning are considered, these include: • Appropriate analytical and decision-making processes exist for identifying and addressing system needs. • Appropriate levels of anticipatory investment occur. • Appropriate consideration is given to long versus short term solutions for challenges with different timeframes. • Appropriate consideration of environmental and community impacts at all stages.	2
Power system analysis and compliance	• Understand extent to which compliance with Security and Quality of Supply Standard is considered as part of network planning processes. • Consider whether responsibility for ensuring the NETS is SQSS compliant should be the responsibility of the FSO, the TO, OFTO, the relevant CATO (assuming legislation is passed in the future) or all parties. • Define which power system assessments (including for operability) should be carried out as part of network planning to inform the CSNP.	2 & 4

Innovation and competition	• Ensure there are no barriers within the network planning processes to all reasonable solutions being adopted and applied, ie where a short/medium term or innovative solution is best it should be used. • Ensure that network planning arrangements provide a gateway to the appropriate competition model (early or late) in onshore networks.	3 & 4
Data exchange and assurance	• Develop arrangements to ensure data is robust, accurate and is shared securely between relevant organisations (eg FSO, TOs, BEIS, CATOs) in a timely manner.	2
Energy System Planning	• Develop arrangements that allows the FSO to provide advice on the development of the wider energy system as well as respond to feedback when planning so that the network and the wider system are co-optimised.	3
Roles and Responsibilities in Network Planning	• Review current roles and responsibilities for network planning including the impact connection offers has on wider system planning. • Develop clear arrangements so that all parties understand their roles and responsibilities with regard to network planning, eg who will lead the development of solutions for strategic investments versus non-strategic investments.	4
CSNP Implementation	• Develop proposed licence modifications and/or regulatory guidance to implement policy positions reached under earlier workstreams. • Develop a view of where code modifications may be required to implement decisions under other workstreams. • Understand the best delivery route for any code modifications that may be required.	N/A

Appendices

Index

Appendix 1 – Summary of consultation responses

1.1. We have considered all responses[24] when reaching our minded-to decision. As we develop the next level of detail in our policy proposals for the CSNP, we will return to responses to our initial consultation where they might inform our proposals, eg on issues related to success criteria, the CSNP enduring vision and roles and responsibilities etc.

Question 1: What are your views on our key objectives for future ET network planning arrangements that can deliver Net Zero at the lowest cost to consumers?

1.2. All three TOs agreed with the objectives, acknowledging the benefits arising from having a CSNP increased certainty and that it would give a holistic GB wide view of network requirements. However, two TOs stated that whilst they agreed with the objectives, they did not feel that the proposed CSNP process meets them. Moreover, one TO stated that the consultation didn't identify or quantify the limitations of the existing FES, ETYS and NOA processes. This TO noted TOs roles were understated within the proposed changes presented within the ETNPR consultation.

1.3. Four stakeholders responded that the CSNP is too focused on cost reduction. Another seven respondents raised that it is vital to consider environmental and community factors from the outset, and iteratively review any potential impacts throughout the different stages within the CSNP process.

1.4. Five stakeholders agreed with the objectives set out and felt that there should be no distinction between onshore and offshore load-related network planning. Thus, instead moving towards an integrated approach to ensure that the network is prepared to meet Net Zero targets.

1.5. One respondent suggested that DNOs be included within the CSNP, as distribution impacts the transmission system, and that the inclusion of DNOs would fully enable holistic network planning.

[24] We have published responses alongside our initial consultation - Consultation on the initial findings of our Electricity Transmission Network Planning Review | Ofgem

Question 2: Are there any other key workstreams that interact with this review that we need to align with?

Table 9: Key workstreams to align to the ETNPR

Workstream	Number of respondents seeking alignment
Offshore Transmission Network Review	10
Nationally Significant Infrastructure Project	7
Early and late competition	5
National Energy Policy Statement	4
Future System Operator	4
Network charging	2
RIIO	2
Whole system obligations, industry codes and framework changes	2
Generation	1
Construction, operation and decommissioning of assets	1
Levelling up agenda	1
Interconnection	1
Distribution system operator	1
Battery storage	1
Electric Vehicle charging	1
Electric heat	1

Question 3: Do you have any views on the scope of the review? Are there any key topics that we have missed?

1.6. Two respondents stated that the CSNP was too focused on cost and required greater consideration of socio-economic and environmental impacts, with a further two stakeholders highlighting the need to meet Net Zero at the lowest cost to consumers, whilst also considering environmental and community impacts.

1.7. Two stakeholders suggested the ETNPR should consider a whole energy system approach, which considers additional energy vectors such as hydrogen, heat, storage, and flexibility assets. Moreover, one respondent stated that the review should not be limited to load-related investments and should also consider non-load related investments.

1.8. One respondent stated that FSO's proposed strategic investments should have counter designs that are provided by both TOs and third parties under early or later competition.

1.9. Three stakeholders, including one TO, stated the need to consider governance, roles and responsibilities, accountabilities and codes and changes required for implementation. Moreover, one TO stated that there is a need to consider the impacts of the CSNP on supply chains, raising that there could be greater investor costs, or a lack of innovation and expertise due to the uncertainty that is created by the CSNP.

Question 4: Do you have any views on the success criteria? Are there any key areas that we have missed?

1.10. Three stakeholders stated that there should be criteria which aim to minimise onshore infrastructure and all resultant negative environmental and community impacts. One respondent requested that criteria should be included which analyses how likely the network option is to bolster public support whilst also not undermining the delivery of key infrastructure required to meet net zero.

1.11. Two respondents requested greater focus on the potential for the CSNP process to reduce cost, including cost of delays from constraints.

1.12. One respondent suggested including criteria which analyses the feasibility of the network planning process to enable competition.

1.13. One TO did not agree with the success criterion 'D2. Simple to develop and implement'[25] as meeting Net Zero is inherently complex and will only become more complex. This TO also did not believe that simplicity is a measure of success. Moreover, the TO stated that the CSNP need to consider how non-transmission parties will be impacted as part of the CBA, including cost and opportunities across industries.

1.14. One TO suggested including criteria such as additional value to consumers compared to the status quo, the level of stakeholder inclusion, and accountability to outputs. However, this TO also stated that the NOA should be scored lower than within our analysis presented in the

[25] See Appendix 1 - Consultation on the initial findings of our Electricity Transmission Network Planning Review | Ofgem

November consultation as the 'stop/start' nature of the NOA does not create confidence for long-term planning, and only considers transmission, whilst a whole system approach is needed.

1.15. Multiple TOs and non-TO respondents stated that the CSNP should be rescored against the criteria once the methodology is known to enable more robust analysis and comparisons between the two processes.

Question 5: What are your views on our enduring vision for Centralised Strategic Network Planning?

1.16. Two stakeholders stated that the enduring process was too focused on economic, technical, and regulatory issues, expressing that this may result in increased community resistance, causing TOs and third parties to fail to receive planning consent. Thus, creating delays to key investments required.

1.17. Two stakeholders were supportive of the Enduring CSNP but felt that competition had not been fully considered within the process and should have a more central role. Moreover, one of these respondents disagreed with the high degree of TO involvement, instead seeking greater FSO autonomy.

1.18. Two TOs were supportive of the CNP identifying system need but felt that whilst the CSNP increases coordination and certainty, we did not understand the trade-off with the increased time, cost, resources, and complexity that the CSNP created. Both TOs felt that competition had not been fully considered and that innovation would be lost by the CNP developing options in isolation.

1.19. One respondent outlined their support for the move towards scenario planning, and away from FES, stating a lack of transparency within current modelling of future supply and demand. Moreover, they stated support for the introduction of clustering.

Question 6: Do you have any views on the proposed central network planner's role, what that planner might be, and how it may perform this function?

1.20. Whilst supportive of the CNP role, seven stakeholders outlined their concerns that the ESO does not have the skills, knowledge, expertise, or resources required to successfully enact the FSO role, and the need for this to be secured for implementation of the enduring CSNP. This was reinforced by a respondent who stated the requirement for extensive

stakeholder engagement as the ESO does not have experience in whole system energy planning.

1.21. One respondent supports the FSO leading the delivery of the CSNP but sought assurances that there would be no TO conflicts within investment decisions, ensuring outcomes are robust and fair. Another respondent stated their support for the FSO being leading the delivery of the CSNP. However, they stated that solutions should be delivered through competition or directly from TOs when projects do not meet competition criteria.

1.22. One TO stated that whilst they agreed with the body leading delivery of the CNSP having enhanced planning capabilities to model supply and demand and improve coordination, this organisation should delegate optioneering to TOs or third parties to allow for clear responsibilities and accountabilities. Thus, outlining that the FSO should focus on strategic direction of the network and improved coordination, but not design.

1.23. Another TO raised that whilst they can accept that the FSO will take on a coordinating role, there should be greater degrees of coordination with TOs than proposed within the consultation.

Question 7: What are your views on the proposed stages and focus of the enduring CSNP model? If you can suggest alternative approaches to any of the stages, then please do so.

1.24. One TO and one other respondent support the move away from FES and use of more probabilistic methods. However, one respondent said that the model should aid decision making, and not substitute it.

1.25. One TO stated that the central network planner should focus only on strategic investments, with all other options being proposed by TOs or third parties through competition. Thus, the central planner's role should instead focus on challenging potential inputs to the network.

1.26. One TO stated that Stages 2 (Identify system need) and 3 (Identify investment options) must include TO or third-party input, and that more information was required on liabilities between the CSNP and delivery bodies. They also raised the concern that the CBA doesn't consider system operability, SQSS standards or needs from local generation.

1.27. Two respondents welcome the inclusion of social and environmental factors within the CBA, stating that this modification is a progressive change in practice. Moreover, one respondent stated that this was a key mitigation to the potential risks aligned to not gaining planning consent. However, the other respondent outlined the importance of ensuring that these factors are not lost within the CBA and should be key considerations when developing this tool.

1.28. One TO requested that the CSNP be reviewed every 5 years, in line with RIIO uncertainty mechanisms.

1.29. One respondent raised the need for the CSNP to consider connection lead times, and cost and impacts of generators not being able to connect.

Question 8: What are your views on closer stakeholder co-working to break longer-term uncertainty deadlocks?

1.30. All respondents agreed there should be increased stakeholder engagment, but it should be iterative and not restricted to deadlocks

Question 9: What are your views on allocating risks and accountability for various aspects of the CSNP, and for delivering the options finalised under the CSNP? Do you have any suggestions to mitigate and of the risks?

1.31. Six respondents, including two TOs, stated that a key risk to the successful implementation of the CSNP was the FSO not having the skills or knowledge required to enact the CNP role. Furthermore, one respondent stated that a key mitigation would be giving the FSO a less directive role in determining SIs.

1.32. Two respondents stated that the CNP should be accountable for high-level designs provided, and that TOs and third parties should be responsible for managing all risks associated with delivery.

1.33. One respondent sought clear accountabilities to all parties, and that SQSS requirements are known to any third parties working on the network.

1.34. One respondent felt a key risk was having TOs providing options and working too closely with the FSO, resulting in influence upon tender specifications or access to information

not available to bidders, thus restricting competition and creating unfair bias. Moreover, another respondent stated that the FSO must be financially and technologically neutral when enacting the CNP role.

1.35. Two TOs stated that there must be clear roles, responsibilities, and accountability to prevent duplication of roles between the CNP and TOs. Moreover, they stated that the CNP must have incentives and obligation to deliver quality outputs. Additionally, one of the TOs sought remuneration for activities sitting outside of their licence obligations such as data sharing. One TO did not agree with the proposed position that TOs should assume risk if they do not agree with the SI design.

1.36. One TO disagreed that TOs would retain responsibilities for identifying and resolving network issues that result in non-compliance with SQSS, as, if planning responsibilities were removed from TOs, it would not be proportionate to sanction TOs for non-compliance.

Question 10: What are your views on the proposed Transitional arrangements?

1.37. Most respondents supported the transitional CSNP to improve clarity and certainty when integrating onshore and offshore planning, and the need to develop skills and capabilities within the ESO.

1.38. One TO raised significant concerns surrounding the transitional CSNP delaying the HND, believing that the CSNP couldn't be delivered in the timescales required. This was reinforced by one TO who did not believe that a 2022 output for a transitional CSNP was realistic or deliverable, and that the transitional process was a distraction from the 2030 offshore wind generation targets. Moreover, they strongly opposed the uncertainty emerging from the introduction of the CSNP. However, one TO felt that clustering already occurs in practice and is not a new initiative within the ETNPR.

1.39. One TO support strategic investments connecting onshore and offshore to help enable GB to meet Net Zero targets, and the introduction of clustering. However, one TO felt that clustering already occurs and is not a new process introduced within ETNPR.

Question 11: Do you have any views on the next steps to implement the CSNP?

1.40. One respondent stated that there was a disconnect between FSO, OTNR and Early Competition within the CSNP, requesting further information of how these key workstreams would fit into the CSNP process.

1.41. Two TOs requested further information on how Pathfinders would fit into the CSNP and interact with wider network planning processes.

1.42. One respondent suggested the appointment of independent advisors to prevent any conflicts of interest between parties.

1.43. One respondent also stated that there was a need to ensure that there was no bias between traditional TO led solution and non-network solutions provided by third parties.

1.44. One respondent raised that by introducing competition models within ET network planning, there would be increased uncertainty arising from this process.

Question 12: What are your thoughts on our initial view of the areas to be covered in the next phase of the review? Are there other areas that aren't included that you would like us to include?

1.45. One TO outlined that there needed to be further consideration of Topic 2, looking at the transparency of decision-making processes and how conflicts would be managed. Moreover, there was a requirement to outline roles and responsibilities of all industry parties, data exchange mechanisms, and the challenge process for processes and outcomes.

1.46. One TO and one stakeholder suggested focusing on the CBA and decision-making processes for approving solutions, suggesting that this could be placed within Topic 2, or as a standalone topic. Furthermore, this TO suggested that the ESO should work closely with parties, such as TOs, who have experience in consenting and handling environmental issues when developing this process and going forward within the CSNP.

1.47. One TO stated that there is a need to establish codes and licences ahead of implementation of transitional arrangements. Moreover, this TO requested that we focus on Topic 4 to enable robust consideration of how Topic 1 (clustering of large projects) would be developed and applied.

1.48. One respondent suggested the continued use of WGs and SAG to aid in key policy development staged for the CSNP, utilising robust stakeholder engagement throughout the decision-making process. One TO also stated to continue with the use of WGs but requested the inclusion of case studies to test that the CSNP will deliver its proposed outcomes and benefits.

1.49. One respondent raised that WGs and SAG should be opened to related working streams to ensure collective success.

Appendix 2 – Privacy notice on consultations

Personal data

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

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

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

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

2. Why we are collecting your personal data

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

3. Our legal basis for processing your personal data

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

3. With whom we will be sharing your personal data

We may share consultation responses with BEIS. Please note that responses not marked as confidential will be published on our website. Please be mindful of this when including personal details.

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

Your personal data will be held for r six months after the project is closed, including subsequent projects or legal proceedings regarding a decision based on this consultation, is closed.

5. Your rights

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

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

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

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

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

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