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Decision

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

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This document sets out our decision that the Future System Operator (FSO) should deliver a new transmission network planning output called a Centralised Strategic Network Plan (CSNP). The CSNP should be a plan for all load related network planning on the transmission network. Through the CSNP the FSO should also provide advice to stakeholders including Government about the development of the wider energy system, eg the siting of future electrolysis, offshore wind leasing areas or new nuclear build etc. We expect to consult on the detailed requirements of CSNP in the near future.

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1. Introduction

What is in this document?

1.1 This document sets out our decision that a Centralised Strategic Network Plan (CSNP) for the future development of the electricity transmission network should be delivered. We expect the process for delivering a CSNP to build upon or, where appropriate, replace the existing processes. The overall process for delivering a CSNP will be led by the Future System Operator (FSO). However, as the FSO may not be in place until 2024 (subject to primary legislation), 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.

1.2 Within this document, we also explain the topics we will consult on to develop the detailed requirements of a CSNP.

What is not in this document?

1.3 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 decision for the detailed implementation or requirements of CSNP nor that a FSO should be established. However, responses to both the initial November consultation and the July 2022 minded-to decision consultation provide feedback on this.[2] We will use this feedback when developing our detailed proposals for the delivery of a CSNP.

Context

1.4 In October 2021, the UK Government published the Net Zero Strategy,[3] 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

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

target, the Government also intends to fully decarbonise the power system by 2035.

1.5 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 that 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

1.6 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[4], 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 (that will transition out of the ESO) of the transmission system that will retain many of the responsibilities of the ESO but also have a broader role, and we expect it to deliver the CSNP. The roles and responsibilities of the FSO are being considered as part of the Energy Bill, however, 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.[5]

The Electricity Transmission Network Planning Review (ETNPR)

1.7 In May 2021, Ofgem commenced a review into network planning arrangements for electricity transmission networks.[6] 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 that the network planning processes are appropriate given the level of change anticipated. We have focused on planning

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

for new demand and generation connecting to the system, also known as load related planning.

1.8 We wanted to understand whether the existing network planning processes and tools of the transmission owners (TOs) as well as the GB wide processes led by the ESO, could be enhanced 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.

1.9 The current GB-wide planning process (the Future Energy Scenarios (FES), Electricity Ten Year Statement (ETYS), Network Options Assessment (NOA) cycle) focusses on thermal constraints and transmission network boundaries, as well as fault current. CSNP should incorporate all load related network planning, looking at capacity constraints across the entire network, as well as operational constraints that are caused by new demand and generation.

1.10 This document sets out our decision to establish this new process.

Impact assessment

1.11 Where appropriate, regulatory decision making is 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.

1.12 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.

1.13 We consider that we have carried out the required statutory impact assessment in line with the Green Book [8] and our guidance,[9] and that it meets our obligations

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

[9] Impact Assessment Guidance | Ofgem

under the Utilities Act 2000 in a proportionate and transparent manner. To aid navigation, avoid repetition and improve readability, we integrated the IA within the consultation on our minded-to decision, 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]

1.14 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 electricity transmission networks to efficiently meet decarbonisation targets. 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.

1.15 Within this document we have explained where we have updated our IA as a result of responses to the consultation on our minded to decision. In the annex to this document, we have provided updated versions of Chapter 3 and Chapter 4 of our July 2022 consultation.

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)

[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.

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

British Energy Security Strategy (April 2022)

British energy security strategy - GOV.UK (www.gov.uk)

Consultation on accelerating onshore electricity transmission investment

Consultation on accelerating onshore electricity transmission investment | Ofgem

Our decision making process

1.16 We consulted on the initial findings of our Electricity Transmission Network Planning Review in November 2021 and received 22 responses. We summarised the responses to the November document in our consultation on our minded-to decision.[11]

1.17 We then consulted on our minded-to decision on the initial findings of our Electricity Transmission Network Planning Review. We received 15 responses one of which was confidential. Annex 1 of this document provides a table with a list of the respondents, and a summary of the responses to the consultation questions. The full responses can also be accessed on the consultation page on our website.

Table 1: Decision making stages

Stage	Date
Consultation on initial findings of the Electricity Transmission Planning Review	05/11/2020
Initial consultation closed	18/12/2021
Consultation on minded-to decision Open	08/07/2022
Consultation closes (awaiting decision). Deadline for responses and responses under review	18/08/2022

[11] Consultation on our Minded-to Decisions on the initial findings of our Electricity Transmission Network Planning Review | Ofgem

Stage	Date
Responses published	17/10/2022
Consultation decision	17/11/2022

Your feedback

General feedback

1.18 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:

- Do you have any comments about the overall quality of this document?
- Do you have any comments about its tone and content?
- Was it easy to read and understand? Or could it have been better written?
- Are its conclusions balanced?
- Did it make reasoned recommendations?
- Any further comments?

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

2. Decision: Centralised Strategic Network Planning

Section summary

This chapter sets out our decision relating to the creation of a new network planning output, the Centralised Strategic Network Plan (CSNP).

Our decision

2.1 We have decided:

- there should be a new network planning output called the CSNP;
- the development of the CSNP should be led by the FSO; and
- the scope of CSNP should include all load related transmission network planning, ie, all planning related to new demand and generation impacting the electricity transmission network.

2.2 The CSNP will include planning of the onshore and offshore network to cope with the additional demand and generation and planning where interconnection should be sited on the system.

2.3 Where a load-driven investment in the transmission network also addresses a non-load related driver such as the health of an asset, then it will be within the scope of CSNP. All other network planning that is related to non-load related drivers, eg, replacement of an asset solely due to its condition, will remain entirely within the remit of TOs.

What respondents said in response to the consultation on our minded-to decision

2.4 A number of respondents noted that it was difficult to provide feedback given the level of detail provided relating to CSNP. As we note in section 1.3, this document does not provide a decision on the detailed implementation requirements of CSNP, such as the stages of delivering a CSNP etc. Therefore, respondents' feedback relating to these areas isn't covered in this document. However, these will be taken into account when we consult on the details of CSNP in the future. This

chapter only covers the respondents' views in relation to our three decisions as laid out in section 2.1 above.

2.5 In relation to our decisions, several respondents repeated the same key views and reasons as set out in their previous response to our consultation on the initial findings of our ETNPR, including on the enhanced role of the FSO as a central network planner. We have considered all the feedback we received, however, unless new reasons or areas of thinking are given to support those views, we have not repeated those views in this chapter, but we have summarised them in Annex 1.

Centralised Strategic Network Plan

2.6 Several respondents including the ESO, and industry stakeholders welcomed the introduction of a CSNP and agreed that given the pace and scale of change in the energy system, this is the right time to bring in a new holistic strategic network planning process that includes onshore and offshore networks, interconnectors, and wider energy system planning. Respondents also agreed with the need to address system operability challenges as part of network planning.

2.7 TOs supported the objectives set out in our consultation; however, some stated that the level of detail that was needed to comment on whether the CSNP would achieve its aims was missing. Others didn't agree that CSNP would meet these aims or is required. One TO reiterated their previously shared view that making improvements to the existing arrangements, rather than a wholesale change, would better achieve our objectives.

2.8 Third party network developers and Offshore Transmission Owners (OFTOs) welcomed a centralised approach to network planning, with the opportunity for third parties to participate in network design and delivery through competition. They felt that this will speed up delivery and increase the quality and efficiency of network development outcomes.

2.9 An interconnector developer respondent asked for clarity on how the proposed CSNP process may impact on interconnector project development and how it would help avoid delays in network reinforcements where these are identified as pre-requisites to interconnector connections.

2.10 A respondent sought clarity on the definition and implications of strategic investments.

2.11 Local councils welcomed the inclusion of environmental and community impacts in the network planning process, and the need for transparency of process.

Roles and responsibilities in CSNP

2.12 Several TOs emphasised the need to consider the existing roles of TOs, and their strengths in network planning and development. One supported a collaborative approach in network planning so that their strengths can be utilised appropriately.

2.13 Several TOs felt they should retain responsibility for all regional load related works, which don't relate to augmenting boundary capability, and customer connections, in order to be able to progress these at pace and flex the plan as and when required.

2.14 One TO stated that network planning for critical works to ensure Security and Quality of Supply Standard (SQSS) compliance and maintain security of supply should be retained by existing network owners.

2.15 One respondent didn't agree that CSNP will improve identification and delivery of strategic investments and felt that it could limit innovation and delay delivery. This respondent expressed concern that Ofgem's minded-to decision supports an approach that will discourage collaboration across the industry and creates a monopoly FSO (we note that the decision to establish an FSO is not the subject of this document).

2.16 One respondent proposed that input for CSNP should be taken from a range of stakeholders such as electricity distribution network operators, gas network operators, generators, and equipment suppliers, with the latter to identify challenges with supply chain and overall delivery.

2.17 One respondent pointed to the Holistic Network Design (HND)[12] as developed by the ESO. This respondent felt that ESO had not been transparent, nor engaged or consulted enough with users of the network and TO's. This respondent felt that this is an indication of an unsuccessful process delivered by a single entity.

[12] https://www.nationalgrideso.com/future-energy/the-pathway-2030-holistic-network-design

Reasons for our decision

2.18 We provided the reasons for our position in the consultation on our minded-to decision.[13] Following consideration of the responses to the consultation that we have received, we have not changed our overall position. As such we have referred to the relevant reasons within our consultation on our minded-to decisions in the sections below relating to each of our decisions. Where there are new areas of thinking, or where new issues have been raised by respondents, or where we have changed our rationale, we explain these below.

Centralised Strategic Network Planning

2.19 Our reasons to introduce a new planning output called CSNP are the same as those given in our minded-to decision. CSNP will consider the GB-wide onshore and offshore transmission system as a whole. It should provide clear and timely investment signals while considering all system needs. In addition to new network build it will consider innovative, time-limited and non-network solutions to network problems. By taking a GB-wide view of all load related planning it will facilitate strategic investment in the transmission system. In addition, it will consider the environmental and community impacts of new infrastructure; and it will be entirely transparent. These are stated in full in sections 2.13 to 2.47 of our consultation on our minded-to decisions on the initial findings of our ETNPR.

2.20 We recognise one respondent repeated their feedback suggesting that we make iterative improvements to existing processes to achieve the objectives of CSNP. We would repeat that this decision does not relate to the detail of how a CSNP will be delivered. We will consult further on the next levels of detail. We will consult on whether it is appropriate to enhance, replace or develop existing processes when considering the component parts of the planning process.

2.21 One respondent sought clarity on the impact of CSNP on interconnector project development, and how the CSNP would help to avoid delays in network reinforcements where these are identified as pre-requisites to interconnector connections. We will develop further detail on how interconnectors will be planned as part of CSNP in the next phase of the review. We expect the outcomes of the Interconnector Policy Review (ICPR) to apply to future Interconnector development and associated roles and responsibilities. However, CSNP will play a

[13] Consultation on our Minded-to Decisions on the initial findings of our Electricity Transmission Network Planning Review | Ofgem

central role in identifying where, when, and how much interconnection to other countries will be beneficial. We do not expect the detailed planning and delivery of the interconnectors themselves to be in the scope of a CSNP. This guided approach may also result in less need for network reinforcements to connect new interconnection resulting in speedy connections.

2.22 We note a respondent's observation that further clarity is needed on the definition and implications of strategic load related investments. As stated in sections 2.38 – 2.41 of our minded-to decision consultation, and section 4.8 of the Next Steps chapter in this document, we intend to consult separately on the definition, criteria, or framework the FSO should apply when determining whether an investment is strategic or not.

2.23 We note respondents' feedback welcoming the inclusion of environmental and community impacts in the network planning process, and the need for transparency of process. We will develop further detail on this as further detail on the different stages of delivering a CSNP is developed.

Roles and responsibilities in CSNP

2.24 We do not intend that the FSO develop a CSNP in isolation from other stakeholders. Development of a CSNP is intended to be a highly collaborative and transparent process, but led by one central body which can take a strategic GB-wide view to lead network development. Given that the assets and the network that is being developed are owned by network owners, we expect TOs to be a key contributor to the CSNP process and, subject to further consultation, TOs could lead aspects of developing a CSNP. We expect competition as a delivery model will be considered within CSNP, either as a result of the FSO procuring services or through the competitive appointment of transmission owners.

2.25 Similarly, we believe that CSNP will not be a blocker to innovation. We expect the FSO to lead in developing innovative ways of solving network problems, by providing its own thought leadership and by inviting innovative solutions from a range of providers. As noted in section 2.49 of our July consultation, we believe that an independent FSO leading the planning process should not have a natural incentive towards a particular type of solution, as it will not commercially benefit from recommending more network infrastructure to be built. This means that it may be more likely to consider innovative solutions such as procuring a service or

a short to medium term non-network solution to capacity shortfalls, than recommending new network be built.

2.26 We note that across all responses from OFTOs, independent network developers and suppliers, CSNP has been welcomed for its potential to increase competition. We will develop further detail on CSNP and how it should enable competition and consult on this in the future.

2.27 Regarding the view expressed by one respondent on the HND, we continue to believe that the OTNR HND is a successful process. However, we note the concerns raised and will address these in respect of the CSNP as we develop the detail on the CSNP stages and roles and responsibilities.

2.28 We haven't taken a decision on whether critical works to ensure SQSS compliance and maintain security of supply should be planned by TOs, the FSO, OFTOs, any Competitively Appointed Transmission Owner (CATO) or all parties. As stated in section 6.4, table 9 of our minded-to decision consultation, we will consult on this separately as our work progresses.

2.29 We agree with the suggestion by one respondent that the CSNP should take input from a range of stakeholders such as electricity distribution network operators, gas network operators, generators, and equipment suppliers, with the latter to identify challenges with supply chain and overall delivery. CSNP is proposed to promote whole system thinking and efficient development of the energy system, with a requirement for extensive input from stakeholders from across industry, communities and government.

3. Updates to Impact Assessment

Section summary

This section describes how we have considered feedback on our estimate of the scale of load related investments in the electricity transmission network between 2025 and 2040 that could be impacted by the CSNP and how we have updated the IA. We also respond to feedback on our qualitative assessment of the impacts of CSNP. An updated IA following consideration of feedback is given in Appendix 2.

What we said in our minded-to decision consultation regarding the scale of load related investments

3.1 In our minded-to decision consultation, we provided an estimate of the scale of future load related expenditure that will be in the scope of early iterations of the CSNP. We did this for a period for which we are reasonably confident that we can make an estimate. However, we do not attempt to quantify the benefits of CSNP.

3.2 We said that we expect the CSNP to be implemented by 2024/25 contributing to investment decisions from April 2025. We estimated the scale of load related investments until 2040, as it is likely that similar levels of expenditure may be required between 2030 and 2040 and between now and 2030. We didn't include investments beyond 2040 due to greater uncertainty around the future demand and supply of energy.

3.3 In total, we estimated that the CSNP is likely to impact a potential £134bn of future load related expenditure. This estimate included approved investments that are known and part of the RIIO 2 baseline allowances, or proposed investments that may come forward via RIIO 2 'reopener' uncertainty mechanisms, and investments in the offshore transmission network.

What respondents said about the scale of load related investments

3.4 Several respondents agreed with our approach to estimate the scale of future load related investments that may be impacted by CSNP, although some felt that it was

difficult to assess the scale. Others didn't agree that it was appropriate or added value.

3.5 One respondent felt that our approach to estimate the scale of the load-related investments appeared transparent and reasonable; however, it wasn't clear if it included investments with shared load and non-load (asset health) related drivers.

3.6 One respondent felt that the scale demonstrated that a small percentage improvement in the process, eg, by allowing competition for some needs, will result in significant consumer benefit. However, another respondent felt that whilst they agreed that an attempt should be made to understand the materiality of the CSNP proposals, the high-level scoping calculations are of limited value since consumer value of CSNP hasn't been quantitively assessed.

3.7 Respondents also noted that the following were excluded from our estimate and could be included:

- Potential investments through the Medium Sized Investment Project (MSIP) RIIO 2 uncertainty mechanism
- Large Onshore Transmission Investment (LOTI) projects not within the scope of the Network Options Assessment (NOA)
- Interconnectors and Multi-Purpose Interconnectors (MPIs). One respondent pointed out that there could be between 7GW to 20GW of installed interconnector capacity by 2040 as per the Future Energy Scenarios 2022 data workbook
- Load-related investments from other RIIO 2 uncertainty mechanisms such as those relating to customer connection works
- Gas networks

3.8 One respondent felt that the £0.8M per MW 'unit cost' that we used to estimate the cost to connect the remaining 14GW of ScotWind offshore wind projects for the purposes of this IA, may be an underestimate. This was because they felt that further offshore integration than that delivered through the OTNR's HND Pathway to 2030 is required. They felt that the current proposals in the HND Pathway to 2030 workstream do not represent a significant enough step-change from the radial model in reducing the number of coastal landings and hence mitigating environmental and community impacts.

Updates to our estimate after considering responses

Investments with shared load and non-load related drivers

3.9 RIIO-2 investments with shared load and non-load (asset health) related drivers are included within our estimate to some extent as follows:

- For any such investments that are part of our RIIO 2 baseline allowances, the portion of these investments that have been classed as load related allowances are included in our estimate. Any allowance for such projects that has been apportioned as non-load related expenditure will not have been included. Whilst we only include baseline allowances relating to the final year of RIIO 2 in our estimate, we've used the total RIIO 2 allowances to estimate investments for future price controls in this IA.
- For any such investment with a shared driver that has been/is expected to be funded through the RIIO 2 LOTI uncertainty mechanism, our estimate will include the entire investment, and not just a portion of it.

Quantitative assessment of consumer value from CSNP

3.10 We don't consider that it's possible at this stage of development of the CSNP, to quantitively assess the financial benefits of CSNP. While we have not quantified them, we consider that there are likely to be significant benefits of making changes to how load related electricity transmission network planning is done, eg if all planning is done together, it will be possible to consider issues together to a greater extent potentially reducing the overall investment required.

Medium Sized Investment Projects

3.11 We'd said in our minded-to decision consultation that we didn't have an accurate indication of how much funding may be requested in RIIO 2 through the MSIP reopener mechanism. We did not include potential MSIP projects in our estimate for this reason.

3.12 Since publishing our minded-to decision consultation, we received the annual Regulatory Reporting Packs (RRP) from the three TOs. For two out of the three TOs, the RRPs included an indication of the scale of known investments that TOs will request in RIIO 2 through this mechanism. We made some assumptions on additional investments that may be requested in the years for which information wasn't available in the RRPs. For the third TO we took its feedback that we should

consider including the scale of MSIP investments in our IA and sought this information directly from it.

3.13 Since we're estimating the scale of CSNP from April 2025 to 2040, we have used the RIIO-2 data that has been provided and assumed that expenditure between April 2026 to 2040 will be similar to that in RIIO 2. We have explained our rationale for the estimates we have made in the updated IA included within annex 2 of this document.

3.14 Table 2 below shows an estimate of potential load related expenditure related to MSIP reopeners that will be incurred from 2025 to 2040.

Table 2: CSNP Impact Assessment - potential load related MSIP expenditure from 2025 to 2040 (2021/22 price base, £bn)

Price Control Time Period	Potential Expenditure
2025 - 2026	0.3
2026 - 2031	0.7
2031 - 2036	0.7
2036 - 2040	0.6
2025 – 2040 (Total)	2.2

Interconnectors

3.15 While we agree that the CSNP will impact future development of interconnectors, we have chosen to exclude them from our estimate of the potential scale of impact of CSNP. For the purposes of this exercise, we've taken the view that interconnectors connect to the wider transmission system and that while a CSNP will indicate where in GB interconnectors should connect and to which market – CSNP will not complete the rest of the planning of an interconnector. Therefore, we don't expect them to be planned under CSNP in the same way as the rest of the onshore and offshore electricity transmission network.

Load related investments relating to customer connection works

3.16 The Transmission Entry Capacity (TEC) Register[14] is a list of generation projects that hold contracts for TEC with the ESO. These include existing and future

[14] ESO Data Portal: Transmission Entry Capacity (TEC) Register - Dataset| National Grid Electricity System Operator (nationalgrideso.com)

connection projects and projects that can be directly connected to the National Electricity Transmission System (NETS) or make use of it. The TEC register is essentially a queue for connecting to the transmission system. However, there are a number of projects on the register which are holding a place in the queue, but unlikely to ever connect. The ESO is currently offering a TEC amnesty, meaning those projects that were unlikely ever to connect could leave the register at a reduced cost.

3.17 The ESO has also raised a modification proposal to the Connection and Use of System Code, CMP 376.[15] If implemented, CMP 376 would give the ESO the ability to prioritise projects in the queue based on project readiness, not just based on when a party entered the queue.

3.18 Given a number of prospective connecting customers may leave the queue – it is difficult to use the TEC to estimate the scale of investment directly related to connections at this time.

Large Onshore Transmission Investment (LOTI) projects not within scope of the NOA

3.19 We don't have sufficient information to accurately estimate the potential scale of LOTI projects that aren't within the scope of the NOA. Therefore, we've excluded these costs from our estimate.

Update to scale of Large Onshore Transmission Investments based on NOA 7 Refresh

3.20 As a result of the publication of the NOA 7 (2021/22) Refresh, we have updated our estimated scale of investments through this uncertainty mechanism that will be impacted by CSNP. The table below shows an approximation of the scale of this investment using the same assumptions as those made in our July consultation.

3.21 We have corrected an error in the previous estimate for the last price control time period from 2036 till 2040. We previously estimated five years of investments by error, we have now reduced this to four years.

Table 3: 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	1.8

[15] CMP376: Inclusion of Queue Management process within the CUSC | National Grid ESO

2026 - 2031	13.7
2031 - 2036	13.7
2036 - 2040	11
2025 - 2040	**40**

Offshore Load Related Capex

3.22 One respondent felt that the £0.8M per MW 'unit cost' that we used to estimate the cost to connect the remaining 14GW of ScotWind offshore wind projects for the purposes of this IA may be an underestimate, as they felt that further offshore integration than that delivered through the OTNR HND Pathway to 2030 is required. To this, we point out that we didn't use the forecast cost produced by the ESO for the OTNR HND for the purpose of our estimate.

3.23 As explained in our IA, to estimate the cost to connect the remaining 14GW of ScotWind projects, we've used the same assumptions as those used for Ofgem's Impact Assessment of the OTNR's Pathway to 2030 workstream's minded-to decision on the Delivery Model. This is based on our own estimate of offshore network costs based on incurred costs for completed projects. This estimates a capex of £0.8m per MW of offshore wind generation.

Gas Networks

3.24 In the future the CSNP when led by the FSO is anticipated to be able to consider whole system solutions to ET network issues. Therefore, this should include natural gas/hydrogen network solutions or co-optimising the development of the transmission network with the wider energy system. However, we haven't developed sufficient detail on this area, particularly the scope, to quantify the potential impact of CSNP on gas network development – ie, we do not know the extent to which the FSO will advise on the development of the gas network, or just the siting of, as an example, a hydrogen production electrolysis plant through a CSNP. Therefore, at this stage in the development of CSNP, it will not be possible to estimate this impact.

Estimate of scale of CSNP investments from 2025 to 2040

3.25 From our revised update to the estimate of the various types of future load related expenditures, we have estimated that without substantial new market approaches, the CSNP is likely to impact a potential £137bn of future load related expenditure.

A full breakdown of this figure is given in Appendix 2 where we have provided the complete updated IA based on the above changes.

What we said in our minded-to decision consultation regarding the qualitative impacts of CSNP

3.26 In our July consultation we provided a qualitative assessment of the costs and benefits of introducing a CSNP output and the processes for delivering it.

What respondents said about the qualitative impacts of CSNP

3.27 Respondents can be split in to two broad groups. Generally, TOs were less supportive of our assessment of qualitative impacts, while other respondents were more supportive.

3.28 One infrastructure manager/developer felt that our assessment was too narrow – and focussed too much on those directly impacted. It notes that interconnector developers for example may benefit from a more strategic planning process which provides more timely connections.

3.29 Network operators did not think we had considered the impact on resources sufficiently. If the FSO and TOs are both needing to recruit engineers with a similar type of competence to a greater extent than they do today, then there may be insufficient capacity in the industry of suitably qualified engineers. We think that the extent to which this risk becomes an issue will depend on the detailed implementation of the different steps of delivering a CSNP.

3.30 One renewable developer did not agree with our assessment of the risks and impacts of CSNP and provided its own assessment. Their assessment suggests that it is more likely that risks will occur and that their impact will also be greater than our assessment. We contend that the precise scale of risk and the likelihood that they will occur depends on the next level of policy detail that is yet to be developed.

Updates to our view of the qualitative impacts of CSNP

3.31 We have updated the qualitative aspects of the IA chapters in two ways. We have included the potential impact on developers of interconnectors. To aid stakeholder understanding, we have incorporated a number of process diagrams intended to illustrate how the development and delivery of a CSNP will be achieved.

Theory of change

3.32 We received feedback related to the theory of change which we have included in Chapter 4 of our consultation.

Illustrating the role of TOs

3.33 TOs and some other respondents observed that the Theory of Change does not sufficiently show the role of TOs in the network planning process.

3.34 However, the theory of change is intended to be the process of how we get from the current arrangements to implementing a CSNP – it is not intended to illustrate how a CSNP itself could be delivered. The early stages labelled with Theory of Change's 'Inputs' or 'Activities' relate to the review itself, rather than the delivery of network planning. The resources to undertake the review are coming primarily from Ofgem, Government and the ESO. They are not coming from other parties not shown on the inputs section of the diagram. We have however amended one part of the 'Outputs' section to show that both TOs and the ESO are likely to have new roles and responsibilities as a result of CSNP.

3.35 The process diagrams we have incorporated within the IA should, in our view, address the feedback that we have not adequately shown the role TOs could have in developing a CSNP. These diagrams are intended to be illustrative. They show the role TOs (and other parties) could have in the development of a CSNP while recognising that the detailed roles and responsibilities will be subject to further consultation.

4. Next steps

Developing the details required to deliver a Centralised Strategic Network Plan (CSNP)

4.1 Having made the decision to require the FSO to develop and deliver a CSNP we intend to consult on the detailed policy required to implement this decision. There is a relatively short time available to develop the processes and tools to deliver a CSNP if the first plan is to be delivered in the 2024/2025 regulatory year. At present we intend, to publish multiple smaller documents, rather than a single larger document. These will focus on discrete aspects of CSNP such as the proposed stages of delivering CSNP and the outputs required for each stage. We aim to conclude policy development during the summer of 2023.

Approach to developing next level of policy

4.2 We do not intend to be prescriptive in setting the requirements of each stage, eg we do not intend to say what sort of methodologies should be used. However, we are likely to require that methodologies are developed transparently, reflect best practice and are consulted upon. There are several precedents for this approach. These are related to the delivery of complex outputs by the current ESO such as the requirement to develop and have in place an Electricity System Restoration Assurance Framework as set out in 'Special Condition 2.2 Electricity System Restoration Standard'.

4.3 While the focus will be on the FSO, we will also consult on the roles and responsibilities that might be assigned to other parties, eg transmission owners. While the FSO will have overall responsibility for delivering a CSNP, the roles and responsibilities of different parties may vary from stage to stage.

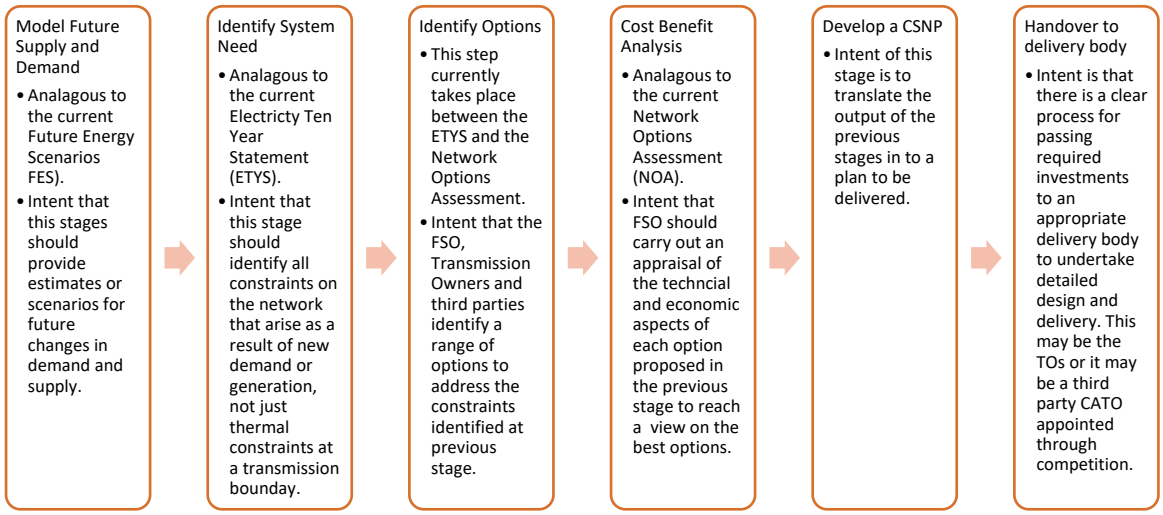
Areas of further policy development and what we expect to cover in each area

Stages of delivering a CSNP

4.4 In our November 2021 consultation, we sought views on the potential stages of CSNP below (figure 1). We also said that a new CSNP should be delivered every 2-

3 years. We intend to consult on the stages and frequency of delivering a CSNP in light of feedback we have received and in the context of other policy development, eg thinking on future price controls. Subject to the consultation on future price controls, we then intend to separately consult on the proposed stages and specific requirements (including removal or simplification) of delivering a CSNP.

Figure 1: Potential stages of delivering a CSNP



Stage 1: Modelling future supply and demand – current thinking

4.5 As part of consulting on this step we will set out proposals intended to ensure that the FSO robustly, and transparently estimates future demand and supply. We will also seek to understand the interactions between the current FES[16] and the stakeholders who use it beyond its core purpose of network planning. This stage will focus on the roles and responsibility of the FSO.

Identify system need – current thinking

4.6 This step will consult on the scope of system needs to be included within the scope of the plan. The current ETYS[17] focusses on thermal capacity at transmission network boundaries and on fault currents on transmission system nodes. We expect to consult on including all capacity and operational constraints that might

[16] Future Energy Scenarios 2022 | National Grid ESO
[17] Electricity Ten Year Statement (ETYS) | National Grid ESO

occur because of the modelled future supply and demand. We also expect to consult on the roles and responsibilities of parties such as the TOs as well as the FSO in identifying system needs.

Identify options to address system needs – current thinking

4.7 We want the FSO to consider all the possible economic and efficient solutions to address system needs. This means we want the FSO to consider innovative or commercial solutions as well as enduring capital-intensive solutions. As a result, third parties as well as transmission owners should be included in the option identification stage.

4.8 We have previously said that we expect the FSO to lead the development of strategic investments. The identification of strategic investments could start when identifying the needs for an investment. We intend to test this position when consulting on requirements for identifying system needs.

Cost Benefit Analysis – current thinking

4.9 We expect this stage to be broadly analogous to the current Network Options Assessment. However, the FSO will need to be able to assess the costs and benefits of different types of solutions to a single issue consistently. This may mean a more complex process.

Develop a Centralised Strategic Network Plan – current thinking

4.10 This is a new stage – this step will see the output of the CBA stage translated into a definitive plan, subject to regulatory decision making. We will consider whether this should change the roles and responsibilities of the FSO as well as other parties such as transmission owners, and how obligations might be placed on third parties. If the CBA and the plan say that a particular infrastructure should be delivered, we want to put in place arrangements that ensure an investment is delivered in a timely manner – rather than as happens today where a scheme may receive multiple proceed signals prior to entering the regulatory approval process.

Handover to a delivery body – current thinking

4.11 Either as part of the plan itself or shortly thereafter it will need to be clear which parties are delivering elements of the plan. We will learn lessons from the recent

asset classification decision.[18] This work was undertaken following the development of the recent HND.[19]

4.12 The development of CSNP will have an impact upon other sectors, ie gas and electricity distribution. It will also develop learning that could be applied to those sectors. As the CSNP develops we will consider how other parts of the energy system can be developed in line with our learning from CSNP – this is especially important given the role the FSO will have in the gas sector after its establishment.

[18] Offshore Transmission Network Review: Decision on asset classification | Ofgem
[19] The Pathway to 2030 Holistic Network Design | National Grid ESO

Appendices

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Appendix 1 – Summary of consultation responses

A1.1. We received 15 responses to our consultation on our minded-to decisions on the initial findings of our Electricity Transmission Network Planning Review, one of which was confidential. These responses, apart from the response classified as confidential, can be accessed on the consultation page on our website.[20] Table A1 below provides a list of all respondents, and a high-level consolidated summary of all responses to the 5 consultation questions is given below.

Table A1: List of Respondents

No.	Respondents	Respondent type
1.	Scottish and Southern Energy Networks	TO
2.	Scottish Power Energy Networks	TO
3.	National Grid Electricity Transmission	TO
4.	CPRE The Countryside Charity	Represents natural environment
5.	Suffolk Preservation Society	Represents natural environment
6.	Suffolk County Council and East Suffolk Council	Local council
7.	RWE Renewables	Power Station developer
8.	Essex Suffolk Norfolk Pylons action group	Represents natural environment and communities
9.	Scottish Power Renewables	Power Station developer
10.	East Anglian Alliance of Amenity Groups	Represents natural environment and communities
11.	Unite the Union	Trade union
12.	National Grid Electricity System Operator	ESO
13.	Suffolk Energy Action Solutions	Represents natural environment and communities
14.	Transmission Investment	Third party network developer/OFTO

[20] https://www.ofgem.gov.uk/publications/consultation-our-minded-decisions-initial-findings-our-electricity-transmission-network-planning-review

Summary of Responses

Decision on Centralised Strategic Network Planning (CSNP)

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

A1.2. Several respondents welcomed the introduction of a CSNP and agreed that given the pace and scale of change in the energy system, this is the right time to bring in a new holistic strategic network planning process that includes onshore and offshore networks, interconnectors, and wider energy system planning. Respondents also agreed with the need to address system operability challenges as part of network planning.

A1.3. TOs supported the objectives set out in our consultation, however, some didn't agree that CSNP would meet these aims or is required. One TO reiterated its previously shared view that making improvements to the existing arrangements, rather than a wholesale change, would better achieve our objectives.

A1.4. On the role of TOs and the FSO, TOs emphasised the need to consider the existing roles of TOs, and their strengths in network planning and development, with one supporting a collaborative approach so that these strengths can be utilised appropriately.

A1.5. TOs felt they should retain responsibility for all regional load related works, which don't relate to augmenting boundary capability, and customer connections, in order to be able to progress these at pace and flex the plan as and when required. One TO felt that network planning for critical works to ensure SQSS compliance and maintain security of supply should be retained by existing network owners.

A1.6. Third party network developers and OFTOs welcomed a centralised approach to network planning, with the opportunity for third parties to participate in network design and delivery through competition.

A1.7. A respondent proposed that input for CSNP should be taken from a range of stakeholders such as electricity distribution network operators, gas network operators, generators, and equipment suppliers, with the latter to identify challenges with supply chain and overall delivery.

A1.8. Local councils welcomed the inclusion of environmental and community impacts in the network planning process, and the need for transparency of process.

A1.9. One respondent didn't agree that CSNP will improve identification and delivery of strategic investments and felt that it could limit innovation and delay delivery. This respondent expressed concern that Ofgem's minded-to decision supports an

approach that will discourage collaboration across the industry and creates a monopoly FSO (we note that the decision to establish an FSO is not the subject of this document).

A1.10. One respondent pointed to the Holistic Network Design (HND) as developed by the ESO. This respondent felt that ESO had not been transparent, nor engaged or consulted enough with users of the network and TO's. This respondent felt that this is an indication of an unsuccessful process delivered by a single entity.

Impact Assessment: Scale of load related investment and Qualitative Impacts of the CSNP

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

A1.11. Several respondents agreed with our approach to estimate the scale of CSNP, although some felt that it was difficult to assess the scale. Others didn't agree that it was appropriate or added value.

A1.12. One respondent felt that our approach to estimate the scale of the load-related investments appeared transparent and reasonable, however, it wasn't clear if it included investments with shared load and non-load (asset health) related drivers.

A1.13. One respondent felt that the scale demonstrated that a small percentage improvement in the process, eg, by allowing competition for some needs, will result in significant consumer benefit. However, another respondent felt that whilst they agreed that an attempt should be made to understand the materiality of the CSNP proposals, the high-level scoping calculations are of limited value since consumer value hasn't been quantitively assessed.

A1.14. Some respondents noted several areas of load related network planning that were omitted from our assessment such as:

a. Potential investments through the Medium Sized Investment Project (MSIP) RIIO 2 uncertainty mechanism

b. Large Onshore Transmission Investment (LOTI) projects not within the scope of the Network Options Assessment (NOA)

c. Interconnectors and Multi-Purpose Interconnectors (MPIs).

d. Load related investments from other RIIO 2 uncertainty mechanisms such as those relating to customer connection works

e. Gas networks

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?

A1.15. Generally, TOs were less supportive of our assessment of qualitative impacts, while other respondents were more supportive.

A1.16. One infrastructure manager/developer felt that our assessment was too narrow – and focussed too much on those directly impacted. It notes that interconnector developers for example may benefit from a more strategic planning process which provides more timely connections.

A1.17. Network operators did not think we had considered the impact on resources sufficiently, if the FSO and TOs are both needing to recruit engineers with a similar type of competence to a greater extent than they do today.

A1.18. One renewable developer did not agree with our assessment of the risks and impacts of CSNP and provided its own assessment. Their assessment in essence said that it's more likely that risks will occur and that their impact will also be greater than our assessment.

Impact Assessment: Theory of change

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

and,

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

A1.19. The substantive feedback from TOs was that we had not sufficiently illustrated their role in the current or future processes and that the TOs should be included in the inputs column.

A1.20. A TO felt that the supply chain should also be considered within future iterations of the Theory of Change model due to its significant role in the delivery of new network infrastructure. We note however, that the Theory of Change model only relates to the development of the frameworks for developing the obligations around delivering a CSNP, rather than the execution of the CSNP once the new process is live.

A1.21. Another TO felt that consideration of impacts on the connections process, and the need for its reform was necessary when considering how to best deliver the desired outcomes of CSNP.

A1.22. A renewable developer felt that a much wider group of institutions should provide input into the design of the CSNP, especially The Crown Estate and Crown Estate Scotland.

Appendix 2 - Revised Impact Assessment

In this Appendix we provide the updated Impact Assessment, based on the changes described in Chapter 2 of this document. It follows the same format as the Impact Assessment in our ETNPR minded-to decision consultation, ie it is split into two chapters.

A. 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.

CSNP Impact Assessment

A2.1. By including these sections, this document also provides an IA as well as explaining our decision. At this point we do not provide a quantitative assessment of the potential impacts of the CSNP.

Estimated scale of load related expenditure

A2.2. As noted earlier in this document, the detailed methodology for the CSNP is yet to be developed. Therefore, we do not think it will be possible or feasible to estimate the full cost reduction compared to existing arrangements as the details around implementation have not been developed.

A2.3. In this section, 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. This will give stakeholders a view of the magnitude of future investments that may be in scope of the CSNP without substantial new market approaches and without considering any efficiencies as a result of the CSNP itself. We have done this for a period for which we are reasonably confident we can make an accurate estimate.

A2.4. 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-up exercise to meet the government's ambition to deliver up to 50GW of offshore wind generation by 2030.

A2.5. 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.

A2.6. The estimates used in this section 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

A2.7. As part of our RIIO 2 Final Determinations, we have set baseline allowances for load related capital expenditure for the RIIO 2 price control for the three onshore TOs in Great Britain.[21] This allowance is equal to £2.94bn[22] 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.

A2.8. 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.

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

[22] Correction from previous publication of IA. The previous figure of £2.71 was in 2018/19 price base, this has been corrected to the 2021/22 price base.

Table A2: 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	2.35[23]
2025 - 2040	**8.8**

Reopeners

A2.9. 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

A2.10. The Medium Sized Investment Projects (MSIP) reopener, provides TOs with an annual opportunity to request additional funding for sub-£100m projects, many of which may be critical for achieving Net Zero.

A2.11. Based on information provided to us by the three TOs on MSIP submissions in RIIO2, we have estimated potential load related expenditure pertaining to MSIP reopeners that will be incurred from 2025 to 2040, assuming that similar levels of expenditure may be required between 2026 and 2040 as will be required in RIIO2.

A2.12. Table 1 below shows an estimate of potential load related expenditure related to MSIP reopeners that will be incurred from 2025 to 2040.

Table A3: CSNP Impact Assessment - potential load related MSIP expenditure from 2025 to 2040 (2021/22 price base, £bn)

Price Control Time Period	Potential Expenditure
2025 - 2026	0.3

[23] Correction from previous publication. The figure for the final time period was previously incorrectly based on five years of investment, this has now been corrected to four years.

2026 - 2031	0.7
2031 - 2036	0.7
2036 - 2040	0.6
2025 - 2040	2.2

Large Onshore Transmission Investments

A2.13. The LOTI re-opener provides TOs with an opportunity to request funding for projects with a value greater than £100m.

A2.14. As a result of NOA 7 (2021/22) Refresh, we expect TOs to request an additional £15bn[24] 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.

A2.15. 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 A4: 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	1.8
2026 - 2031	13.7
2031 - 2036	13.7
2036 - 2040	11
2025 - 2040	**40**

Offshore Load Related Capex

[24] This figure is the potential forecast estimated expenditure from NOA 7 (Refresh) 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.

A2.16. The government has set an ambition to deliver up to 50GW of offshore wind generation by 2030.[25] Approximately 11GW of this is already connected to the network. A further 23GW has 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.

A2.17. It is estimated that the 23GW that has been planned for through the first HND will cost £32bn to connect.[26]

A2.18. 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 projects in a second HND.

A2.19. 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.

Table A5: 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

Estimate of scale of CSNP investments from 2025 to 2040

A2.20. Without substantial new market approaches, we have estimated that the CSNP is likely to impact a potential £137bn of future load related expenditure.

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

Qualitative Impacts of the CSNP

Impacts

Ofgem

A2.21. 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

A2.22. When the FSO takes 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

A2.23. The 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.

A2.24. 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 TOs could scale back some of their planning activities depending on the roles and responsibilities decided upon.

OFTOs

A2.25. 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

A2.26. 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

A2.27. 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 A6: 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

A2.28. We have summarised the potential risks associated with the development of CSNP in Table 8 below.

Table A7: 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

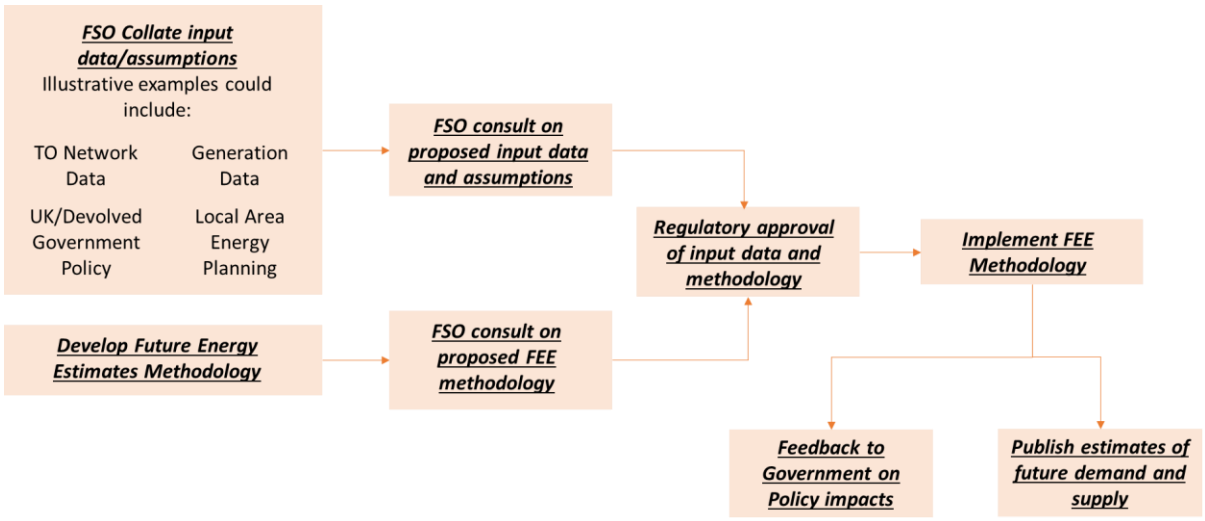
Illustrating the potential process of delivering a CSNP

A2.29. The remainder of this section describes the potential process by which a CSNP could be delivered. It reflects how one could reasonably assume a CSNP could be developed. However, policy in this area is subject to further consultation.

Estimating Future Demand and Supply

A2.30. The first step in developing a CSNP will likely involve estimating future demand and supply. This step is likely to be broadly analogous to the development of the Future Energy Scenarios (FES). It may build upon, enhance, or replace the existing FES depending on detail yet to be developed.

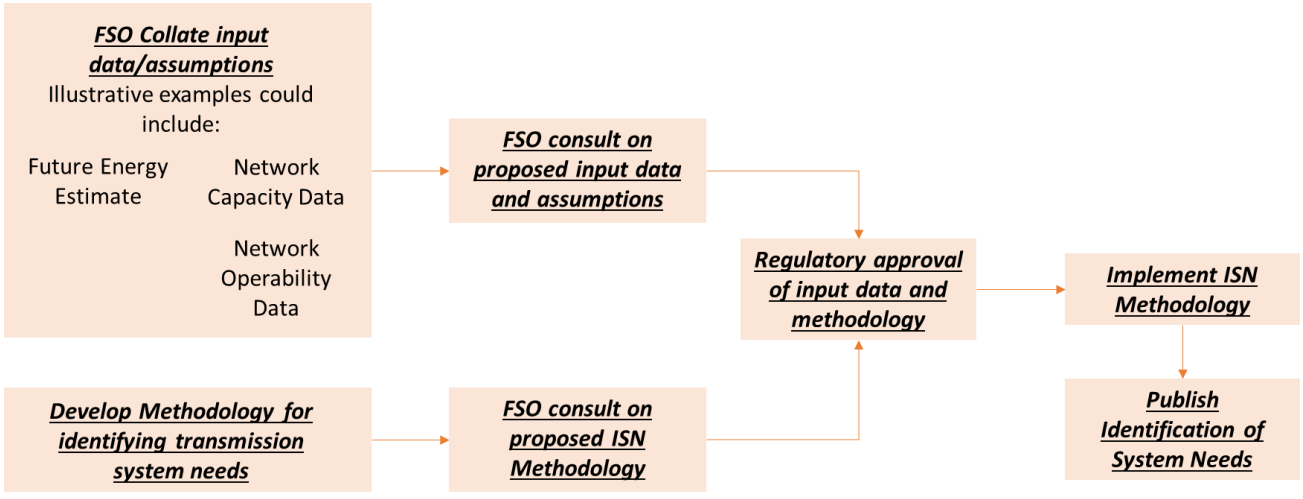
Figure A1: Estimating Future Demand and Supply



Identifying system needs

A2.31. The second will likely involve identifying where the system is constrained. This step may involve expanding the current Electricity Ten Year Statement (ETYS) process. The ETYS focusses on fault current level and thermal capacity as transmission boundaries. However, the FSO in collaboration with TOs will need to identify all constraints on the transmission system that impact upon capacity or the system's ability to operate.

Figure A2: Identifying System Needs



Identifying viable investment options

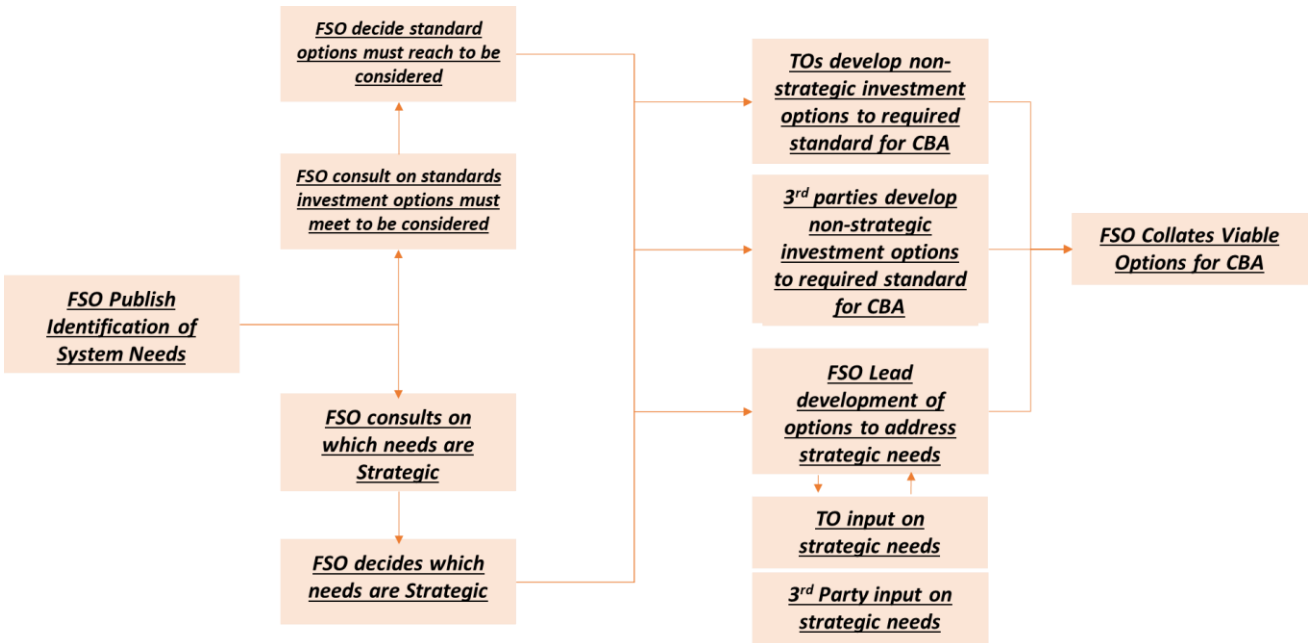
A2.32. The third step is likely to involve identifying the viable investment options to address the needs that have been identified in the previous stage. The TOs already do this today, for the purposes of the Network Options Assessment (NOA) process as well within their licence areas where new capacity does not contribute towards boundary capacity.

A2.33. While this step may be broadly analogous to NOA, there are a number of key differences:

- CSNP will have a wider scope than the current NOA;
- there will be new participants in the process; and
- there is likely to be a distinction between strategic investments and non-strategic investments.

A2.34. This means there may be a need to ensure that the process by which parties generate options is standardised. This would allow options proposed by third parties, the FSO and TOs to be compared with one another for purposes of a cost benefit analysis.

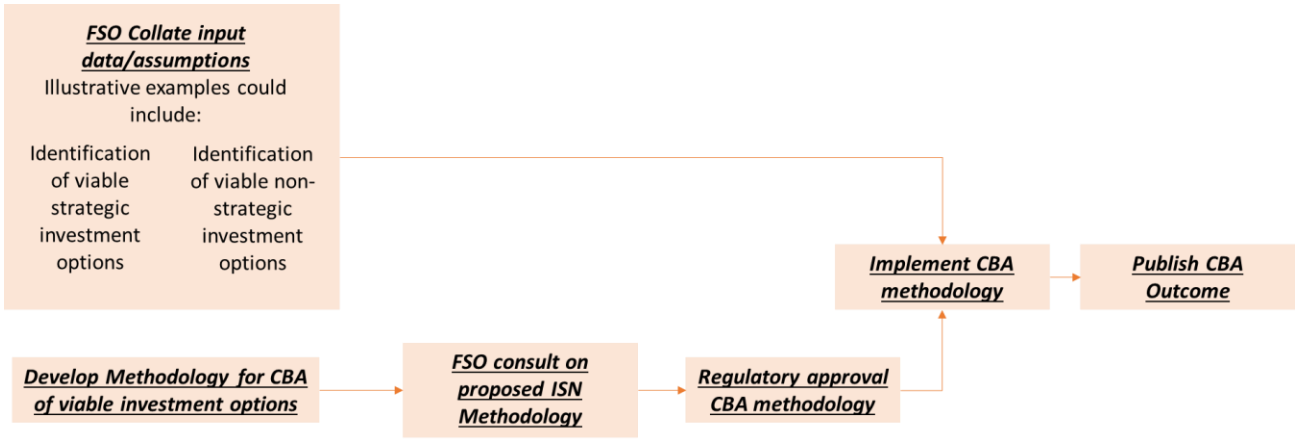
Figure A3: Identifying Viable Investment Options



Cost Benefit Analysis

A2.35. This step is broadly analogous to the existing NOA. After viable investment options have been identified, the FSO will undertake a cost benefit analysis to understand which solutions should be invested in.

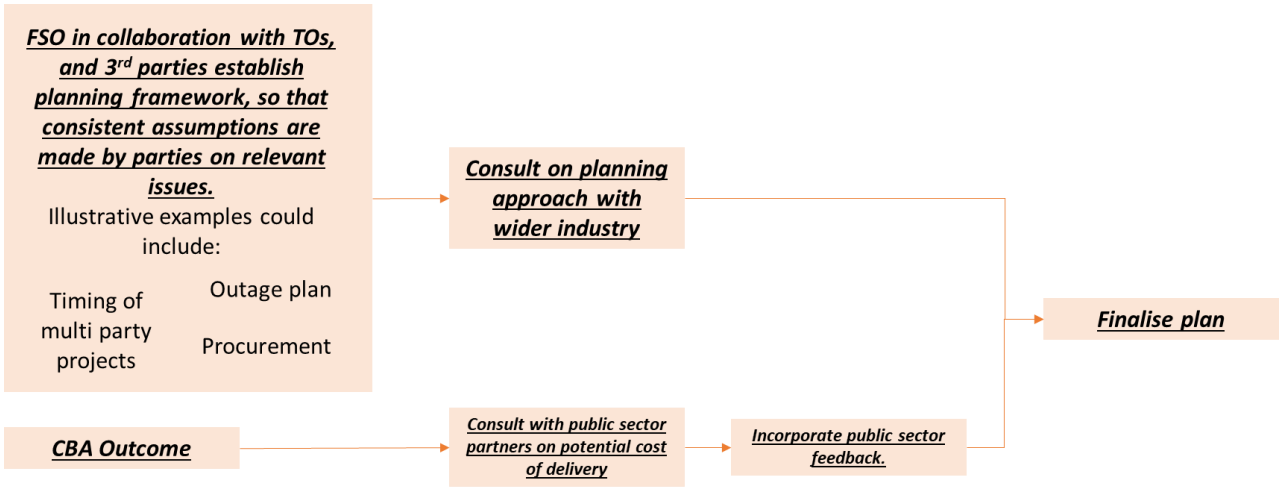
Figure A4: Process of delivering Cost Benefit Analysis



Finalising a CSNP

A2.36. This step is likely to involve translating the outcome of the cost benefit analysis into a definitive plan. To ensure delivery of the plan, Ofgem will need to put in place regulatory frameworks to ensure responsible parties deliver the necessary infrastructure in a timely manner.

Figure A5: Process for Finalising a CSNP



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.

Theory of change

Overview

A2.37. 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 A6 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.

Inputs

A2.38. 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 likely that each body may also utilise external consultancy in the next 1-2 years.

Activities

A2.39. 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.

A2.40. 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.

A2.41. We will continue to work on identifying interdependencies with related areas of 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, network charges and electricity distribution.

A2.42. 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.

A2.43. 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.

A2.44. Drawing upon their expertise and skills, the FSO will 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

A2.45. 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.

A2.46. The FSO will identify strategic investments and create a new network planning output 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.

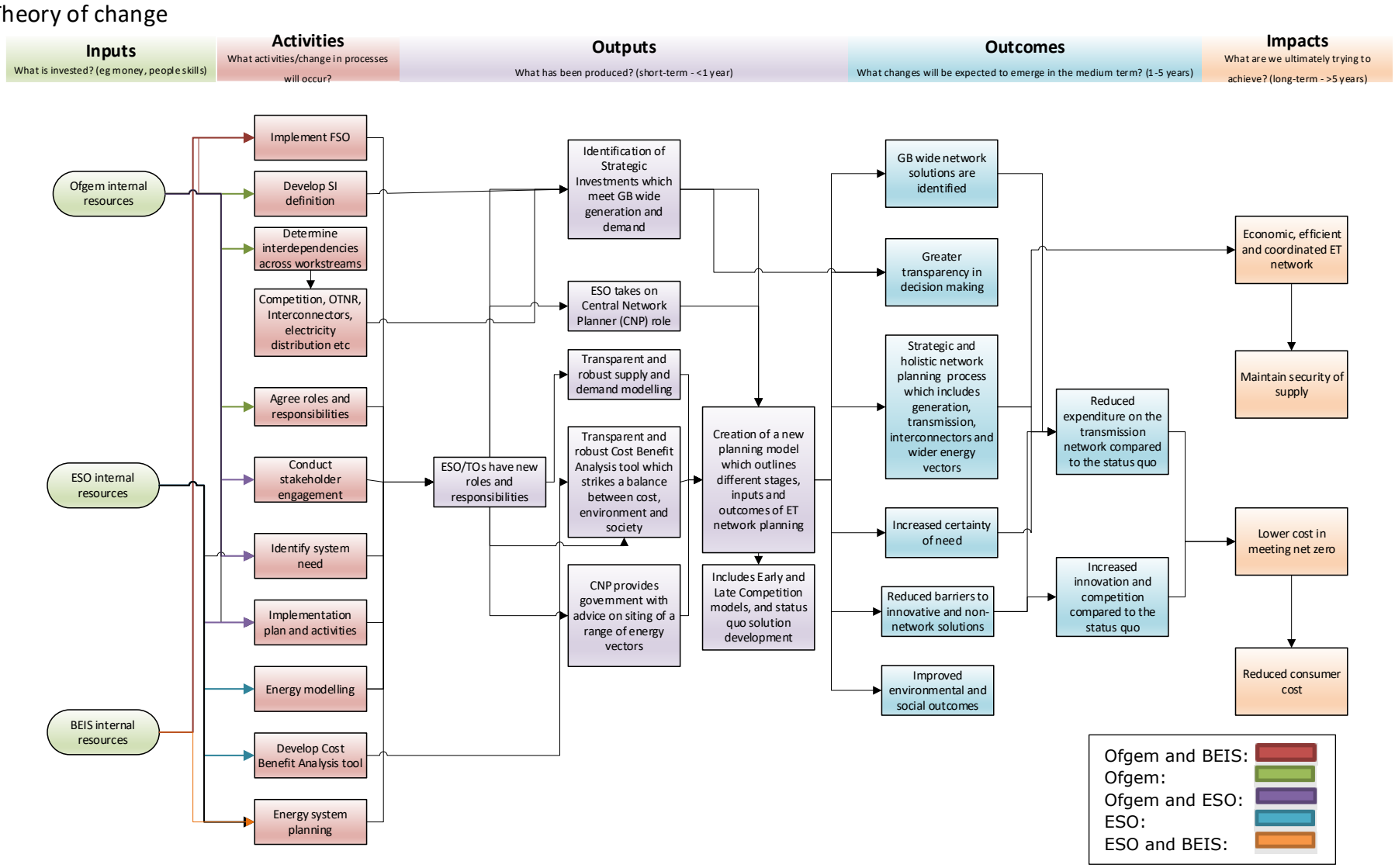
Outcomes

A2.47. 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

A2.48. 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 A6: Theory of Change



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