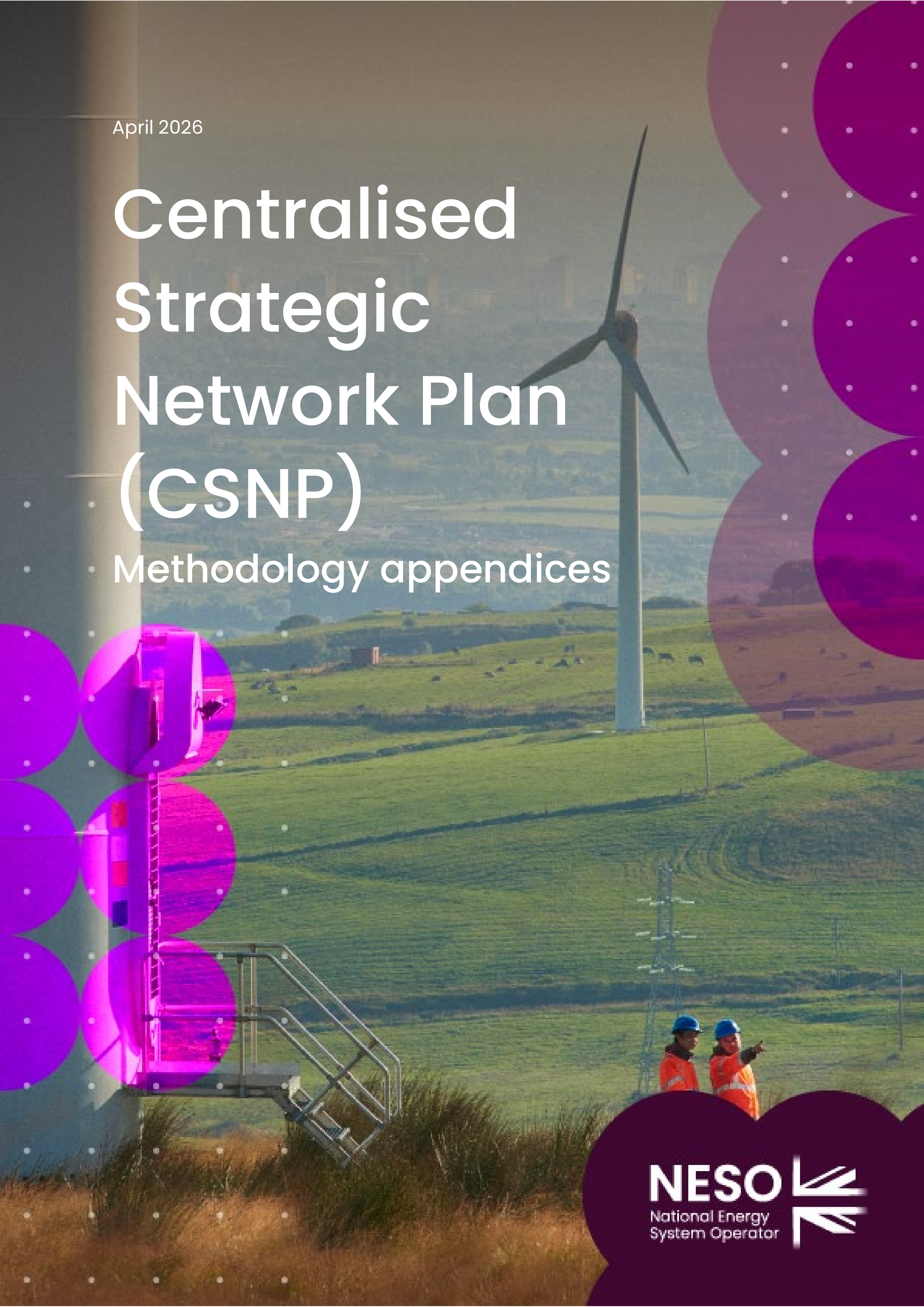
April 2026

Centralised Strategic Network Plan (CSNP)

Methodology appendices



NESO
National Energy System Operator

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Stakeholder approach

As the Centralised Strategic Network Plan (CSNP) is the network planning process for Great Britain (GB), there are a range of stakeholder views that we will need to consider.

Stakeholder definitions

Table 1 outlines the stakeholder categories which we will use below.

Table 1: Stakeholder definitions

Stakeholder category	Definitions
Government and regulatory	Ofgem, DESNZ, Welsh and Scottish governments, local/regional governments and other formally established organisations or individuals that are publicly funded to deliver a public or government service.
Transmission licensed parties	Electricity transmission licensed parties are transmission owners that own and operate the electricity transmission networks in GB. For gas, the NTS System Operator - National Gas Transmission - is the licensed party that owns and operates the natural gas transmission system in GB.
Domestic and international energy industry	Organisations or entities, or representatives thereof, involved in the production (onshore and offshore), processing, conversion, transport and sale of energy. This includes fuel extraction, manufacturing, providing energy and ownership of energy infrastructure and large energy users.
Research bodies	Groups who are working on the development of new technology, approaches or insights that could provide new capability to improve the delivery of the network (for example, universities or other research institutions).
Environment	Type one: Statutory stakeholders Type two: Non-statutory stakeholders (organisations or individuals) who have a high interest, actively campaign, or strategise for environmental awareness, and highlight the importance of protecting the environment and wildlife.

Community representatives and societal interest groups	Individuals, groups, consumers, organisations or businesses that have an interest in energy or the impact this has on the community, a specific region or at a national level with different societal dimensions.
Land and marine	Individuals, organisations or businesses, that own, use or have an interest or concern with policies or plans for onshore or marine territories, such as fisheries.

Engagement touchpoints in the CSNP

Stakeholder engagement will be undertaken throughout the CSNP cycle to help shape the outputs of the plan and ensure successful outcomes. Listening and considering a range of perspectives and insights from our stakeholders will help us create a realistic whole system network plan. Our engagement will centre around the process steps. The details of our activities will be communicated outside of the CSNP methodology. However, Table 2 provides an overview of the key engagement touchpoints.

Table 2: Overview of main engagement touchpoints in the CSNP process

1	Electricity Initial Offshore Design Exercise (IODE)	System requirements
Summary	A single offshore design will be produced for each of the SSEP pathways prior to the UK Secretary of State for Energy and Net Zero (SoS)'s decision on the final pathway. This is a new process in planning and is the foundation of the third-party process (for offshore designs).	System requirements are a series of publications that presents NESO's assessment of the transmission systems' capabilities and future needs.
Step	Drive	Identify
When is this information available?	The final IODE design will be known when the SoS selects the final pathway. The IODE will be published no later than the system requirements.	This information will be available when the SoS selects the final pathway.
Duration of process	This will be communicated outside of the Methodology.	This will be communicated outside of the Methodology.
Where can I access this information?	neso.energy/what-we-do/strategic-planning/centralised-strategic-network-plan-csnp	neso.energy/what-we-do/strategic-planning/centralised-strategic-network-plan-csnp
What does the output look like?	A document outlining the initial offshore design will be published.	Electricity will publish: 1. residual stability 2. high voltage needs 3. low voltage needs, boundary analysis, bulk power flows, thermal loading limitations Gas will publish: 1. entry capability needs (additional capability needs or potential to repurpose/decom) 2. exit capability needs (additional capability needs or potential to repurpose/decom) We intend to engage with third parties around the publication process to ensure they understand the data to help propose network options.
What is the input required from stakeholders?	N/A (more information in DOD process below).	N/A
What do I need this information for?	The outputs of the IODE will allow third parties and network owners to develop offshore network options. More information on the mechanisms to submit offshore options will be shared outside of the CSNP methodology.	Publishing this information provides a signal to transmission network owners and third parties to identify onshore network proposals to submit to the CSNP.
How frequently is this information available?	This process is undertaken for the first CSNP cycle only. However, it could be repeated if the data is required in the subsequent CSNP cycles. This is to be determined.	Published every three years as part of the CSNP cycle. For electricity, residual analysis and thermal loading limitations will be published annually.

2	Electricity detailed offshore design (DOD)	Options proposal process
Summary	The DOD process will: 1. refine the offshore design identified in the IODE. 2. allow electricity TOs and third parties to suggest changes and additional reinforcements to the offshore design. 3. allow NESO and stakeholders to explore opportunities for electrical coordination. Third party and electricity TO proposals will be welcome until the offshore design freeze.	At this stage of the CSNP process, third parties can submit options including offshore designs.
Step	Develop	Develop
When is this information available?	The DOD process will begin after the system requirements are published and in parallel to the option development and option appraisal stages. We will communicate more detail including the offshore design freeze outside of the methodology.	The mechanisms to submit options and timelines for submissions will be defined in CSNP governance, based on the information in the Methodology. We will share more information with stakeholders as soon as practicably possible.
Duration of process	This will be communicated outside of the Methodology.	This will be communicated outside of the Methodology.
Where can I access this information?	IODE information will be available and can be used to propose changes to the design. neso.energy/what-we-do/strategic-planning/centralised-strategic-network-plan-csnp	neso.energy/what-we-do/strategic-planning/centralised-strategic-network-plan-csnp
What does the output look like?	The detailed offshore design will be incorporated into the holistic CNSP design. The format is yet to be determined and it will be shared outside of the methodology.	For electricity and gas, transmission licensed parties must develop a range of reinforcement options as required in their licences. Third parties can submit transmission reinforcement options to the process. A range of hydrogen infrastructure options could be developed to enable hydrogen flows identified by NESO. Any party who has passed the eligibility check can submit options. All parties in the process will be considered third parties (as there is currently no GB hydrogen transmission licensed party).
What is the input required from stakeholders?	All stakeholders can propose changes to the IODE design. The mechanisms to propose these changes are still being refined. However, where possible, the processes and mechanisms will align with the onshore submission process. More information will be shared outside of the methodology.	None
What do I need this information for?	Stakeholders will need this information to enable them to propose changes and feed into the offshore design.	N/A
How frequently is this information available?	Currently, this process is undertaken for the first CSNP cycle only. However, it could be repeated if the data is required in subsequent CSNP cycles. This is to be determined.	Every three years as part of the CSNP cycle.

3	Options summary	Environmental assessments
Summary	A summary of the reinforcement options or hydrogen network options developed by NESO, transmission licence owners (for gas and electricity) and third parties ahead of the Appraise step.	The CSNP will include a Strategic Environmental Assessment (SEA), Habitats Regulations Assessment (HRA) and Marine Conservation Zone (MCZ) assessments. The CSNP will not require on-the-ground surveys and project-level environmental assessments, such as an Environmental Impact Assessment (EIA). These will be conducted in the delivery pipeline by the delivery body.
Step	Develop	Appraise
When is this information available?	Options submitted will be published ahead of the appraise step.	After consultation processes, the final environmental reports will be published the year that the final CSNP is published.
Duration of process	This will be communicated outside of the Methodology.	The SEA scoping statutory consultation: seven weeks. The HRA/MCZ evidence gathering and methodology consultation: six weeks. HRA/MCZ SCNB consultation: six weeks, in conjunction with the SEA public consultation (12 weeks).
Where can I access this information?	neso.energy/what-we-do/strategic-planning/centralised-strategic-network-plan-csnp	neso.energy/what-we-do/strategic-planning/centralised-strategic-network-plan-csnp
What does the output look like?	We will publish information for projects submitted to the CSNP process detailing which have progressed and those that have not. Evidence for these decisions will be provided. For electricity, this will include the annual residual options.	Following consultation on draft final HRA and MCZ reports and a draft SEA environmental report, final versions will be published of each. An SEA Adoption Statement will also be published (see final publication output for more information).
What is the input required from stakeholders?	None	Statutory Nature Conservation Bodies for the SEA Statutory Nature Conservation Bodies for the HRA/MCZ. However, NESO will continue to share environmental reports with members of the Environmental Stakeholder Group. All stakeholders are encouraged to engage in the public consultation.
What do I need this information for?	This information will help stakeholders understand what options have been submitted into the CSNP, which have progressed and which have not ahead of the draft CSNP consultation.	The final environmental reports will help inform and influence the final CSNP GB network design and avoid or mitigate significant negative effects.
How frequently is this information available?	Every three years as part of the CSNP cycle.	Every three years as part of the CSNP cycle.

4	Draft CSNP	Final CSNP
Summary	A draft publication of the final CSNP for consultation. This will include the preferred GB network design, SEA draft environmental report which will include input from the HRA and MCZ and potential future GB network designs.	The final CSNP publication will be published following a consultation. This will include the final GB network design for delivery.
Step	Appraise	Deliver
When is this information available?	Approximately six months ahead of the final CSNP publication date.	Expected at the end of 2028.
Duration of process	12-week consultation in alignment with SEA public consultation.	Expected at the end of 2028.
Where can I access this information?	neso.energy/what-we-do/strategic-planning/strategic-energy-planning-sep-publications-consultations-and-updates	neso.energy/what-we-do/strategic-planning/strategic-energy-planning-sep-publications-consultations-and-updates
What does the output look like?	A draft CSNP publication (format to be determined) and supporting annexes.	The final CSNP publication (format to be determined) which will have been updated using consultation feedback (where relevant). This will be published. It will set out areas of GB where reinforcements or hydrogen networks are needed. To accompany the CSNP, an SEA Adoption Statement will be published as required under Part 4 of the English and Welsh SEA Regulations and Part 3 of the Environmental Assessment (Scotland) Act 2005, reflecting the requirements of the SEA.
What is the input required from stakeholders?	All stakeholders are encouraged to respond to the CSNP consultation. This is the final opportunity to help shape the final publication.	None
What do I need this information for?	For visibility of content ahead of the final CSNP publication and share feedback. This will provide stakeholders with a first view of proposed areas of network reinforcement. We are also obligated to consult on our proposals.	The publication will be used by project owners as evidence for their needs case(s). Stakeholders can use this information to understand areas of GB where electricity, gas, hydrogen transmission networks and offshore designs are recommended.
How frequently is this information available?	Every three years as part of the CSNP cycle.	Every three years as part of the CSNP cycle.

5	Updated Methodology
Summary	Before each successive CSNP cycle, the licensee must review the previous CSNP Methodology and consider any improvements to better facilitate the achievement of the licensee's network planning objectives and obligations. The licensee must submit all proposed amendments to the CSNP Methodology to Ofgem for approval before implementing any changes.
Step	N/A
When is this information available?	The Methodology will be updated and we will consult on the changes. The Methodology will be submitted to Ofgem for approval.
Duration of process	Consultation window will be a minimum of four weeks.
Where can I access this information?	neso.energy/what-we-do/strategic-planning/centralised-strategic-network-plan-csnp
What does the output look like?	A publication. Updated where relevant ahead of the next CNSP cycle.
What is the input required from stakeholders?	None
What do I need this information for?	The Methodology sets out our approach for the CSNP process and how stakeholders can partake.
How frequently is this information available?	Every three years as part of the CSNP cycle.

Strategic Energy Planning working groups

We will use the existing Strategic Energy Planning (SEP) working groups to inform a wide range of stakeholders during the different stages of the Centralised Strategic Network Plan (CSNP) where applicable. Details of the groups we will use are below.

Environmental working group

This group brings together statutory and non-statutory environmental stakeholders representing GB's land and marine environment to:

- determine the approach and methodology for appraising and assessing the environment for the CSNP
- gather environmental data and feedback from the group to support the environmental appraisals (SEA, HRA and MCZ assessment) for the CSNP
- demonstrate the CSNP minimises and mitigates environmental impact
- assist in meeting the statutory consultation requirements for the SEA, HRA and MCZ assessment

Environmental working group membership organisations include:

Cadw	Defra	DESNZ
Environment Agency	Historic England	Historic Environment Scotland
Joint Nature Conservation Committee (JNCC)	Marine Management Organisation (MMO)	Natural England
Natural Resources Wales	NatureScot	Royal Society for the Protection of Birds (RSPB)
Scottish Environment Protection Agency (SEPA)	Scottish Government	The Wildlife Trust
Welsh Government		

Industry working group

Energy industry stakeholders such as transmission owners (TOs), distribution network operators (DNOs), energy infrastructure developer representatives, original equipment manufacturers (OEMs) and academics sit on this group to provide an industry steer and expertise in both electricity and hydrogen. The group:

- is a central communications channel to ensure the energy industry understands the aims and objectives of NESO's strategic energy planning projects and how they work together
- tests understanding and gathers data, insights and feedback, showcasing the work of and gathering support for strategic plans

Industry working group membership includes:

Association for Decentralised Energy (ADE)	BEAMA	British Hydropower Associate (BHA)
British Ports Association	Cadent	Electricity North West
Energy Networks Association	Energy UK	Hydrogen Scotland
Hydrogen UK	Institute for Gas Engineers and Managers	National Gas
National Grid Electricity Distribution	National Grid Electricity Transmission (NGET)	Northern Gas Networks
Northern Powergrid	Nuclear Industry Association	Renewable Energy Association (REA)
Renewable UK	Renewable UK Cymru	Royal Academy of Engineering
Scottish Renewables	SGN	Solar Energy UK
SP Energy Networks (Electricity Distribution)	SP Energy Networks (Electricity Transmission)	SSEN Distribution
SSEN Transmission	Tech UK	UK Energy Research Centre (UKERC)
UK Power Networks	Wales and West Utilities	

SEP societal forums

Although not considered as 'energy organisations' in the traditional sense, some societal interest groups are keen to know about the energy trilemma because it impacts or contributes to their purposes or goals. Such groups bring diverse perspectives to the conversation, so we will ensure our engagement with them is coordinated. One way we will gather these insights is by using the SEP societal forums. These represent a broad spectrum of economic, demographic and environmental interests across GB. The purpose of the forums is to provide insight on the development of NESO's SEP programmes, while listening to feedback which we will consider in the development of the CSNP.

The following criteria will define the specific societal groups we engage with:

- They have participants/members across more than one geographical region.
- They are non-statutory.
- They are non-decision-making.
- They have an interest in the future energy system.
- They have an influence in discussions on the future energy system.

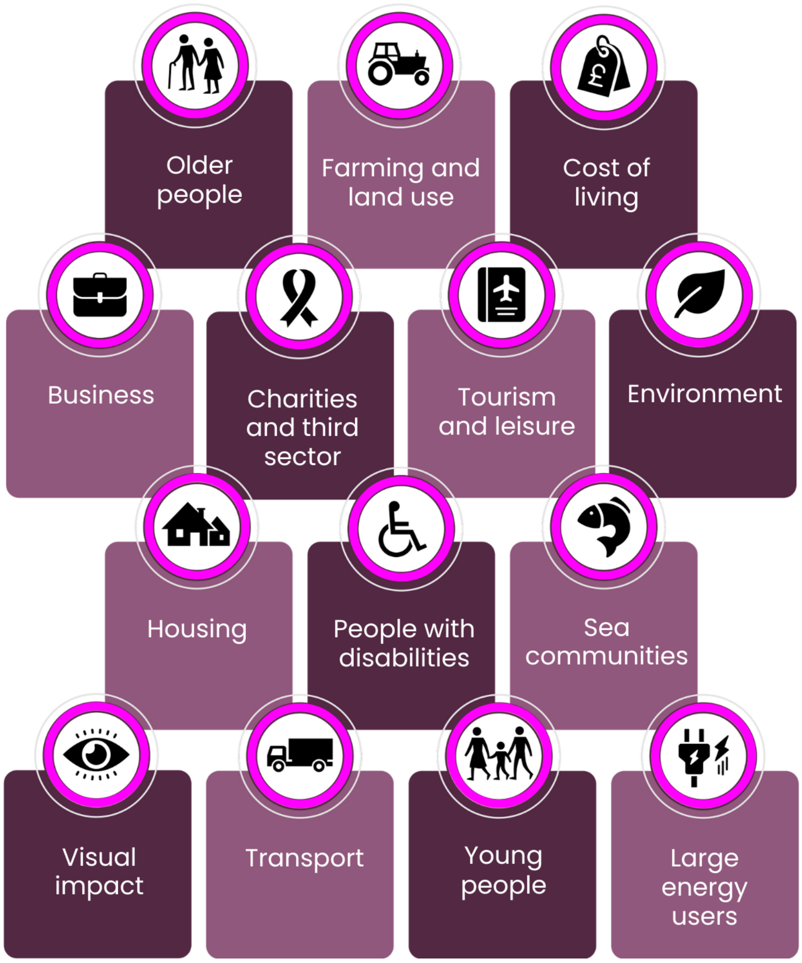

Figure 1: Overview of interest groups

Land and marine use spatial planning working groups

These groups bring together government stakeholders with planning expertise and land or marine use data to:

- gather data and feedback from the group to support the development of the land and marine use framework, plus the technical engineering design requirements for the technologies we are spatially optimising
- support the approach and methodology for appraising and assessing land and marine use
- challenge and review the pathways to prioritise land and marine uses and recommend pathway trade-offs provide spatial data modelling expertise

These objectives are relevant to the Strategic Spatial Energy Plan (SSEP) and are designed to support input into its modelling. The scope of the objectives could broaden according to the needs of the CSNP throughout its cycle. This will be reviewed within NESO to ensure we are engaging with stakeholders consistently across SEP and that the right mechanisms are in place to gather the right insights. However, our offshore governance group will also ensure spatial considerations are factored into the CSNP. Land use spatial planning working group membership includes:

- Ministry of Housing, Communities and Local Government (MHCLG)
- Department for Environment, Food and Rural Affairs (Defra)
- Welsh Government
- Department for Science, Innovation and Technology (DSIT)
- Planning Inspectorate
- Ministry of Defence (MoD)
- Scottish Government
- Department for Energy Security and Net Zero (DESNZ)

Marine use spatial planning working group membership includes:

- Defra
- Welsh Government
- Scottish Government
- DESNZ
- North Sea Transition Authority (NSTA)
- Marine Management Organisation (MMO)
- Crown Estate Scotland (CES)
- The Crown Estate
- Ministry of Defence (MoD)

2. Appendix B: Governance

Governance

The following section outlines the membership of the various governance groups and their roles and responsibilities (which will be subject to refinement and formal agreement).

NESO is accountable for the delivery of the Centralised Strategic Network Plan (CSNP) under our licences. We will seek the endorsement/recommendation of the CSNP committee at various stages throughout the process, including ahead of the final plan being submitted to Ofgem. However, the final decision sits with NESO. Figure 2 shows the governance structure that will be in place. Whilst we have included draft terms of reference for the committee and other groups, these will be ratified by the CSNP committee and formalised into agreed Terms of Reference.

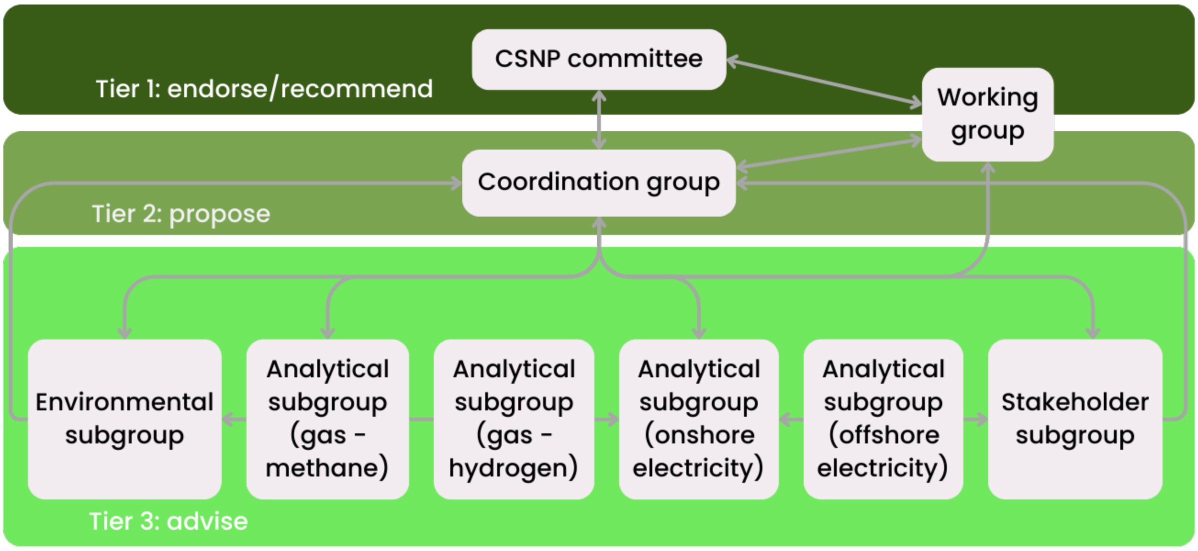

Figure 2: CSNP governance and decision-making structure

CSNP committee

The committee will be responsible for providing strategic direction and advice on the development and production of the CSNP.

Membership includes:

- Director level NESO (chair)
- NESO senior representation
- Ofgem senior representation
- DESNZ senior representation
- onshore transmission network owners (electricity and gas transmission network owners) senior representation

- Scottish Government senior representation
- Welsh Government senior representation

The secretariat working group will provide the technical secretariat for the committee.

The purpose of the committee is to:

- oversee and provide strategic direction and advice on the development and production of the CSNP
- consider all preferred options produced from the CSNP options development and assessment process
- endorse preferred projects in a delivery pipeline prior to being released to Ofgem to access project funding for electricity
- recommend projects to Ofgem for gas (methane) and hydrogen
- reach formal consensus on public messaging on CSNP publication
- make recommendations on the resolution of disputes escalated from the coordination group

Committee outputs include:

- a collated summary of the committee's views and recommendations (where appropriate) to be included in the final documentation
- development of key messaging for the CSNP publication
- a recommendation on the resolution of disputes escalated to the committee

Logistics:

- frequency - every six weeks or by exception
- duration - two hours
- location - Microsoft Teams (default)
- submission - slides/papers with clear confirmation of input needed three business days in advance, to be read ahead of the meeting
- minutes - to be taken and circulated with the action log within five business days
- quorum - at least one representative from each organisation (absence to be covered by deputies)
- where agreed and relevant, members from other organisations to attend and present agenda items

Coordination group

The view of the coordination group and its members will be considered, but it is not a decision-making body.

Membership includes:

- NESO Senior Manager (chair)

- NESO
- Ofgem
- DESNZ
- transmission network owners
- an independent expert
- representative from environmental subgroup
- representative from stakeholder subgroup
- NESO to provide the technical secretariat for the coordination group

The purpose of the coordination group is to:

- monitor progress against CSNP timeline and objectives
- consider and consolidate advice received from the subgroups
- propose to the Committee which investment options should proceed based on their delivery timescale and the system need
- make recommendations on the resolution of disputes raised to the group

Group output includes:

- a summary of the advice provided (where appropriate to be presented to the CSNP Committee)
- reports that summarise the advice provided by the subgroups to present to the CSNP Committee
- a recommendation on the resolution of disputes escalated to the coordination group

Logistics:

- frequency - every month
- duration - two hours
- location - Microsoft Teams (default)
- submission - slides/papers with clear confirmation of input needed three business days in advance, to be read ahead of the meeting
- minutes - to be taken and circulated with the action log within five business days
- quorum - at least one representative from each organisation (absence to be covered by deputies)
- where agreed and relevant, members from other organisations to attend and present agenda items

Secretariat working group

Membership:

- NESO

The purpose of the secretariat working group is to:

- proactively support and ensure high quality information is presented to the CSNP committee
- manage risks and actions for the CSNP committee and coordination group
- ensure information flows between all governance groups and subgroups
- ensure coordination and information sharing across CSNP, SSEP and RESP

Environmental subgroup

Views of this subgroup will be taken into consideration, but members will not have the right of decision-making for the CSNP.

Membership:

The environmental subgroup has the same membership as the environmental working group (Appendix A). This approach is intended to avoid stakeholder fatigue and ensure consistency across all plans and forums. Transmission owners will be invited to meetings pertinent to CSNP.

The purpose of the environmental subgroup is to:

- ensure the CSNP minimises and mitigates environmental impact
- gather environmental data and feedback from the group to support the environmental appraisals and Strategic Environmental Assessment (SEA), Marine Conservation Zone (MCZ) and Habitats Regulation Assessment/Appraisal (HRA) of the CSNP
- assist in meeting the statutory consultation requirements for the SEA and HRA

Group output includes:

- a summary of the advice provided (where appropriate to be presented to the CSNP committee)
- a form of report to feed into the CSNP governance structure to manage information sharing across the various groups

Logistics:

- frequency - every four to six weeks
- duration - two hours
- location - Microsoft Teams (default)

- submission - slides/papers with clear confirmation of input needed five business days in advance, to be read ahead of the meeting
- minutes - to be taken and circulated with the action log within ten business days
- quorum - at least one representative from each organisation (absence to be covered by deputies)
- where agreed and relevant, members from other organisations to attend and present agenda items

Analytical subgroups

There will be four analytical subgroups – electricity (onshore and offshore), gas (methane), and hydrogen. Views of these subgroups will be taken into consideration, but members will not have the right of decision-making for the CSNP.

Membership includes:

- Manager NESO (NESO Chair and Technical Secretary)
- Ofgem
- DESNZ
- relevant network transmission owners
- relevant external subject matter experts (offshore)

The purpose of the analytical subgroups are to:

- provide oversight, advice and insight on the modelling and analytical processes

Group output includes:

- a summary of the advice provided (where appropriate to be presented to the CSNP Committee)
- a form of report to feed into the CSNP governance structure to manage information sharing across the various groups

Logistics:

- frequency - every month, but may be longer at points in the CSNP cycle (depending on need)
- duration - two hours
- location - Microsoft Teams (default)
- submission - slides/papers with clear confirmation of input needed three business days in advance, to be read ahead of the meeting
- minutes - to be taken and circulated with the action log within five business days
- quorum - at least one representative from each organisation (absence to be covered by deputies)

- where agreed and relevant, members from other organisations to attend and present agenda items

Stakeholder subgroup

Views of this subgroup will be taken into consideration, but members will not have the right of decision-making for the CSNP.

Membership includes:

- Manager NESO (NESO Chair and Technical Secretary)
- Ofgem
- DESNZ
- distribution representatives
- industry representatives
- supply chain representatives
- offshore coordination groups
- community representatives

The purpose of the stakeholder subgroup is to:

- provide an industry steer and expert view of the options development and assessment process
- ensure the energy industry understands the CSNP process
- test understanding of the CSNP and gather feedback and insights for an energy industry point of view

Group output includes:

- a summary of the advice provided (where appropriate to be presented to the CSNP Committee)
- a form of report to feed into the CSNP governance structure to manage information sharing across the various groups

Logistics:

- frequency - every month
- duration - two hours
- location - Microsoft Teams (default)
- submission - slides/papers with clear confirmation of input needed three business days in advance, to be read ahead of the meeting
- minutes - to be taken and circulated with the action log within five business days

- quorum - at least one representative from each organisation (absence to be covered by deputies)
- where agreed and relevant, members from other organisations to attend and present agenda items

3. Appendix C: Resilience Risks

Environmental risks

Operational risks

Environmental risks

Table 3: Environmental risks

Risk	Description	How is this risk currently managed?	Considerations for network planning and CSNP
Severe storm	Storm force winds and lightning. **Networks:** Storm force winds and lightning damage overhead lines. This results in network faults and the subsequent loss of demand (customers) and generation. **Security of supply:** Storm force winds exceed the safe operation limits of windfarm. Wind generation is reduced.	**Networks:** • Overhead lines are designed and constructed in accordance with a range of legislation, British standards and technical specifications. • Engineering Technical Report 132[1] provides guidance on how to improve the resilience of overhead lines to vegetation-related faults. **Security of supply:** • NESO's Electricity National Control Centre (ENCC), can procure additional generation in anticipation of reduced wind output.	**Networks:** • Understand the impact of a severe storm on transmission assets. • If it is likely that transmission faults will become more common and this should be considered by the Security and Quality of Supply Standard (SQSS) review/changes to overhead line standards. • Any changes to SQSS or standards should be incorporated into CSNP modelling. • Network companies must ensure that any technical solutions comply with SQSS and other standards. **Security of supply:** • Ensure future generation mix (and spatial distribution of generation) can cope with loss of a generation type and

[1] ENA, ena-eng.org/ena-docs/D0C3XTRACT/ENA_ET_132_Extract_180902050423.pdf

Risk	Description	How is this risk currently managed?	Considerations for network planning and CSNP
			still deliver required capacity and ancillary services, without significant network constraints. (Ancillary services are the services necessary to support the transmission of electric power from generators to consumers). • Stress test different generation mixes (and spatial distribution of generation) as part of CSNP modelling. • An SQSS review result in holding additional margin for planning or operational requirements or expanding 'adverse conditions'.
Flooding/sea level rise	Flooding can arise from a range of sources including the sea (sea level rise and coastal flooding), rivers (fluvial flooding) and the ground (pluvial flooding). **Networks:** Substation equipment is damaged by floodwater which results in faults and the subsequent loss of demand (customers) and generation. **Security of supply:**	**Networks:** • Network operators conduct flood risk assessments for assets located in flood risk areas or in areas near the coast. • The Engineering Technical Report provides guidance on how to improve the resilience of substations to flooding. Flood protection measures are	**Networks:** • Network companies to ensure that they use the latest flood maps when developing options/designing solutions. **Security of supply:** • NESO should ensure the future generation mix (and spatial distribution of generation) can cope with loss of generation type and still deliver the required capacity and ancillary services without significant network constraints.

Risk	Description	How is this risk currently managed?	Considerations for network planning and CSNP
	Generation plant is damaged by floodwater which results in the loss of generation.	installed at assets considered at risk. • All grid and primary substations are protected to a 1:1000-year flood risk. For any new substation site, the general approach to protecting plant and equipment will be to construct the site or install the plant and equipment above any potential flood levels. • Where flood/erosion mitigations cannot be implemented, existing assets may be relocated. **Security of supply:** • Loss of complete substations due to flood is not currently considered a securable event under SQSS planning or operations.	• Stress test different generation mixes as part of CSNP modelling.
Coastal/fluvial erosion	Increased rainfall/sea level rise leads to erosion at cliffs and riverbanks, removing the ground material. **Networks:** Erosion to riverbanks removes the ground material support to cables and pipes, exposing them. This results in faults and the subsequent loss of demand (customers) and generation. **Security of supply**: Land in the vicinity of offshore cables landfall points and their associated substations is displaced.		

Risk	Description	How is this risk currently managed?	Considerations for network planning and CSNP
	This leads to the loss of interconnector demand/supply.		
Drought	Abnormally low rainfall results in a shortage of water. **Networks:** Ground shrinkage leads to instability to the structures built on top. This results in network faults and the subsequent loss of demand (customers) and generation. **Security of supply:** Water supply restrictions are put in place which limit the amount of water that energy assets can abstract from water sources. This results in a loss of generation.	**Networks:** • Overhead lines and underground cables are constructed in accordance with a range of standards and technical specifications which consider different ground types. • Policies are in place to monitor and inspect overhead networks. • Underground cable specifications have been reviewed and more stringent test conditions have been introduced for joints. Design standards will be updated as necessary. • Cables laid at deeper depths are less susceptible to ground movement. However, cables installed at deeper depths are not able to radiate heat as efficiently, reducing cable ratings. If ground movement risk increases in the future, regional cable depths may be required.	**Networks:** • Understand the impact of drought on transmission assets. • If it is likely that transmission faults will become more common, changes to asset standards should be considered. • Any changes to standards should be incorporated into CSNP modelling. • Network companies must ensure that any technical solutions comply with standards. **Security of supply:** • NESO should ensure the future generation mix (and spatial distribution of generation) can cope with loss of generation type and still deliver the required capacity and ancillary services without significant network constraints. • Stress test different generation mixes as part of CSNP modelling.

Risk	Description	How is this risk currently managed?	Considerations for network planning and CSNP
		Security of supply: • Generators can store a limited amount of water onsite. • The ENCC can procure additional generation from assets that are not dependent on water for cooling.	
High temperatures and heatwaves **Low temperatures, ice and snow**	There is an extended period of hot/cold weather relative to the expected conditions. **Networks:** • Overhead lines/cable circuits/transformers/switchgear overheat or fault, reducing capacity and life expectancy. In some cases, asset failure occurs, resulting in the subsequent loss of demand (customers) and generation. • Wildfires in the vicinity of overhead lines result in network faults and the subsequent loss of demand (customers) and generation. • Operational telecommunication systems can also be disrupted,	**Networks:** • Assets are built and operated in compliance with a range of standards and specifications that take operating conditions and ambient temperatures into account. **Security of supply:** • The ENCC can procure additional generation from assets that are not affected by high/low temperatures.	**Networks:** • Understand the impact of extreme temperatures on transmission assets. • If it is likely that transmission faults will become more common, changes to asset standards should be considered. • Any changes to standards should be incorporated into CSNP modelling. • Network companies must ensure that any technical solutions comply with standards. **Security of supply:** • NESO should ensure the future generation mix (and spatial distribution of generation) can cope with loss of generation type and still deliver the required capacity and ancillary services without significant network constraints.

Risk	Description	How is this risk currently managed?	Considerations for network planning and CSNP
	resulting in a loss of network control or generation. **Security of Supply:** Some generators could stop generating if temperatures exceed or go below certain thresholds. This leads to loss of generation. Increase in customer demand to cope with high/low temperatures. This can lead to transformers overloading, tripping and a loss of demand (customers) and generation.		• Stress test different generation mixes as part of CSNP modelling.

Operational risks

Table 4: Operational risks

Risk	Description	How is this risk currently managed?	Considerations for network planning and the CSNP
Loss of critical national infrastructure	There is a loss of a critical transmission asset or transmission connected energy asset, for example, loss of offshore cable/substation. This leads to an instantaneous loss of supply/demand and results in disruption to customers.	• The SQSS dictates the level of network reinforcement required for assets that connect to significant amounts of generation/demand.	• NESO should ensure that the future transmission network can cope with loss of a critical asset and still deliver the required capacity and ancillary services without significant network constraints.
Full national electricity transmission system failure	There is a cascade failure across the national electricity transmission system (NETS). This results in a nationwide loss of power.	• The system is planned/operated in accordance with SQSS to reduce likelihood of significant outages. • NESO procures electricity system restoration services from generators to restore network in the event of failure.	• No additional consideration required as this risk is managed through other NESO roles.

Risk	Description	How is this risk currently managed?	Considerations for network planning and the CSNP
Partial national electricity transmission system failure	A cascade failure across the national electricity transmission system leads to a regional loss of power.	• The system is planned/operated in accordance with SQSS to reduce the likelihood of this risk.	• No additional consideration required as this risk is managed through other NESO roles.
Instantaneous loss of generation/demand	There is an instantaneous loss of generation/demand leading to an imbalance between supply and demand. This leads to Low Frequency Demand Disconnection relays being triggered and customer disconnections.	• The SQSS dictates that NESO should procure sufficient reserve and response services to deal with the largest loss (generation and demand). • The Frequency Control and Risk Report assesses how much reserve and response should be procured to minimise the risk of customer disconnections.	• No additional considerations required.
Long term loss of generation/gas supply	There is a loss of supply, leading to an imbalance between supply and demand. This leads to customer disconnections.	• The gas network should have sufficient storage to deal with the highest demand expected once in 20 years. • Diversity of the generation mix.	• Ensure the future generation mix (and spatial distribution of generation) can cope with loss of generation and still deliver the required capacity and ancillary services without significant network constraints. • Stress test different generation mixes as part of CSNP modelling.

4. Appendix D: Assessment Framework (Electricity)

Appendix D.1: Scoring characteristics of deliverability sub-criteria

Appendix D.2: Scoring characteristics of operability sub-criteria

Appendix D.1: Scoring characteristics of deliverability sub-criteria

This section outlines scoring characteristics for the deliverability sub-criteria to score individual network reinforcement options. These details are intended as guidance for option developers. Each sub-criterion will be scored on a range from zero (lowest risk/complexity) to five (highest risk/complexity), with explanations provided for all scores.

Note: this applies to electricity transmission only. For gas and hydrogen assessment, please see the main methodology document.

This guidance does not require that every point describing the characteristics for each score be satisfied to assign a score. Instead, it serves as a guideline to reduce subjectivity. Option developers are expected to use this guidance to score the deliverability of proposed reinforcement options into the CSNP process, applying engineering judgement and narratives to justify their scores based on information known at the time.

Options can provide mitigating factors as applicable within the design narratives to lower the overall ranking, making clear how this was achieved. This allows NESO to perform checks or moderation if necessary.

Innovation and mitigating factors

NESO welcomes innovation and new technologies in the option development proposals. Due to the inherent nature of innovative and bespoke assets, these are likely to score higher than well-established technologies in terms of deliverability.

In these cases, the option developer should provide additional narratives that could mitigate the risk, for example, known suppliers, familiarity on the distributed network, non-UK examples of continued operation and network management in case of failure. For innovative solutions, applicable Ofgem funding can be used to justify a designer's choice to lower the individual criterion ranking. In instances where an innovative solution is proposed and mitigating measures are not sufficient, the designer should also propose the counterfactual option to meet the system need.

Technology readiness

Technology readiness refers to the maturity of technologies used in transmission network reinforcement, assessing their industry familiarity, operational experience and deployment track record to determine their feasibility for large-scale implementation. The Technology Readiness Level (TRL) of some assets can be referenced by using online sources such as Institute of Engineering and Technology (IET's) 'cost and characteristics' report[2] or ENTSO-E's Technopedia[3]. Option designers should provide evidence of the operational experience as necessary using examples that would be applicable to the transmission system. Assessments should be made according to the technological outlook at the time of the option submission. However, consideration can be given to industry trends that are expected to converge on a particular functional specification, for example, grid-forming control or 525 kV Bipole for high voltage direct current (HVDC) links.

The option developer should also consider whether the use of certain components would increase the risk of their whole asset/option failing. For example, innovative or bespoke components within a substation could increase the risk if those components fail, as replacing them could cause further disruption or delays.

Table 5 contains sub-criteria topics such as:

- operational experience
- infrastructure integration
- TRL from the IET sources or ENTSOE Technopedia

Table 5: Technology readiness scoring framework

Sub-criteria	**Technology readiness**
Score	**Scoring characteristics**
0	**No risk/lowest risk** • Fully operational for 5+ years, demonstrating exceptional reliability in real-world environments with minimal failures or issues. • Seamlessly integrates with existing infrastructure, requiring no adaptation or customisation for deployment. • Comprehensively tested in real-world conditions, meeting industry standards and regulatory requirements, with no untested aspects/components. • All major components at technology readiness level of 8 or 9; that is, HVAC transmission assets.
1	**Very low risk** • Operational for 3-5 years, with consistent performance in relevant environments and minimal issues. • Minimal customisation required for integration with existing systems, ensuring ease of deployment. • Extensive testing in real-world conditions, meeting all required standards and regulations or only one untested component within a larger asset.

[2] IET, theiet.org/impact-society/sustainability-and-climate-change/iet-electricity-transmission-technologies-report
[3] ENTSO-E, entsoe.eu/technopedia/

Sub-criteria	Technology readiness
	• All major components at technology readiness level of 8 or 9; that is, conventional STATCOM.
2	**Low risk** • Operational for 1-3 years, with limited issues in relevant environments, showing moderate reliability. • Can integrate with minor adaptations or adjustments needed during deployment. • Rigorous testing conducted in controlled environments and some real-world testing, meeting basic standards or only one untested component within a larger asset. • Technology readiness level of 7+; that is, voltage source converters at ±320 kV DC.
3	**Moderate risk** • Rigorous testing conducted in controlled environments and some real-world testing, meets some standards or only one untested component within a larger asset. • Operational for one year or less, with limited operational history or experience in similar environments. • Requires significant customisation and adaptation for integration with existing systems, leading to deployment challenges. • Some real-world testing, conducted in controlled environments or with some untested component(s) that may cause major failure. • All major components at technology readiness level of 6; that is, STATCOM with grid forming.
4	**High risk** • Operational history in highly limited environments with limited experience in similar applications. • No seamless integration with existing systems, requiring major customisation or adaptation. • Minimal testing of single asset or components, with no validation in real-world conditions or against regulatory standards. • Technology readiness level of asset or components 5+; that is, high temperature superconducting >320kV cables.
5	**Very high risk** • No operational history, with no proven success in any environments. • Incompatible with existing systems, requiring extensive customisation and redesign to deploy. • No testing or validation conducted of single asset or components, with no alignment to industry standards or regulations. • Technology readiness level of asset or components ≤4, meaning multi-terminal multi-vendor converter station at 380 kV and ±525 Kv.

System access

Integration of the reinforcement options will require transmission network outages during different construction phases. These outages may have lower or greater impact on other system users (depending on whether mitigation is possible to reduce supply loss) on delivering the option to the agreed date. System access evaluates the risk impact by assessing the estimated outage plan for critical infrastructure.

Option developers should consider the system access requirements of the proposed option. If providing several options that may interact, the design narrative should explain how outage impacts could be minimised. Across the whole system view, NESO will examine all the options to determine potential constraints and security of supply impacts and investigate further sensitivity studies during later detailed design.

Table 6 contains sub-criteria topics such as:

- length of system outages
- mitigation plans or strategies
- outage planning and disruptions

Table 6: System access scoring framework

Sub-criteria	**System access**
Score	**Scoring characteristics**
0	**No risk/lowest risk** • No outage of non-key assets. • Minimal disruption expected, with alternative routes or redundancies accounted for. • Planned works align well with system access windows, minimising risk to operations.
1	**Very low risk** • Potential outages lasting no longer than 1 month on some key infrastructure(s). • Some short-term disruptions may occur, but the plan allows flexibility to manage them. • Good alignment with system access planning, with minor refinements needed.
2	**Low risk** • Between 1-6 months of outage(s) on key infrastructure(s). • Mitigation plans are outlined but not fully detailed, relying on assumptions that may change. • Potential for moderate disruptions, requiring adjustments in system access planning.
3	**Moderate risk**

Sub-criteria	System access
	• Between 6–12 months of outage(s) on key infrastructure(s). • Mitigation strategies unclear or depend on unproven assumptions, increasing uncertainty. • Risk of considerable disruption, with potential delays in securing system access.
4	**High risk** • Up to 12-15 months of outages on key infrastructure(s). • High uncertainty around outage impacts, making it difficult to predict system access requirements. • Mitigation strategies are weak or not clearly defined, leading to significant operability issues. • Significant risk of prolonged disruption, requiring major interventions.
5	**Very high risk** • Likelihood of multiple frequent outages or >15 months outage on key infrastructure(s). • Severe lack of planning confidence regarding outage impacts and system access constraints. • No or very challenging mitigation strategies, leading to high likelihood of significant network disruptions. • Outages may be prolonged or difficult to manage, with unknown potential operability issues.

Design and construction complexity

Design and construction complexity refers to the challenges associated with both the design and construction of transmission network reinforcement options. For design, it includes factors such as the capacity and scale of the reinforcement option, the interdependence of components, network configuration and the requirements for consenting and planning while considering the proposed delivery date. The Electricity Transmission Design Principles (ETDP) set out strategic, network planning and project development principles that option designers should consider. The strategic and network planning principles will be of relevance for options being submitted into the CSNP, while the project development principles will be relevant after the CSNP, when a recommended option is taken forward into the next stage of development and detailed design.

For construction, it involves challenges related to site accessibility, managing multi-phased projects and coordinating concurrent construction activities while considering the proposed delivery date. For proposed options that would involve multiple sites or locations, designers should consider whether any particular location would increase the complexity that could not be mitigated and thus balance the score of the multi-site option with an accompanying narrative reflecting overall complexity score.

Table 7 contains sub-criteria topics such as:

- system upgrades
- planning process
- delivery challenges, including programme and risk of delay
- stakeholder engagement

Table 7: Design and construction complexity scoring framework

Sub-criteria	**Design and construction complexity**
Score	**Scoring characteristics**
0	**Lowest complexity** • Small upgrades may be involved (reconductoring/hotwiring) without the need for new lines or substations; existing bays utilised. • Minimal network modifications required. • Project approval process is straightforward. • Easily accessible and stable terrain, with no major land stabilisation or deep foundation work required anticipated. • Delivery/installation of critical components not dependent on external factors, meaning weather or transport vessels. • Minimal stakeholder engagement required. • Proven delivery programme with minimal risk of delay.
1	**Very low complexity** • New overhead line using existing substations and bays and/or minimal uncertainties in design, integration and construction. • Straightforward approval process, with minor risks involved. • Easily accessible, with only minor infrastructure upgrades required. • Delivery/installation of critical components not dependent on external factors, meaning weather or transport vessels. • Straightforward stakeholder engagement. • Quick delivery, with only minor risks to schedule.
2	**Low complexity** • New substations and/or FACTS devices may be involved (for example, series compensation, SVCs) and/or some uncertainties in design, integration and construction. • No major accessibility issues, but some level of additional land stabilisation or foundation work required. • Delivery/installation of critical components may be dependent on other factors, meaning weather or transport vessels, with delay impacts of less than one month. • Approvals expected within a short timeframe, with low risks. • Reasonable delivery timeline, with some manageable risks of delay.
3	**Moderate complexity**

Sub-criteria	Design and construction complexity
	• Onshore HVDC links may be involved, converter stations and/or considerable uncertainties in design, integration and construction. • Some accessibility issues requiring infrastructure modifications, some challenging terrain. • Complex stakeholder engagement, with multiple parties involved. • Delivery/installation of critical components dependent on other factors, meaning weather or transport vessels, with delay impacts of less than three months. • Lengthy approval planning process with moderate risks. • Moderate delays due to delivery challenges or dependencies.
4	**High complexity** • Offshore multi-ended HVDC links may be involved and/or major uncertainties in design, integration and construction. • Major accessibility issues or located in a remote highly constrained area, requiring special accessibility solutions. • Highly challenging stakeholder engagement, involving conflicting interests. • Delivery/installation of critical components highly dependent on other factors, meaning weather or transport vessels, with delay impacts of less than six months. • Challenging and lengthy approval planning process with high risks. • Lengthy or uncertain delivery timeline, with major risks to timely completion.
5	**Very high complexity** • Multi-terminal offshore HVDC system with extensive new transmission lines may be involved and/or extreme uncertainties exist in design and/or integration. • Severe integration risks require significant level of testing and validation. • Options located in a severely constrained area, requiring significant transport modifications. • Delivery/installation of critical components highly dependent on external factors such as weather, transport vessels or personnel, with significant delay impacts of over six months. • Highly challenging stakeholder engagement with no clear resolution timeline, leading to lengthy planning approval process. • Lengthy or very uncertain delivery timeline, with little data for programme development and major risks to timely completion.

Supply chain

Supply chain considers the availability of critical components, supplier capacity and logistical challenges influencing the timely and efficient delivery of materials for the transmission network reinforcement option.

Large and/or bespoke network assets with long lead times are often procured by an engineering, procurement, construction (EPC) and installation contract and, as such, option delivery programmes may be critical on key components that are not readily replaced. Assets and components should be sought as applicable from suppliers or sub-suppliers compliant with quality assurance standards (such as ISO 9001), IEC type test certifications or similar as applicable.

Bespoke or innovative assets would score higher; however, the option designer should provide narratives for mitigation on wider impacts on system access as required.

Table 8 contains sub-criteria topics such as:

- component lead times
- quality assurances of components
- number of supply/works contracts

Table 8: Supply chain scoring framework

Sub-criteria	**Supply chain**
Score	**Scoring characteristics**
0	**No risk/lowest risk** • Essential components readily available or component lead times pose no risk to the delivery of the project. • Only standard, widely available components required. • Development is near identical to other previous developments or familiar in transmission industry. • Adequate evidence has been provided that suppliers and sub-suppliers are compliant with quality control processes. IEC standard type testing certifications available. • Single supply/works contracts used, thus minimising interfaces/ interactions.
1	**Very low risk** • Components can be acquired in line with programme expectations with no unforeseen delays. • Development similar or identical to other previous developments or familiar in transmission industry. • <2 bespoke components required (for example, custom switchgear, relays or components). • Adequate evidence has been provided that suppliers and sub-suppliers are compliant with quality control processes.

Sub-criteria	Supply chain
Score	**Scoring characteristics**
	• Single supply/works contracts used, thus minimising interfaces/ interactions.
2	**Low risk** • Components can be acquired in line with programme expectations with no unforeseen delays. • Development similar to other previous developments or familiar in transmission industry. • <4 components required (for example, custom switchgear or protection systems). • Adequate evidence has been provided that suppliers and sub-suppliers are compliant with quality control processes. • Fewer than two supply/works contracts used, thus minimising interfaces/ interactions.
3	**Moderate risk** • Components can be acquired in line with programme expectations with manageable risks regarding delays. • <5 bespoke components used (for example, custom transformers, bespoke switchgear). • Development similar to other previous developments but could use different components, build or other design considerations. • Evidence has been provided that suppliers and sub-suppliers may be compliant to all relevant quality control processes. • Fewer than three supply/works contracts used, increasing risk management for interfaces/interactions.
4	**High risk** • Component delay risks programme delivery, high risk in delays that could impact system access and/or network resiliency. • >5 bespoke components required (for example, bespoke components and prototypes). • Development partially innovative and less familiar to industry, using design specific components, build strategies or other design considerations. • Insufficient evidence to show that suppliers and sub-suppliers have certified quality control processes. • Fewer than four supply/works contracts used, increasing risk management for interfaces/interactions.
5	**Very high risk** • Component delay risks programme delivery, very High risk in delays that could impact system access and/or network resiliency.

Sub-criteria	Supply chain
Score	**Scoring characteristics**
	• Many bespoke components required, which may involve prototyping or developing new technologies. • Development wholly innovative, using design specific components, build strategies or other design considerations. • Insufficient evidence to show that suppliers and sub-suppliers have certified quality control processes. • More than four supply/works contracts used, increasing risk management for interfaces/interactions.

Interactivity

Interactivity refers to challenges arising from inter-scheme dependencies, shared infrastructure requirements, cascading delays and simultaneous constructions. For example, a new circuit option may depend on a different option that delivers a new substation to which the new circuit will connect. Both options have heavy dependence on each other and there may be additional options, including customer connections that are linked together, making them highly interactive. Greater interactivity means higher risk issues for interdependent options.

The interactivity scoring needs to look at all known network reinforcement schemes, including, but not limited to, enabling works, asset replacement works and wider network reinforcement works. Option developers may not have this information and, therefore, they should submit a score based on their best insight of interactions or needs, allowing NESO to complete this criterion scoring and liaise with the affected licensed party as required.

Table 9 contains sub-criteria topics such as:

- interactions with other projects due to network configurations, personnel and so on
- schedule conflict or potential of delay

Table 9: Interactivity scoring framework

Sub-criteria	Interactivity
Score	**Scoring characteristics**
0	**No/lowest complexity** • No interactions or outage-related interdependencies with other projects identified. • Infrastructure sharing optimised, with no overlap with other projects or potential for cascading delays. • No interference with the design and construction of other projects.

Sub-criteria	**Interactivity**
Score	**Scoring characteristics**
1	**Very low complexity** • Dependencies between 1-2 schemes identified. • Some sharing of infrastructure required, but the risk of cascading delays is minimal and the coordination is manageable. • Minor conflicts in scheduling with simultaneous construction with other projects but can be resolved without major adjustments to timelines.
2	**Low complexity** • Dependencies between 3-4 schemes identified. • Infrastructure sharing with other parallel projects required, with some risk of cascading delays or interruptions if not carefully managed. • Multiple schemes scheduled concurrently and there may be some logistical challenges or small delays.
3	**Moderate complexity** • Dependencies between 5-6 schemes identified. • Sharing of infrastructure is complex, with potential for cascading delays or disruptions, requiring extensive planning and ongoing adjustments. • Several schemes to be scheduled at different times, as simultaneous construction could lead to significant delays if not managed correctly.
4	**High complexity** • Dependencies between 7-8 schemes identified. • Shared infrastructure presents a serious risk of delays or interruptions if not continuously monitored and managed. • Coordinating multiple schemes is challenging, with significant scheduling conflicts and potential delays affecting overall timelines.
5	**Very high complexity** • Dependencies between 8+ schemes identified. • Shared infrastructure is a critical factor, with high risk of significant delays or project failures if any issues arise. • Significant overlap in construction schedules leads to high potential for delays, requiring constant monitoring and adjustments.

Appendix D.2: Scoring characteristics of operability sub-criteria

This section outlines scoring characteristics for the operability sub-criterion to score individual network reinforcement options. These details are intended as a guidance document for option developers. Scores will range from zero (lowest risk/complexity) to five (highest risk/complexity), with explanations provided for all scores.

Note: this applies to electricity transmission only. For gas and hydrogen assessment, please see the main methodology document.

This guidance does not require that every point describing the characteristics for each score be satisfied to assign a score. Instead, it serves as a guideline to reduce subjectivity. Option developers are expected to use this guidance to score the operability of proposed reinforcement options into the CSNP process, applying engineering judgment and narratives to justify their scores based on information known at the time.

Options can provide mitigating factors as applicable within the design narratives to lower the overall ranking, making clear how this was achieved. This allows NESO to perform checks or moderation if necessary.

Innovation and mitigating factors

NESO welcomes innovation and new technologies in the option development proposals. Due to the inherent nature of innovative and bespoke assets, these are likely to score higher than well-established technologies in terms of operability.

In these cases, the option developer should provide additional narratives that could mitigate the risk, for example, through existing quality assurance standards, hardware/software in the loop testing requirements, referencing operational examples or highlighting redundancy and network management in case of failure. For innovative solutions, applicable Ofgem funding can be used to justify a designer's choice to lower the individual criterion ranking. In instances where an innovative solution is proposed and mitigating measures are not sufficient, the designer should also propose the counterfactual option to meet the system's need.

Assessments should be made according to the technological outlook at the time of the option submission. However, consideration can be given to industry trends that are expected to converge on a particular functional specification, for example, grid-forming control or 525 kV Bipole for HVDC links.

Protection and control integration complexity

Assessment of an option's complexity with integration into protection, control and monitoring, or other physical systems, conducted through knowledge-based assessment.

For each option, developers should assess the high-level protection and control integration complexity of the option by considering the sub-criteria topics, outlined in Table 10, such as:

- number and type of system interfaces
- technology novelty and operational track record
- testing and validation requirements
- stakeholder complexity

Table 10: Protection and controls integration complexity scoring framework

Sub-criteria	**Protection and control integration complexity**
Score	**Scoring characteristics**
0	**Minimal/standard complexity** • Only standard, widely used interfaces required, if any (for example, standard protocols, no bespoke integration). • Protection and control technology is established and mature and proven in GB context (operational >5 years). • All systems validated through standard testing methods and in real-world operation. • Minimal stakeholder coordination (single TO, no third parties). • No new/bespoke testing or validation requirements expected.
1	**Very low complexity** Installation of new standard protection and control assets, such as: • mostly standard interfaces - minor adaptation may be needed • protection and control technology is well-established and has a proven operational record in GB and similar environments (operational >3 years, minimal issues) • can be validated through standard testing methods • limited stakeholder coordination required (for example, single TO, minor DNO involvement)
2	**Low complexity** • Some bespoke interfaces or adaptations required. • Protection and control technology is relatively mature but with limited operational history in GB and similar environments (operational >1 year, some integration challenges or adaptations may be expected). • Mostly validated by standard simulation methods, but with some additional testing requirements.

	• Coordination with multiple parties required but falls into well-established protocols and practices.
3	**Moderate complexity** • Multiple new or bespoke interfaces required but achieved through adaptation of existing systems and established design practices. • Protection and control technology is new to GB or has a short/limited operational track record (operational <1 year, with known moderate issues or learning curve). • Validation can be achieved primarily through simulation-based methods but advances in methodologies are required as some aspects are untested in GB context. • Coordination with multiple TOs, DNOs or third parties required to upgrade/adapt existing protection and control systems.
4	**High complexity** • Significant bespoke integration across several systems. • Protection and control technology is novel or unproven in GB and has little or no operational history elsewhere (operational experience is experimental or pilot only). • Validation through existing simulation techniques is limited; new methodologies and possibly extended field/lab trials required. • Complex stakeholder coordination between TOs, DNOs or third parties requiring limited, but new, bespoke systems across ownership boundaries.
5	**Very high complexity** • Highly bespoke, multi-system integration with new protocols or architectures not covered by existing design practice or industry standards. • Protection and control technology entirely new or experimental, currently with no operational track record in any similar context. • Validation is currently based on theoretical assessment and current testing methods do not mitigate potential operability risks, leading to currently unknown/unpredictable operational impacts. • Extensive, complex stakeholder coordination requiring more than one new bespoke system across ownership boundaries.

Network operation complexity

Assessment of an option's real-time operation needs associated with analysis tool requirements and business processes to operate the transmission system safely and securely, conducted through knowledge-based assessment.

It is acknowledged that option developers may not have complete information of operational tools, therefore they should submit a score with their best insight of interactions or needs such that NESO can moderate these criteria scoring. Scoring will also be considered at the portfolio level for GB network designs to account for interactions between multiple options.

For each option, developers should assess whether the technology or system configuration of the option exceed the capabilities of current tools and/or business processes and/or SQSS requirements. Where code changes are required, they should be described and justified in the design narrative.

Table 11 contains sub-criteria topics such as:

- integration with existing real-time operational tools
- impact on business processes
- impact on secure system operation

Table 11: Network operation complexity scoring framework

Sub-criteria	Network operation complexity
Score	**Scoring characteristics**
0	**No/lowest complexity** • Option can be integrated using existing tools and processes with only routine model or parameter updates. • No additional effort expected beyond standard practice in GB. • No impact on secure system operation.
1	**Very low complexity** • Only minor updates to existing NESO tools (for example, adding a new line or substation, updating parameters). • No new tool development or major process changes. • Integration effort is 'business as usual'. • No impact on secure system operation.
2	**Low complexity** • New functions or modules required to existing tools (for example, new dispatch logic for multiple HVDCs), but adaptation of existing tools is sufficient. • Some minor process changes or additional coordination required. • Integration effort above routine, but manageable within current resources. • Minimal impact on secure system operation.
3	**Moderate complexity** • Development of a new offline analysis tool required (for example, for voltage, thermal or fault-level assessments considering novel technology). • Considerable updates to existing processes or workflows needed.

	• Integration requires some cross-team/stakeholder involvement and planning.
4	**High complexity** • Multiple new offline analysis tools and new business procedure(s) required to operate the option across multiple departments/teams (for example, new business processes and tools or resources required for network operation planning). • Complex operational tools, such as new wide area monitoring and control systems and associated resources, required. However, some precedent exists for integrating such systems in other regions. • Integration effort is substantial and may impact timelines. • Credible contingencies exceed standard 'loss of infeed' limits.
5	**Highest complexity** • New analysis tools required to facilitate real-time operations, with extensive new business processes required. • Complex operational tools, such as new wide area monitoring and control systems and associated resources, required. However, there is no precedent, it is judged to have very high uncertainty or previous attempts have been unsuccessful. • Unknown post fault reconfiguration required to maintain power transfers or fault management.

Scalability and adaptability

Scalability and adaptability consider the design's ability to expand for future capacity needs, integrate additional energy sources and adapt to emerging technologies or innovations, as well as evaluate the risk of obsolescence.

The developer should consider whether the option has practical provisions for future expansion and scalability (e.g., space, interfaces), has flexibility to support new functionalities and integrate new technologies with minimal disruption and supports interoperability between vendors. Table 12 contains sub-criteria topics such as:

- future expansion capability
- adaptability to change
- interoperability and multi-vendor interactions
- lifespan and risk of obsolescence

It is acknowledged that, for options focusing on enhancing existing network capacity (for example, upgrading circuits, power flow control, dynamic line rating and so on), the scalability and adaptability criteria may not apply. In such cases where there are no practical opportunities to expand the proposed solution, the lowest complexity score can be applied.

Table 12: Scalability and adaptability scoring framework

Sub-criteria	Scalability and adaptability
Score	**Scoring characteristics**
0	**No/lowest risk/complexity** • Clear provisions made for future expansions, system upgrades and the incorporation of new technologies in the long term. • Design incorporates established technologies with proven/ standardised ability to adapt to future technological advancements without significant reinvestment. • Very low risk of risk of obsolescence, with the system remaining relevant and efficient for decades without requiring significant updates. • Design supports multi-vendor and cross-technology interoperability. • Long, proven operational lifespan of assets, with established maintenance and upgrade strategies.
1	**Very low risk/complexity** • Design allows for integration of emerging technologies, but certain upgrades or replacements may be required for full compatibility. • Some provisions made for future upgrades/expansion, but new developments may need re-planning or investments in emerging technologies. • Relatively low risk of obsolescence, with assets expected to remain serviceable for decades, but the design may require minor adaptations to stay relevant in the future. • Design supports multi-vendor and cross-technology interoperability.
2	**Low risk/complexity** • Infrastructure can accommodate emerging technologies, but substantial changes may be needed to integrate them effectively. • Careful planning and investment required for future expansion and technological integration, with parts of the system being potentially challenging to update without major overhauls. • Moderate risk of obsolescence as certain system components may become outdated, requiring future redesigns or replacement • Reasonable lifespan of assets, but some components may require earlier replacement or upgrades. • Minor limitations exist, but the system is generally compatible with multiple vendors/technologies and similar interoperability has been demonstrated elsewhere.
3	**Moderate risk/complexity** • Emerging technologies can be integrated, but this would require major modifications or replacements of key components, leading to long delays.

Sub-criteria	Scalability and adaptability
Score	**Scoring characteristics**
	• Future upgrades may require a complete redesign of certain aspects of the infrastructure. • High risk of obsolescence, with some system elements likely becoming outdated or reaching end of life sooner than the overall lifespan, requiring costly updates. • Some interoperability is possible, but significant adaptation or vendor-specific solutions may be required.
4	**High risk/complexity** • Major technical hurdles for adapting to emerging technologies, requiring large-scale updates or potentially new infrastructure. • Design does not provide an easy pathway for future expansion or technological integration without significant intervention and cost. • High risk of obsolescence, with many parts of the infrastructure likely to be outdated before their intended life span, requiring expensive replacement. • Major interoperability challenges exist and integration with other vendors/technologies is difficult.
5	**Very high risk/complexity** • Adapting to emerging technologies is extremely difficult and would require overhauling much of the system, leading to extensive downtime and high costs. • No clear provisions for future expansion or technological adaptation, with infrastructure being unlikely to support future needs without major investments or complete redesigns. • Very high risk of obsolescence (infrastructure may become obsolete quickly), requiring near-total replacement within a short period. • System is largely proprietary or vendor-locked and cannot be integrated with other vendors or technologies.

5. Appendix E: Assurance

Assurance

Risk-based approach

A proportionate risk-based assurance approach will be performed based upon the levels of complexity and impact identified across CSNP. For example, those areas which are considered higher risk with higher levels of complexity and impact will require higher levels of assurance and related controls to ensure the risks identified are mitigated appropriately. This will form the basis of analytical rigour in ensuring the right level of controls are in place commensurate to the levels of risk identified. For example, risk assessments will be performed as appropriate for analysis performed by CSNP to identify the level of controls required. The controls required will be aligned to good practise guidance, such as the Analytical Quality Assurance (AQuA) Book guidelines[4].

Four lines of defence

The programme follows the NESO four lines of defence model approach as follows:

- **First line of defence -** Front-line programme and operational staff and management who manage the CSNP programme-related activities. This includes internal programme and CNSP operational team activities to ensure plans, processes and deliverables follow good practice standards, are consistently applied and are appropriately documented.
- **Second line of defence -** Oversight from the NESO Strategic Energy Planning (SEP) portfolio and other NESO subject matter experts.
- **Third line of defence -** Oversight from NESO Internal Audit.
- **Fourth line of defence -** Oversight from an independent third party.

Assurance scope

Assurance includes both the programme management and technical delivery of the CNSP programme. Programme management ensures the programme achieves its objectives by reviewing its progress, plans and processes. Technical delivery assurance will cover the design, implementation and performance of key processes, drawing principally upon the guidance in the AQuA Book.

These assurance processes will provide regular feedback to CSNP management to ensure appropriate good practice continues to be effectively maintained and performed.

Integrated assurance plan

An integrated assurance plan will be used to coordinate and monitor the required levels of assurance across the CNSP programme. This will be part of the programme delivery plans and aligned to the programme assurance and governance framework.

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[4] UK government, gov.uk/guidance/the-aqua-book

Programme management assurance

First line assurance will be delivered by the CSNP team. They are responsible for programme management processes and aligning these to NESO and relevant wider good practice standards. Key assurance processes within the programme include:

- scope management and planning
- risk, assumption, issues, dependencies (RAID)
- procurement and cost control
- programme governance and reporting

Second line assurance will be delivered from outside of the CSNP team by other bodies within NESO. The wider SEP Portfolio Office, which is responsible for managing teams across our strategic energy planning initiatives, will lead and provide assurance of:

- programme management controls
- quality assurance of key deliverables

As per our governance framework there will be specified milestones incorporated in the schedule; this includes:

- specified stage gates throughout the programme life cycle with defined entry and exit criteria
- assurance checks prior to the release of key deliverables, including quality control of these deliverables

The SEP Portfolio Office has the option to conduct deep dives into areas identified as a concern or develop treatment plans for identified risks or issues. Other NESO functions that may also support in performing additional assurance reviews include:

- NESO Engineering Assurance performing additional quality assurance reviews
- NESO Major Projects Department performing additional programme management assurance reviews
- Office of the Chief Economist performing additional 'check and challenge' sessions across analysis performed

Risks and issues identified by the second line activities will be reported to CSNP management as appropriate and escalated through the governance structure as required.

Third line assurance can be formed by the NESO's Internal Audit team. Currently, independent assurance is provided by a third party acting as fourth line assurance. They have performed a programme management review of the CSNP programme and recommendation actions have either been completed or are in progress. The need for any future independent fourth line assurance programme management review will continue to be assessed, and additional programme management assurance will be carried out as required.

Technical assurance

Technical assurance will be delivered through the four lines of defence structure, with the addition of external peer review and audit. This is encouraged as part of the AQuA Book guidance for programmes with the highest degree of risk and complexity, which is determined based on a structured risk matrix that considers business risk and complexity.

NESO will also have clearly defined roles during this process, in line with the AQuA Book's guidance, such as Commissioner, Analyst, Assurer and Approver.

First line assurance will maintain good practice controls aligned with relevant standards, with particular focus on the AQuA Book and NESO's analytical rigour standards. This will include maintaining key controls, such as, but not limited to:

- assumptions logs
- decision logs
- data quality logs
- peer reviews of analysis
- modelling risks and issues log
- analysis documentation, traceability and version control
- quality reviews performed by the relevant assurance lead and recorded through established governance checkpoints as appropriate

Second line assurance will utilise internal subject matter experts (SMEs) from our assurance team and across NESO. This may include:

- ongoing oversight across the programme key deliverables by SEP portfolio assurance
- deep dives as required over key deliverables
- check and challenge sessions from SMEs from across NESO
- technical SME review of modelling assumptions, data integrity and reproducibility of analytical outputs, providing challenge against NESO Analytical Rigour standards

Third line assurance is currently not providing technical assurance. This is provided by the independent third party (fourth line assurance). Competitively procured on behalf of the SEP portfolio, this specialist provider is retained to perform an assurance role on CSNP key processes and deliverables. They are intended to provide ongoing independent third-party assurance over the CSNP's key deliverables.

6. Appendix F: Other Strategic Plans and Policies

Other strategic plans and policies

Consultation with stakeholders, including the devolved administrations, has clarified the role and importance of strategic UK and nation-level plans, policies and programmes that NESO needs to consider.

We have outlined our approach to national, regional and sub-national plans in the following section.

National plans – Following the publication of the Centralised Strategic Network Plan (CSNP), the Scottish Government will consider whether it would be appropriate to amend the National Planning Framework 4, National Marine Plan or sectoral adopted marine plans.

The Welsh Government will explore the relationship between the CSNP and Future Wales: The National Plan and the Welsh National Marine Plan. Therefore, national level plans will be considered for the evaluation framework as appropriate. Additional UK, GB and devolved nations' strategies and other information may also be considered as required, particularly where these documents are relevant to the evaluation framework approach.

Regional and local sub-national plans – It is anticipated that sub-national regional and statutory plans (such as the London Plan and local development plans) are more appropriate to consider during future planning stages. They are important because some regional and local scale matters could still contain elements of national interest or significance. To cater for this, where appropriate, these matters will be picked up at a strategic level through national planning policy and plans.

Overview of strategic plans, policies and programmes

Here is a brief overview of the strategic plans, policies and programmes:

The National Planning Policy Framework – Published in December 2025, it outlines the UK government's planning policies for England and includes a framework for locally prepared plans for housing and other developments in a sustainable manner.

National Policy Statements (NPS) – The suite of twelve designated NPS set out the national need for certain types of major infrastructure for different sectors, as well as the main criteria for judging the acceptability of projects. These apply to England and, in some circumstances, Wales. For the energy sector there are six NPS:

- The overarching NPS for energy (EN-1).
- NPS for natural gas electricity generating infrastructure (EN-2).
- NPS for renewable energy infrastructure (EN-3).
- NPS for natural gas supply infrastructure and gas and oil pipelines (EN-4).
- NPS for electricity networks infrastructure (EN-5).

- NPS for nuclear power generation (EN-6), intended to be replaced by an updated version (EN-7) by the end of 2025, as is the NPS for renewable energy infrastructure (EN-3).

The Land Use Framework – Published by Defra, it aims to support the delivery of multifunctional, resilient and productive landscapes in England to meet the ambitious targets for enhancing the environment, delivering net zero and supporting food security.

National Planning Framework 4 (NPF4) – Published in February 2023, it is a national spatial strategy for Scotland, tied together with a set of national planning policies. The plan sets out spatial principles, regional priorities and national developments.

Future Wales – National Plan 2040 – This is the national development framework for Wales and has development plan status.

Planning Policy Wales (PPW) – Published in February 2024, it comprises the land use planning policies of the Welsh Government. It considers how the planning system contributes to the delivery of sustainable development and improves the social, economic, environmental and cultural wellbeing of Wales.

The UK Marine Policy Statement – Published in March 2011, it is a framework for preparing marine plans and considering decisions impacting the marine environment. It seeks sustainable development in the UK marine area and will be integral to the development of the SSEP.

Defra's Marine Spatial Prioritisation Programme – This enables the UK government to deliver on its commitments in English waters, including offshore wind targets, to help achieve net zero, along with developing marine nature recovery and supporting sustainable fisheries. To deliver this work, a cross-government programme board has been established.

Scotland's National Marine Plan (2015) (NMP) – This provides a comprehensive overarching framework for all marine activity in Scottish seas. It sets out a policy framework to help determine if new or existing marine activity is environmentally or economically sustainable and suitable for the area. It serves as the primary guide to decision-making on the use of marine space and resources in Scotland. This is currently being updated and a new plan (NMP2) will be published soon.

Sectoral Marine Plan for Offshore Wind Energy (SMP-OWE) – Published in 2020, it identified sustainable plan options for the future development of commercial-scale offshore wind energy in Scotland, including deep water wind technologies. It covers both Scottish inshore and offshore waters. This is currently being updated and a new plan (SMP-OWE2) will be published soon.

England Marine Plans (North, South, North East, North West, South East and South West Marine Plans) – The England Marine Plans consist of six regional Marine Plans that have been prepared, combining adjacent inshore and offshore marine plans to cover the 11 English Marine Plan areas that cover the inshore and offshore waters of the English marine area.

The Initial Plan Framework (IPF) – Published in 2022, it outlined the process for development of the Sectoral Marine Plan for Offshore Wind Innovation and Targeted Oil and Gas Decarbonisation. It helped identify areas suitable for the future development of offshore wind for smaller innovation projects and projects targeting the electrification of oil and gas infrastructure in Scottish waters. This is part of Scotland's decarbonisation and transition to net zero. This framework will be replaced by the new SMP-OWE when adopted.

Welsh National Marine Plan (2019) – This sets out the Welsh Government policy for the next 20 years for the sustainable use of Welsh seas.

7. Appendix G: Formal Response to Consultation Feedback

Overview

Whole system feedback

CSNP process steps feedback

Overview

This appendix provides a comprehensive overview of the feedback received from stakeholders following the Centralised Strategic Network Plan (CSNP) Draft methodology consultation (30 June – 1 August 2025). It details how we considered and acted on the main feedback themes to inform the development of the final CSNP methodology and where, if relevant, we could not act on consultation feedback.

We have grouped the feedback into two themes:

- **Whole system** – including stakeholder engagement and governance.
- **The CSNP process steps** – drive, identify, develop, appraise and deliver.

Under each theme, sub-sections have been included, highlighting specific feedback for each energy type.

Consultation details

The consultation questions were a mix of sentiment analysis (such as do respondents agree/disagree) and free text responses. The questions in the consultation were framed around our engagement, governance structure and the CSNP process steps. There were 61 different organisations who responded to the consultation and we analysed over 1,000 pieces of individual feedback.

Participants included national and local governments, transmission owners, distribution networks, academia, trade associations and energy industry experts. Collectively, they provided a breadth of insights and suggestions for consideration in the Methodology. All feedback was assessed to ensure it was considered to ensure the framework is one that will enable efficient, whole system network planning. We then improved clarity in several sections and included more comprehensive descriptions of roles and responsibilities where appropriate. We would like to thank all respondents for taking the time to respond to the consultation and sharing their insights with us.

This was the second CSNP methodology consultation, following the first high level principles window which closed on 20 January 2025. Using feedback from the first consultation, the draft document proposed a first-of-a-kind planning framework that considers the interactions between gas, hydrogen and electricity, paving the way for building a low-carbon, affordable and secure energy system for the future. The following updates are based on the feedback we received from our second consultation.

Our draft methodology outlined the process steps for the whole system CSNP. In the final version, we have provided clarity as to what NESO means by whole system in the executive summary and how this concept links to our duties and applies in practice within the CSNP within the first chapter. This additional text aims to provide stakeholders with a clear understanding of the considerations and trade-offs the CSNP will consider as a Great Britain (GB) transmission network plan.

The methodology outlines details on the links between the CSNP and other inter-related plans such as the Regional Energy Spatial Plan (RESP) and the Strategic Spatial Energy Plan (SSEP) in the section about planning GB's energy networks in response to feedback. Following our submission on 31 January 2026, we continued engaging with stakeholders to raise awareness of the CSNP and explain where stakeholders can participate in the process.

We look forward to continuing to collaborate with our stakeholders developing the first whole system network plan for GB.

Whole system feedback

Stakeholder engagement

In the draft methodology, we created stakeholder categories to represent the range of stakeholders that will interact with the Centralised Strategic Network Plan (CSNP) at various stages of its cycle across gas, hydrogen, and electricity. Those groups represent stakeholders across England, Scotland and Wales, reflecting the scope of CSNP as a GB-wide energy network plan.

As the CSNP progresses, we will continue to ensure these compositions are fit for purpose and reflective of the process.

During the consultation, we asked stakeholders to confirm whether we are engaging with the right groups of stakeholders and to highlight any other key groups we had not already included.

Over half of the respondents supported us engaging with the proposed groups. Additional stakeholder groups suggested were:

- energy prosumers (individuals or entities that both produce and consume energy, often through renewable sources) and community energy projects (for local energy resilience and decarbonisation goals)
- local and regional government
- finance/investor representation (as part of wider energy industry engagement activities)
- large energy consuming industries (large demand, particularly around industrial clusters)
- seabed leasing authorities
- hydrogen network planning stakeholders and developers
- gas storage operators
- cross-sectoral trade bodies

The suggestions made highlight the importance of inclusive engagement. When stakeholders from diverse backgrounds provide constructive opinions and expertise, they ensure the CSNP is comprehensive and effective. Most of these suggestions were made about specific CSNP's process steps, such as those considered within the governance framework, or to ensure they are included as part of the groups already proposed in the document. Therefore, we have not created additional stakeholder groups in the methodology. However, we have refined our category names and our definitions so that they encompass the proposals made in the feedback. As some stakeholders can sit in one or more of the groups, we have not explicitly referenced them by types in our definitions. These can be found in Appendix A, under stakeholder definitions.

There was a call for additional transparency around the CSNP's published outputs in the feedback. To address this, we added new chapters to the methodology. The Publish section explains our expected document outputs, including the Strategic Environmental Assessment (SEA) adoption statement, and how we intend to develop them. Our Consult section includes more details on how we plan to consult on the draft CSNP and publish the final document and our approach to stakeholder feedback.

Respondents were interested in understanding when and how we plan to engage with them. We have added an engagement touchpoint table (Table 2) to the document. This is designed to provide clarity for stakeholders on the process steps, including inputs and outputs required of stakeholders across all the energy types. Wider engagement activity supporting these steps and enhancing this information will be developed outside of the methodology as part of our wider CSNP engagement plan in line with the development of the process.

In parallel to finalising the CSNP methodology, we have been coordinating our engagement activities with our Strategic Energy Planning (SEP) colleagues. We have been reviewing the membership of the working groups with our SEP colleagues to ensure that, going forward, there is representation relevant to the development and delivery of the CSNP. Discussions are ongoing.

As a transmission-level network plan, the CSNP will not directly deal with local projects. We nonetheless will work with local stakeholders and utilise the structures put in place, as well as the relationships developed by the Regional Energy Strategic Plan (RESP) teams, to ensure the alignment between transmission and distribution-level planning.

For example, we have (and will continue to) reach out to local and regional councils/authorities to explain the CSNP, its objectives, why it is relevant to stakeholders at a regional level and how they can help shape the plan. We are also utilising the SEP societal forums and regional host area forums to ensure the needs and perspectives from regions are considered and that proposals in the plan are feasible and aligned with relevant local planning and development plans.

Our local engagement for each vector:

- **Electricity –** onshore and offshore spatial planning organisations are included in our governance groups to ensure integrated, feasible approaches are taken in the CSNP.
- **Gas –** bilateral conversations with gas distribution networks (GDNs) are ongoing to explore distribution-level network reinforcement solutions and incorporate GDN datasets into network needs assessments.
- **Hydrogen –** after the summer 2025 consultation closed, we launched a call for interest for the hydrogen methodology discussion group. With the experience of developing local hydrogen projects (usually within one/more industrial clusters), group members have extensive knowledge of both hydrogen and the local area. Outputs from the discussion group have supported the refinement of this hydrogen planning methodology.

As the CSNP considers offshore networks, interconnection and offshore hybrid assets (OHAs), respondents felt we need to engage with European stakeholders to ensure we bring international expertise, experience and innovation in system and network planning. NESO engages multilaterally with European Transmission System Operators (TSOs) throughout the insights stage in the offshore design work, as part of our contribution to the Offshore Transmission System Operator Collaboration (OTC) group. The group's third expert paper "Joint Planning in Europe's Northern Seas[5]" has helped inform our view of future cross-border opportunities. During the indicate stage, we will engage bilaterally with European TSOs to refine our planning assumptions.

As the CSNP process evolves, we will continue to engage with a range of stakeholders to understand their varying needs and perspectives to ensure that our communications remain clear, timely and effective and are applied to gas, hydrogen and electricity consistently where we can. The electricity and natural gas systems are well established and comprised of significant infrastructure in GB, with hydrogen infrastructure being considered. Although our stakeholder groups encompass all three energy types, our engagement plan is expected to reflect these differences in maturity and expected development within the scope of the plan.

The stakeholder groups are our building blocks, and we will continue to implement relevant feedback to enhance engagement throughout the CSNP. Our strategic approach, as well as our practical applications, will evolve in line with the development of the CSNP steps.

Governance

The governance structure in the CSNP is designed to ensure accountability and to facilitate successful implementation of the plan and final publication. When asked whether the governance structure set out in the draft methodology is appropriate to support the CSNP, most respondents answered neutrally or agreed. When asked if the membership, roles and responsibilities of the governance structure will support the delivery of the whole system CSNP, most respondents agreed or answered neutrally.

There were several recommendations made by stakeholders, including improving transparency by publishing minutes or reports from the working groups. This is something we will action once the CSNP governance process begins. NESO is an impartial body with responsibilities across both the electricity and gas systems and we agree with respondents that this will help enhance whole system strategic network planning within the scope of the CSNP and more widely. Our regulatory and incentives framework also encourages transparency, which will make NESO more clearly accountable to its stakeholders.

[5] Issuu, issuu.com/eliagroup/docs/joint_planning_in_europe_s_northern_seas?fr=sMmRjOTg0MjU2MjU

In the draft methodology, we proposed a three-tiered governance structure with five subgroups, including:

- environmental
- analytical (gas–methane)
- analytical (hydrogen)
- analytical (electricity)
- stakeholder

Based on suggestions from respondents, we have established an additional offshore subgroup to our governance structure to ensure structured and transparent routes for offshore discussions, inputs and ensure cross-border coordination.

Some respondents said they would like to see processes in place to ensure the governance structure remains effective. We will recruit an independent expert role for the committee group. Although we are an impartial organisation, the role of the expert is designed to challenge the group as we develop and deliver the first CSNP.

Ensuring that the CSNP governance structure reflects whole system thinking was fed back by several respondents. Specific analytical subgroups for energy types have been designed to ensure the right expertise is sought across their focus areas. However, we agree with respondents that the governance structure should ensure effective inter-vector integration where possible and that the model identifies whole system level efficiency, fairness and fosters innovation where feasible within the network planning process. The mechanisms to ensure this are being explored before the governance structure begins.

Some respondents suggested the subgroups be set up as soon as possible to utilise industry expertise to its full extent. The governance structure timings will be communicated outside of the methodology, subject to Ofgem's approval.

However, we agree that stakeholder insights are crucial to deliver the CSNP and ensure fairness, expertise and objectivity in decision-making. We have extended membership in groups across the tiers to ensure a breadth of relevant expertise is considered. Both the Scottish and Welsh governments have been invited to join the committee. This will ensure the CSNP outputs are suitable across Great Britain, particularly where there are differences in some policy areas.

We now have distribution representation in our stakeholder working group. We agree with stakeholders that this will ensure synergies across transmission and distribution are considered and decisions reflect realities. We have not included distribution level representation on the committee as requested by some stakeholders. This is because the CSNP is a transmission level plan, with decisions informing the final CSNP plan. Therefore, we do not believe distribution representation is necessary on the committee. These recommendations aim to enhance the governance structure, promote transparency and ensure a more integrated and effective approach to network planning. The CSNP structure will be reviewed to ensure it is fit for purpose as the process evolves ahead of the next cycle.

CSNP process steps feedback

Scope and framework

Electricity

Stakeholders were asked if they agreed with the proposed scope and framework, consisting of the options funnel and delivery pipeline, for electricity transmission network planning. Feedback from respondents was broadly positive.

Some respondents felt that the framework proposed risks embedding rigid assumptions that could hinder innovation and investment, particularly for interconnector projects. This is because stakeholders stated that a rigid structure poses a risk that commercially viable and innovative solutions could be overlooked or excluded and could limit opportunities for developers to propose alternative project designs or respond to emerging market and system needs, particularly for complex cross-border infrastructure.

Stakeholders note that the rigid adherence to modelled assumptions built into the CSNP may not always align with the economic, technical or permitting realities of individual projects. Stakeholders said this could impede the development of projects or be disadvantageous to projects that do not conform to the optimal network configurations in the CSNP, even though these projects could offer system benefits.

Some marine and fishery stakeholders stated that the framework does not ensure sufficient consideration for marine stakeholders, notably commercial fisheries. These stakeholders suggested the need for more robust processes to address spatial conflicts, socio-economic impacts and ensure effective mitigation and compensation for marine environments.

We acknowledge the concerns raised from stakeholders. As outlined in the governance text above, we have created an offshore subgroup within the governance structure which will enable us to engage more closely with relevant offshore stakeholders and ensure spatial planning topics can be considered and expertise shared from the right stakeholders. We will also continue to engage with industry throughout the CSNP cycle to ensure that the plan supports viable projects and does not restrict feasible transmission network alternatives. The SSEP, which is focussed on spatial planning for the locations of electricity and hydrogen generation and storage, is also a key input into the CNSP. Therefore, spatial planning will also be considered in this way.

Whilst overall there was support for the CSNP framework, stakeholders emphasised that more detail and clear actionable steps are needed to make it effective and implementable and that we need to expand on the links between the electricity and hydrogen networks. To address this, we have included more details on roles and responsibilities throughout the methodology. We will continue to engage with stakeholders to build on this information outside of the methodology, ensuring a transparent, comprehensive and robust process. As the CSNP will be published every three years (away from some of our current annual transmission network process), we are also reviewing where we can share more information throughout the process to ensure we are enabling option development and are not reducing transparency.

Although overall stakeholders agree with the steps outlined in the document, some respondents wanted more clarity on how they translate into whole system planning. The whole system section of the methodology now outlines the links and variations between electricity, hydrogen and gas and what this could look like in the future to provide more context. While a whole-system perspective is essential, the technical requirements and scale of transformation will vary across different energy systems. These differences will shape the specific planning expectations. We have included an image (Figure 3) that outlines where there are nuances between the different energy types to provide more clarity.

Gas

Responses were generally supportive of aligning gas planning with electricity and hydrogen processes. We have updated the methodology to confirm that gas network planning will follow a similar structured approach to electricity and hydrogen, ensuring consistency across the energy types. We will lead the appraisal of strategic gas options, applying the same governance principles and environmental assessments (Strategic Environmental Assessment/Habitats Regulations Assessment (SEA/HRA)) as for electricity and hydrogen.

Several stakeholders requested clarity on how gas options will be published and assessed. In response, we have committed to publishing the Gas Options Assessment (GOA) before the appraisal stage to provide transparency and enable meaningful engagement.

Hydrogen

Respondents mostly supported the fact that hydrogen planning gives equal consideration to all prospective projects. They recognised certain projects have and will be supported by the Hydrogen Transport and Hydrogen Storage Business Models (HTBM/HSBM respectively). Funded by Department for Energy Security and Net Zero (DESNZ), HTBM provides funding and revenue guarantees to hydrogen projects, which is likely to make the selected projects more attractive to investors. Nonetheless, respondents prefer the hydrogen network scoping to give the same treatment for all projects in a transparent, independent and fair manner.

We have strengthened the methodology to make clear that the CSNP will consider all potential proposals that could form part of the strategic network, rather than limiting consideration to projects currently applying for DESNZ funding. This ensures that the planning process remains comprehensive and future-focused, capturing the full range of credible options.

In addition, the methodology confirms that both new-build and repurposed infrastructure options will be assessed holistically, with no inherent bias towards one approach over the other. Decisions will be based on whole-system benefits, deliverability and resilience, ensuring fairness and transparency in how options are developed and appraised.

Drive

Electricity

This section of the draft methodology included information on the energy pathways, resilience and the offshore design process, although only questions relating to the offshore design process were asked in the consultation.

Some stakeholders felt that the offshore information was confusing because it was condensed into the Drive chapter as opposed to aligning with the process steps. We have separated the offshore information to align with them and explained the different stages that offshore options go through sequentially.

Stakeholders were asked if they agreed with the use of spatial and electrical coordination to develop the offshore networks. Most respondents agreed with this approach. Therefore, will be using strategic and spatial coordination alongside electrical coordination in the offshore design process. When asked for further comments, some stakeholders cautioned against advancing complex non-radial network designs without a clear regulatory framework or delivery pathway.

Multiple stakeholders (including various developers) have raised concerns around the lack of a delivery framework for electrically coordinated assets and concerns around ownership arrangements of electrically coordinated assets. These are areas which we have fed back to Ofgem to explore how certainty can be provided to the wider industry.

Most stakeholders agreed with our plan to design using current cable standards as design elements to provide certainty for connections. We will continue to engage proactively with stakeholders from the supply chain.

Stakeholders were asked if it would be helpful to see the indicative offshore design ahead of the full indicative onshore design. Most agreed with stakeholders emphasising the importance of clear, timely information to be published to enable effective engagement, investment planning and scrutiny of proposals. Therefore, following the single selection of an SSEP pathway (by the UK Secretary of State), the corresponding indicative offshore design will be published. This will take place prior to the publication of system requirements and will give stakeholders an opportunity to review, provide feedback and propose alternative solutions. Additional text has been added to the methodology to clarify why an indicative offshore design is being produced ahead of a full indictive onshore design, following stakeholder comments.

Other general comments captured in the feedback included comments on terminology for 'landing point', 'interface point' and 'connection point', which we have reviewed to ensure consistency.

Stakeholders suggested NESO should coordinate closely with industry, Ofgem, DESNZ and European TSOs, sharing methodologies for assessing project viability and ensuring that international network connections are developed in line with broader system needs and market realities. To provide clarity and reassurance on this feedback, we have added additional wording to highlight how leasing authorities engage with a range of stakeholders to balance the needs and priorities of seabed users. We have also included an overview of our engagement with European partners on interconnection ambitions, including through the Offshore TSO Collaboration (OTC) group. We will continue to work with industry, Ofgem and DESNZ to ensure the outputs of the CSNP are viable.

Gas

Respondents were generally supportive of publishing gas options before the options assessment, highlighting the importance of transparency. Stakeholders agreed that gas planning should align with electricity and hydrogen processes.

Since the consultation closed, we have continued engaging with gas network operators and industry representatives to refine data inputs and ensure alignment with decarbonisation pathways.

Hydrogen

Stakeholders expressed support for the use of the proposed datasets, including the Strategic Spatial Energy Plan (SSEP) and Future Energy Scenarios (FES), as the basis for hydrogen network planning. These sources were recognised as appropriate starting points for modelling, while respondents also highlighted the importance of transparency and supplementing them with additional industry and government data where necessary. Outputs from these two datasets will be used to model a national hydrogen network.

When asked whether we should consider other data sources for the modelling, respondents shared insights on further potential data sources. Some mentioned the lack of transparency in SSEP data at the time of writing and suggested more engagement with industries and the network to fill potential data gaps. They also raised that FES data tend to rely on consumer behavioural change and, as a result, it is crucial to also include data from industries in the modelling. They cited additional sources such as forecasts from GDNs, Climate Change Committee's (CCC) Seventh Carbon Budget, DESNZ and private sector stakeholders.

In November 2025, SSEP published the data transparency update, providing further details on data sources and assurance for its robustness. Since the consultation closed, we have continued the conversation with stakeholders from the private and public sector. The engagement allowed us to further define the additional datasets for the hydrogen modelling and ensure the strategic alignment with DESNZ's Hydrogen Transport and Hydrogen Storage Business Model (HTBM/HSBM respectively) workstreams.

The initial engagement in November 2025 revealed a lack of clarity around the deliverables of various NESO workstreams (SSEP, FES) amongst the stakeholders. This was subsequently clarified in the context of hydrogen network planning during the next engagement. These engagements helped identify key stakeholder groups (including network operators, cluster leads, regional organisations and developers of hydrogen and carbon capture and storage (CCS) infrastructure) to inform the bottom-up modelling. Stakeholders also emphasised the need for a more streamlined data request aligned with time horizons, as well as a more coordinated approach to engagement and data collection across NESO workstreams. In response to this feedback, we have set out our ongoing and planned engagements, clarified the time horizons for data inputs and mentioned our approach for sharing standardised data-request templates within the methodology. We have also strengthened internal coordination with other NESO workstreams to ensure a more consistent and efficient approach, which is outlined within the methodology.

Identify

Electricity

There were two questions included in this electricity chapter. The first asked if stakeholders agreed with the scope of analysis in the identify step. Most answered neutrally or agreed.

When asked for additional comments on the Identify step, stakeholders wanted clarity on the use of SSEP boundaries as a starting point for cross boundary. They also wanted clarity if changes to boundaries that were identified as part of the CSNP, either by new boundaries being defined, were removed or amended. We are committed to making these changes through engagement and once agreed, issuing study guidelines. It is expected that most boundaries will stay the same as those previously used by NESO's Electricity Ten Year Statement (ETYS) as they remain valid for assessing electricity transmission network constraints, therefore enabling comparison with previous publications.

Stakeholders indicated that they wanted to understand who is going to be carrying out the analysis identified in this step. As part of the updated text, we have confirmed that most of the analysis will be carried out by NESO, in partnership transmission owners. More details regarding data exchange and model creation will form part of the updated System Operator Transmission Owner Code (STC) and associated procedures (STC-P). Both will be updated following the final methodology, in accordance to the principles set out and following the governance route of the STC. To supplement this further, we have also clarified the roles and responsibilities after explaining process for bulk power flow analysis and analysis framework.

In the methodology, we confirm that we will produce the pathways and use these to produce the boundary requirements which we will then publish so that all option developers can use them. We have clarified we will use SSEP boundaries as starting point for cross-boundary infrastructure.

The second question asked if stakeholders had any feedback to improve the presentation of system requirements, as shown in the chapter. Some respondents reinforced the need to provide the data in an accessible format to ensure participants can use the information in their own analyses. We agree with this feedback and will ensure our engagement plan is one that considers the needs and levels of expertise across a range of stakeholders. Where necessary, targeted engagement will help decipher the results from system requirements outputs and we will ensure our data is accurate and clear for all. We will also investigate other ways to present data, such as seasonal or annual heatmaps outside of the methodology, to help with the presentation of the data. We will ensure that input for relevant stakeholders is factored into development the system needs identification process to ensure optimal solutions for reinforcements are considered.

Gas

Stakeholders emphasised transparency in how system needs are identified and prioritised and requested clarity on the data sources that will underpin this stage. There were also suggestions on considering datasets provided by the distribution operator.

We have updated the methodology to confirm that gas planning will follow a similar structured approach to electricity and hydrogen. NESO will use outputs from SSEP and FES as primary datasets. This decision will ensure a consistent planning assumption across the three vectors, as well as giving due consideration to emerging technologies such as CCUS and biomethane. We will also engage with GDNs to explore the possibility of having distribution forecasts as one of the data sources.

Hydrogen

Respondents broadly support using SSEP boundaries as a basis for hydrogen network analysis, which will identify the system needs for the hydrogen network. Suggestions were also shared about the usage of SSEP boundaries. For example, boundaries should remain flexible to accommodate cross-boundary infrastructure and account for different technology types. This is to ensure the boundary definition won't become a limitation for assessing project viability based on the principle of optimisation. They also encourage us to take community and environmental factors into account and evaluate network needs in the context of interdependencies between electricity, gas and carbon.

In response to the feedback on identifying hydrogen network needs, and the usage of SSEP for the network analysis, we have clarified that the CSNP will apply SSEP boundaries as a starting point but maintain flexibility to accommodate cross-boundary infrastructure and diverse technology types. This approach ensures that boundary definitions do not constrain optimisation or project viability. We have also committed to incorporating environmental and community considerations and assessing hydrogen network needs in the context of whole-system interdependencies, including electricity, gas and carbon.

In November 2025 we engaged stakeholder groups, including:

- network operators
- cluster leads
- regional organisations
- hydrogen developers

We explained our top-down and bottom-up modelling approach for identifying hydrogen network needs. Stakeholders generally agreed with our top-down approach, which takes a national view of inter-zonal energy transfers. Stakeholders also stressed that the bottom-up approach to demand data should be as granular as possible. Stakeholders also noted that the two approaches were unlikely to match up. Stakeholders also appreciated the level of insight and clarification gained from the series of engagements.

In response to feedback, we have committed to more engagement activities with relevant stakeholders to streamline relevant data sharing to inform our modelling. We have also stated that any mismatch in our two modelling approaches will inform sensitivity analysis within CSNP as it relates to pipeline sizing and network needs.

Develop

Electricity

The Develop chapter outlined the process for developing options, although we asked four questions covering the third-party process. As a result of the feedback received, we have made several changes to this chapter.

We asked stakeholders what information would be useful to support submitting an option and what additional support they would need to develop options. We have updated the methodology to provide more clarity about the information a third party would need to submit an option and how options could be developed.

We have explained what the third party will have to provide, including a cost and programme breakdown, spatial information, a technical decision (which will need to evidence the benefit to the indicative design, system needs or the Security and Quality of Supply Standard).

If the third-party option has demonstrated that it provides the information that is required, then an initial filtering will take place which will be equivalent to that of licensed parties. If after this a third-party option is assessed as not feasible to deliver or operate, we will inform the third party of this decision. If it is feasible to deliver or operate, we will then work with the third party to ensure that the reinforcement option is suitably developed.

In the updated Methodology we have provided more information regarding options that might require further development ahead of the Appraise step. If the option is at an early stage of development, it could be considered in a future cycle.

The updated text also brings together information on the offshore and onshore reinforcement options process so that is both consistent and clearer for stakeholders to understand the option proposal process.

We have also added details explaining how we will engage with stakeholders who want to partake in the process. More information and mechanisms to support option submissions will be shared with stakeholders outside of the methodology and we will ensure these are provided in a timely manner. We will inform stakeholders whether their options will progress in the CNSP prior to publishing the options summary.

Our engagement activities will also include details as to how stakeholders will be able to use either the indicative offshore design or system needs, as well as providing further guidance on the scope of the offshore proposals, reinforcement options and market opportunities. Deadlines for submitting options will be shared outside of the methodology. In line with other steps in the CSNP, we have provided more details on the roles and responsibilities. For the Develop step, this covers the process identified for transmission licensed parties and third parties for on and offshore proposals.

We asked stakeholders what their preferred methods of communications would be for the third-party process. These insights were invaluable and we are pleased that we are already communicating using mechanisms such as webinars, updates on our website, bilateral conversations and direct engagement with specific industry groups. We will continually explore other relevant communication methods.

Overall, stakeholders agreed with the options development process and the required information.

Gas

For gas, we asked questions focused on how strategic options would be developed and what information would be required to support this process. Feedback indicated strong support for aligning gas development steps with electricity and hydrogen, but stakeholders requested greater clarity on the submission process and the role of third parties.

We have updated the methodology to confirm that gas development will follow a similar structured approach to other vectors. We specified that third parties can also submit network reinforcement options, and National Gas Transmission (NGT) will continue to operate the transmission network as the gas transmission owner and operator. The process for submitting options has been further clarified for NGT, GDNs and independent third parties.

To raise awareness and encourage participation for the option submission, we will use a variety of methods, including webinars and bilateral engagement with gas network operators and industry representatives.

Hydrogen

Nearly half of the respondents believed there should not be any restrictions on who is eligible to propose options to meet the hydrogen network needs. There is also a general support for NESO to pre-filter submitted proposals, similar to the electricity process.

Respondents held mixed views on our proposed treatment of new build and repurposed assets (Question: Should we always consider new build asset options as an alternative to proposed repurposed assets?). Some cited that new build and repurposed may not always both be deliverable, hence not “always” compared as alternatives. Others believe repurposed assets should always take precedence over new build.

There is also an expectation for a unified and consistent planning approach across electricity, gas and hydrogen. One respondent cited that distribution-level proposals are being treated separately in gas and electricity, but not in hydrogen. Ensuring planning consistency across the three vectors underpins the whole system approach and provides certainty and clarity for stakeholders.

In November 2025 we engaged with industry (network operators, cluster leads, regional organisations and hydrogen developers) further in workshops and the methodology for option development was outlined. Some participants felt the Develop step was too onerous because industry would not expect many options to be bought forward and the assessments and detail outlined for submissions would further restrict this, so it was stressed that NESO should take a high-level approach. In response to this, NESO has removed the pre-filtering phase from Develop. We have made the submission requirements higher level and have offered support in option development.

The idea of NESO developing all options in response to the system requirements was raised in one workshop. This was rejected by industry, however it was agreed that if a system requirement is not deemed to have been addressed by options submitted during the Develop step, then NESO should identify a solution to fill that gap.

Further scrutiny within the workshops questioned the value of NESO's role, highlighting overlap between NESO's methodology and that utilised by the DESNZ business models of which the Hydrogen CSNP is informing. Engagement is ongoing with DESNZ on the alignment of processes.

The methodology and "gate" process that will be utilised in the Develop step was refined throughout the workshops, with industry generally pleased with the use of a portal for data submission and query tracking. The need for absolute clarity for each gate requirement was stressed.

Appraise

Electricity

In this step, the options which have been created and submitted to us in Develop will be systematically analysed and assessed against a multiple criterion. We have looked at the chapter and, based on feedback, we have made a number of changes.

We understand that Appraise is a key step that stakeholders want to understand. Feedback showed that there was a need for more detail to be provided so that those who submitting reinforcement options can understand how we will assess them. We have restructured the introduction to set out the key process steps in the framework for network design appraisal clearly.

We have improved the look and feel of the chapter by defining the assessment criteria more succinctly and establishing the network design against the chosen SSEP. This means that the CSNP:

- can plan the network in anticipation of future connections that will be informed by the SSEP
- can ensure that we align the network design to the SSEP
- Can be endorsed by the UK and devolved governments of Scotland and Wales and the regulator

Stakeholders overwhelmingly indicated that we should undertake the statutory environmental assessments on the whole system. We have now moved the information relating to the statutory environmental assessments to section two of the methodology to reflect the fact that we will consider them as part of the whole system approach to the CSNP.

Some stakeholders struggled to understand how the monetisation would work in practice: as a result, we have added two examples of possible monetisation of the sub criteria that have been provided, using a mixture of historical and academic information to inform decision-making and with expert judgement potentially been employed, to be controlled through the CSNP governance process.

In keeping with other steps in the methodology, we have added roles and responsibilities to this step and we will take the reinforcement options that are submitted by transmission owners and third parties via our centralised database. The data supplied will be both quantitative and qualitative; we will assess this against the multiple criteria set out in the step and, finally, we will create multiple credible network designs consisting of multiple shortlisted economically viable reinforcement options.

Gas

There was not visible opposition when we proposed using the GOA methodology to plan the gas network in CSNP. Respondents cited, however, the need to put the document under constant review and take it out for consultation where necessary.

There is also a varied view on the inclusion of fugitive emissions in the economic assessment.

Some respondents shared concerns about the timing of engagement with GDNs. They wanted NESO to allocate sufficient time to better align the planning between transmission and distribution.

Moving forward, we will be refreshing and reviewing GOA methodology on a regular basis. Where necessary, the methodology will be consulted with the public to ensure it is fit for purpose.

We maintained our decision unchanged for assessing fugitive emissions of each proposal, which is recommended by the HM Treasury Green Book and was adopted in the previous GOA (published in December 2025).

We have taken the feedback onboard and started drawing up engagement plans with GDNs in order to further explore the feasibility of their suggestions in the consultation responses.

In addition, we will also include a qualitative supply chain assessment for each proposal. We recognise the critical role supply chain plays in delivering reinforcement options and will assess all elements of design proposals by including the supply chain analysis.

Building a secure future energy system is at the heart of the CSNP planning approach, together with affordability and net zero considerations. In the Appraise step, we will assess the security of supply in the form of High Impact Point Probability Failure (HIPF).

Hydrogen

Most respondents strongly agree with hydrogen utilising a consistent approach to assessing the environmental and community impact of network planning. This reflects a general desire for unifying the planning methodology across three vectors wherever possible. It also demonstrates the inseparable importance of adopting a multi-criteria analytical framework in the appraisal process, by giving due consideration to the economic, environmental and social impacts of any given proposals.

In the final CSNP methodology, we reinforced such a commitment and will carry out the SEA/HRA assessment for hydrogen planning with the same rigour as for electricity.

We recognised that there is not an established market framework for hydrogen to assess the commercial impact of network proposals. We invited responses on whether we should consider additional economic factors/costs in the appraisal stage. Nearly two thirds of respondents agreed that we should.

In November 2025, we held workshops with industry stakeholders (including network operators, cluster leads, regional organisations and hydrogen developers) to present the Appraise methodology. Constraint costs were a key area of discussion in Appraise. Stakeholders agreed these costs are not essential at this stage, as the CSNP is forward-looking and significant hydrogen network constraints are not expected before 2050. However, NESO recognised that sensitivity studies, particularly those reflecting different supply and demand profiles or limitations of repurposed gas assets, may still indicate some constraints. As a result, the scope of the constraint analysis was further refined. If material constraints that could affect the optimal network option emerge during sensitivity testing, NESO will consider appropriate methods to monetise these impacts and include them in the economic assessment.

We also asked how we can better engage with stakeholders in developing the methodology for the hydrogen planning. Respondents cited the following:

- **Comprehensive –** engagement should ensure representation from the whole hydrogen value chain – generation, transport, storage and demand.
- **Regular and transparent –** stakeholders should be informed throughout the development cycle and with a transparent process to build trust.
- **Direct engagement -** a direct conversation with industries should happen, not just via trade associations, and involve strategic project developers in the process.
- **Strategic alignment -** stakeholders encourage us to use existing forums and make a clear distinction between NESO engagement and those initiated by DESNZ.

Since the closure of the consultation, we have hosted four consecutive small discussion group sessions with stakeholders who expressed interest in shaping the planning methodology. The breadth and depth of the stakeholder input have been reflected in our final document. We will continue to use a variety of engagement vehicles, ranging from governance groups, webinars and dedicated bilateral engagement, to ensure stakeholders can contribute to hydrogen planning via clear and open channels.

In response to stakeholder feedback, the societal costs and benefits section of the assessment criteria under Appraise is also being expanded for further clarity.

Deliver

With only two questions making up the Deliver step in the electricity side of the CSNP, and with only one of those questions being open ended, stakeholders were broadly in favour of the process that was defined in the Methodology, one stakeholder wanting us to amend the materiality triggers so that the change control process could be started with less than 50% increase in the total capital cost of a reinforcement. The wording was slightly amended to allow for the change control process to be triggered if the capital cost change was less than 50% but could impact the reinforcement option's progress.

Stakeholders felt that the methodology would benefit from a consult, refine and publish section, which we have added to the document. We have also added an engagement touchpoint table (Table 2) to bring together the interactions that stakeholders will have with the CSNP. We have created with as there were multiple references to engagement points within the document and this brings all of them together in a table format.

Next steps

Following approval from Ofgem on the CSNP methodology, we will establish the governance structure and continue to enact our strategic engagement activities.

Before each successive CSNP cycle, NESO must review the previous document and consider any improvements to enhance our network planning objectives and obligations. As required, we must submit all proposed amendments to the CSNP methodology to Ofgem for approval before implementing any changes.

8. Appendix H: Glossary

Glossary

Table 13: Glossary of terms and acronyms

Term	Description
AC (alternating current)	Electrical current in which the direction of the flow of electrons switches back and forth at regular intervals or cycles. In GB, the direction is reversed 50 times each second, which is known as a frequency of 50 Hz.
ANCAR (Annual Network Capability Assessment Report)	National Gas Transmission publication of current and future capability requirements of the National Transmission System (NTS), with the last version of this being published in June 2024.
AONB (area of outstanding natural beauty)	An area of countryside in England and Wales which has been designated for conservation due to its significant landscape value.
Assessment criteria	Economic, environmental, community, deliverability and operability criteria for the assessment of network reinforcement options and GB designs.
ATR (autothermal reforming) of methane	A chemical process to produce hydrogen from natural gas.
Balance Sheets	FES net zero pathways and the Falling Behind scenario are transformed into demand day forecasts that can be processed within SCT for analysis within Simulation and Optimisation on Networks (SIMONE).
BCR (Benefit-Cost Ratio)	A financial metric used to evaluate the feasibility and profitability of a project or investment. It is calculated by dividing the total expected benefits of a project by the total expected costs.
BM (Balancing Mechanism)	NESO's primary tool to balance supply and demand on GB's network. It is used to buy and procure the right amount of electricity required to balance the system minute by minute, and second by second, to balance supply and demand in real time.
Boundary	A division of the system into two parts, crossing critical circuits that carry power between the areas where power flow limitations may be encountered.

BRAG (black, red, amber and green)	Refers to a colour-coded level of risk that has been assigned to various elements of a project.
Busbar	A distribution of power to various connections inside a substation. It allows different circuits to be connected and disconnected as required for system operation.
Capacity	The maximum rated power output, usually measured in kilowatts (kW), megawatts (MW), gigawatts (GW) or terawatts (TW).
Capex (capital expenditure)	The investments a company makes to acquire, improve or maintain long-term assets.
CATO (competitively appointed transmission owner)	An entity competitively appointed to construct, own and operate part of the GB electricity transmission network.
CBA (cost-benefit analysis)	A method of assessing the benefits of a given project in comparison to the costs. This tool can help to provide a similar basis for all projects to be considered.
CCUS (carbon capture utilisation and storage)	The capture of carbon dioxide from a process or point of emission and either the usage in other applications or the compression, transport and storage within long-term facilities such as geological formations like depleted oil and gas wells.
CfD (Contract for Difference)	A key mechanism within the UK's energy strategy, aimed at incentivising investment in low-carbon electricity generation for consumers.
CNI (Critical National Infrastructure)	Critical elements of infrastructure (facilities, systems, sites, property, information, people, networks and processes), the loss or compromise of which would result in major detrimental impact on the availability, delivery or integrity of essential services, leading to severe economic or social consequences or to loss of life.
CO_2e (CO_2 equivalent emissions)	A metric used to compare the emissions of greenhouse gases based on their global warming potential (GWP). CO_2e represents the amount of CO_2 that would have the same warming effect as a given amount of another greenhouse gas.
Constraint	A situation where energy is restricted in its ability to flow between two points, for example, due to thermal or voltage limitations.
Constraint (gas network)	The inability to flow gas on or from the NTS, referred to as entry and exit constraints.

Constraint costs	The cost of taking balancing actions on the electricity transmission system which redispatch generation to prevent unacceptable conditions across parts of the network.
Consumer costs	Costs that will be recovered through domestic energy bills.
Cross-border (International) electricity interconnectors	Physical connections between the electricity grids of two or more countries, enabling a two-way flow of electricity.
CSNP framework	A framework that will encompass a range of different processes and outputs for the CSNP. It will include the publication of system requirements, a roadmap of potential longer-term options and a plan of projects for delivery.
DC (direct current)	Electrical current that flows consistently in one direction.
Demand	The amount of electrical power that is being used by consumers.
Demand Adjuster Tool (DAT)	The tool that rebalances zones to undertake demand sensitivity network analysis.
DESNZ (Department for Energy Security and Net Zero)	UK government department responsible for delivering security of energy supply, ensuring properly functioning energy markets, encouraging greater energy efficiency and seizing the opportunities of net zero to lead the world in new green industries.
Detailed design	A plan that includes consenting, planning and construction stages of project development.
Earliest delivery date	The earliest year a reinforcement project is projected to deliver by the reinforcement option developer.
Electrolysis	The process of using electricity to split water into hydrogen and oxygen.
ETYS (Electricity Ten Year Statement)	A NESO publication that shows the likely future transmission requirements of bulk power transfer capability of the national electricity transmission system.
FES (Future Energy Scenarios)	NESO's range of net zero pathways for the future of energy out to 2050.
Fossil fuels	A hydrocarbon-containing material such as coal, oil and natural gas, formed naturally in the earth's crust from the remains of dead plants and animals that is extracted and burned as fuel.

Gas transmission system	The network of pipes and pressure stations used to safely move gas at high pressure from its source over long distances.
GB design	The combination of electricity transmission reinforcements or commercial arrangements.
Generation	The sources of electrical power from a diverse range of resources.
GNCNR (Gas Network Capability Needs Report)	As NESO, we hold a gas system planner licence in addition to our electricity system operator licence. First published in December 2024, it outlined the network capability on the NTS in relation to the natural gas supplies and demands from the Future Energy Scenarios (FES) pathways. National Gas uses the system needs identified in the GNCNR to develop network reinforcement options.
GOA (Gas Options Advice)	A document that evaluates reinforcement investment proposals from NGT Strategic Planning Options Proposal (SPOP) to meet the NTS capability requirements highlighted in GNCNR.
GW (Gigawatt)	A unit of power equal to 1,000,000,000 watts.
GWP (global warming potential)	The measure of the impact on the climate of various greenhouse gases.
HILP (high-impact low-probability event)	Event which, if it were to materialise, would have a substantial impact on the safety, security and/or resilience of the GB energy system at a national level.
HM Treasury Green Book	The UK government's guidance on options appraisal and evaluation. It supports proper consideration of the costs, benefits and trade-offs of alternative options for delivering policy objectives. The Green Book uses the five-case model as outlined in the business case guidance for projects and programmes. This is the government's recommended framework for developing business cases.
HND (Holistic Network Design)	A recommended onshore and offshore design that could facilitate the UK government's ambition of 50 GW of offshore wind in GB by 2030.
HRA (Habitats Regulations Assessment)	A process that determines whether development plans could negatively impact local plans on a recognised protected European site beyond reasonable scientific doubt.
HVAC (high voltage	AC power transmission at voltages above 110 kilovolts (kV).

alternating current)	
HVDC (high voltage direct current)	DC power transmission at voltages above 110 kilovolts (kV).
Hydrogen transportation and storage systems	The infrastructure necessary to transport and store hydrogen.
Inertia	The kinetic energy stored in spinning parts of synchronous power generators that helps to stabilise the system.
Interconnector	A high voltage cable that connects the electricity systems of neighbouring countries.
Interface zones	The areas of the onshore transmission system where a reinforcement will connect between.
MCA (multi-criteria analysis)	A form of appraisal, comprising various classes of methods, techniques and tools, with different degrees of complexity and which explicitly consider multiple objectives and criteria in decision-making problems.
MCDA (multi-criteria decision analysis)	An analytic method used to select from or rank a set of choices where these can be assessed against delivery on a range of criteria or performance objectives, while providing a clear rational structure for the decisions to be taken.
MCZ (Marine Conservation Zone)	A type of Marine Protected Area (MPA) in England, Wales and Northern Ireland (referred to in Scotland under the umbrella MPA term). These areas protect the seabed and marine organisms by preventing or limiting environmentally damaging activities.
MITS (Main Interconnected Transmission System)	All the 400kV and 275kV elements of the onshore transmission system and, in Scotland, the 132kV elements of the onshore transmission system operated in parallel with the super grid, as well as any elements of an offshore transmission system operated in parallel with the super grid, but excludes generation circuits, transformer connections to lower voltage systems, external interconnections between the onshore transmission system and external systems and any offshore transmission systems radially connected to the onshore transmission system via single interface points.
MPA (Marine Protected Area)	An area where the seabed and marine organisms are protected by preventing or limiting environmentally damaging activities.

Methane reformation	The process of transforming methane into hot steam to produce hydrogen and carbon monoxide.
MPI (Multi Purpose Interconnector)	A subclassification of Offshore Hybrid Assets (OHAs) where the generating assets are located in GB waters.
NETS (National Electricity Transmission System)	The electricity transmission network in GB, comprising a mixture of overhead cables, underground cabling, subsea cables and associated substation equipment (asset the size varies from 400kV, 275kV, and 132kV).
Network model for voltage analysis	An electrical network model of the GB transmission network suitable for voltage analysis, including planned network developments agreed with the transmission network owners and an agreed generation and demand background. The model is built using STCP22-1.
Network option	The proposed option to meet network needs for a future hydrogen network.
Network reinforcement option	A proposed asset or commercial arrangement which could improve the electricity network's function.
NGT (National Gas Transmission)	The owner and system operator of the NTS.
NOA (Networks Options Assessment)	A NESO-run process that makes recommendations to TOs regarding which projects to proceed with to meet future network requirements as designed in the Electricity Ten Year Statement.
Nodal pricing	An alternative to the current national wholesale electricity price. It would use small pricing zones (potentially down to the consumer level) where the prices in individual zones would be based on the costs of producing and supplying energy in that area.
NPV (net present value)	The difference between the present value of cash inflows and the present value of cash outflows over a period of time.
NSP (network services procurement)	A process that opens new opportunities for the industry to offer solutions to meet system needs across constraints, stability and voltage. It helps reduce the need for new network build and includes our stability and voltage markets.
NTS (National Transmission System)	The network of high-pressure gas pipelines, compressor stations and other above-ground assets that transport gas from entry to exit points.

Ofgem (Office of Gas and Electricity Markets)	GB's independent National Regulatory Authority, a non-ministerial government department. Its principal objective is to protect the interests of existing and future electricity and gas consumers.
OHA (offshore hybrid assets)	Assets that combine interconnection with other forms of offshore generation, providing the potential for coordination and efficiency benefits compared to standalone point-to-point connections.
Opex (operational expenditure)	The cost required to operate and manage assets and enable commercial agreements.
Preferred network design	The optimal GB electricity transmission network design, including both onshore and offshore. This design will consist of a combination of network reinforcement options.
Quadrature booster	Transformer used to improve the capability of power transmission by controlling power flow through specific circuits.
Reactive compensation	The process of adding or injecting positive and/or negative Var's to a power system to essentially attain voltage control.
REMA (Review of Electricity Market Arrangements)	A government policy to review electricity market arrangements to identify reforms needed to transition to a decarbonised, cost effective and secure electricity system.
Resilience	The ability to recover from unexpected and unforeseen circumstances. Preventative measures such as supplementing assets with backup units contribute to a higher resilience.
RIIO (Revenue = Incentives + Innovation + Outputs)	The framework used by Ofgem to ensure the energy sector provides a safe, reliable service that delivers value for money to consumers.
Risk (environment and community)	The potential risk of impact on environment and communities in relation to proposed options and combinations thereof.
SCT (Scenario Creation Tool)	The tool that creates load duration curve demand days to be analysed within SIMONE for current and future NTS network planning.
SEA (Strategic Environmental Assessment)	A systematic process aimed at integrating environmental, social and economic considerations into the development of policies, plans and programmes. It helps to ensure that sustainability is prioritised and that potential environmental impacts are assessed early in the planning process. SEA enhances public participation in

	decision-making and aims to protect the environment while promoting sustainable development.
Shapefile	A digital file format used in geographic information systems (GIS) to store geospatial vector data. Shapefiles can represent points, lines and polygons, making them essential for mapping boundaries and other areas.
SIMONE (Simulation and Optimisation on Networks)	The hydraulic modelling software that NESO uses for current and future NTS network planning requirements.
SPOP (Strategic Planning Options Proposal)	NGT's proposal of NTS reinforcement options to be evaluated by NESO.
SQSS (Security and Quality of Supply Standard)	A standard that sets out the criteria and methodology for planning and operating the National Electricity Transmission System onshore and offshore.
SSSI (Site of Special Scientific Interest)	A protected conservation area in England that has features for special interest, such as wildlife, geology or landform.
Stability	The inherent ability of the system to quickly return to acceptable operation following a disturbance. The term is used to describe a broad range of topics, including inertia, system strength and dynamic voltage.
Strategic design	The high-level design of an electricity network reinforcement, including whether it is onshore or offshore, predominantly overhead or underground and any strategic mitigation.
Strategic envelope	The geographical area where a reinforcement is required. Interface zones will connect in between.
System costs	The underlying costs of building, maintaining and operating infrastructure to provide energy and services.
TPC (Transmission Planning Code)	NGT's approach to planning and developing the NTS in accordance with their duties as a gas transporter and other statutory obligations.
TO (transmission	The licensed companies that operate and maintain the onshore infrastructure within GB, namely National Grid Electricity Transmission (NGET), Scottish and Southern

owner (onshore))	Electricity Networks Transmission (SSEN) and SP Transmission plc.
Technology type	The type of reinforcement, such as High Voltage Alternating Current (HVAC), High Voltage Direct Current (HVDC) or upgrades to the existing network and its minimum capability, capacity and voltage.
Third party	A stakeholder who participates in the CSNP and does not own a GB transmission network licence.
Transmission licensed parties	Electricity transmission licensed parties are transmission owners that own and operate the electricity transmission networks in Great Britain (GB). The gas transmission licensed party in GB is National Gas Transmission, which owns and operates the natural gas transmission system in GB.
Zonal pricing	An alternative to the current national wholesale electricity price. It would use regional pricing zones where the prices in individual zones would be based on the costs of producing and supplying energy in that area.

9. Appendix I: Upcoming Workstreams

Upcoming workstreams

Table 14 provides stakeholders with a summary of the upcoming workstreams which are required to prepare for the CSNP.

Table 14: Summary of the key upcoming workstreams to be undertaken as part of the CSNP.

#	Chapter	Description	Forum	Date
1	General	NESO will create and share a worked example.	CSNP governance groups	30 September 2026
2	General	NESO will set out the end-to-end process to produce the CSNP and related publications. This will highlight key roles and responsibilities for all parties participating in the CSNP.	CSNP governance groups	30 September 2026
3	General	NESO will share a detailed plan for the delivery of CSNP with key milestones.	CSNP governance groups	30 June 2026
4	General	NESO will create and share a stakeholder engagement plan.	CSNP governance groups	30 September 2026
5	General	NESO will establish the governance groups as outlined within Appendix B.	CSNP governance groups	30 June 2026
6	General	NESO to propose new CSNP industry code changes.	Relevant code governance	31 March 2026
7	Identify	NESO will clarify and agree the timings for the data exchange and study guidelines with the transmission owners.	Approved via the STC joint planning committee (JPC)	31 December 2026

#	Chapter	Description	Forum	Date
8	Identify	NESO will agree with the relevant stakeholders the study years for analysis, in addition to the timing of network model exchange and quality assurance process.	Approved via the STC JPC	31 December 2026
9	Develop	NESO will agree format and timings of the option submission, including submission templates to be used and how the information will be submitted. For example, this will include the project cost and delivery information submission templates, mandating a consistent level of data and assumptions. Alongside the templates, NESO will outline further detail on the approach that option developers will use to create their delivery dates for each option.	Ofgem	30 October 2026
10	Develop	NESO to provide details on the submission support process tailored for third parties that also includes regular drop-in sessions, standardised design templates, FAQs and early stage feedback on eligibility or scope.	CSNP governance groups	31 December 2026
11	Appraise	NESO will agree what and how sensitivity analysis will be used during the Appraise step. NESO will agree which resilience events will be developed from existing energy pathways through CSNP governance, informed by historic and emerging risks identified through our Resilience and Emergency Management role.	Ofgem	31 December 2027
12	Appraise	NESO will finalise a list of monetisable environment, community, deliverability, and operability (ECDO) areas with relevant stakeholders.	Ofgem	30 October 2026

#	Chapter	Description	Forum	Date
13	Appraise	NESO will establish and agree a list of constraints for the environment and community criteria with relevant stakeholder groups.	CSNP governance groups	30 June 2026
14	Appraise	NESO will finalise the matrix tool used for the CSNP environment and community analysis.	CSNP governance groups	30 September 2026
15	Deliver	NESO will specify when the CSNP change control windows take place.	Ofgem	31 December 2026
16	Deliver	NESO will produce and agree terms of reference for the CSNP change control process.	Ofgem	31 December 2026
17	Deliver	NESO will provide further clarity on how the offshore change control process will be undertaken.	Ofgem	31 December 2026

10. Legal notice

Legal notice

For the purposes of this report, the terms "NESO", "we", "our", "us" etc. are used to refer to National Energy System Operator Limited (company number 11014226).

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