Public

CSNP webinar: Hydrogen network planning

July 2025

NESO
National Energy System Operator

Agenda

Join Q&A at Slido.com #9057891

Presentation includes:

- NESO: Planning the energy system
- Whole system CSNP
- Hydrogen network planning under the whole system CSNP framework
- Next steps
- Q&A

NB – we'll record the presentation including Q&A

Join Q&A at Sli.do use code #9057891

We will moderate and answer questions that are relevant to CSNP and reflect a diverse perspective. You can also get in touch via box.sep-portfolio@nationalenergyso.com for any specific consultation questions.

At a glance:

Join Q&A at Slido.com #9057891

CSNP will develop a hydrogen network plan informed by outputs from the Strategic Spatial Energy Plan (SSEP)

CSNP hydrogen plan will inform decisions on DESNZ Hydrogen Transport & Storage Business Model allocations.

We have proposed three-tier approach is for hydrogen network planning covering models that reflect:

1) a national strategic view,
2) an industrial cluster systems view,
3) a broader industrial view

The CSNP hydrogen processes will be further developed using feedback from the consultation and further policy updates. We will create a more detailed methodology, which we will engage with stakeholders on in due course.

NESO National Energy System Operator

Join Q&A at Slido.com #9057891

NESO – Planning the whole system

The challenge

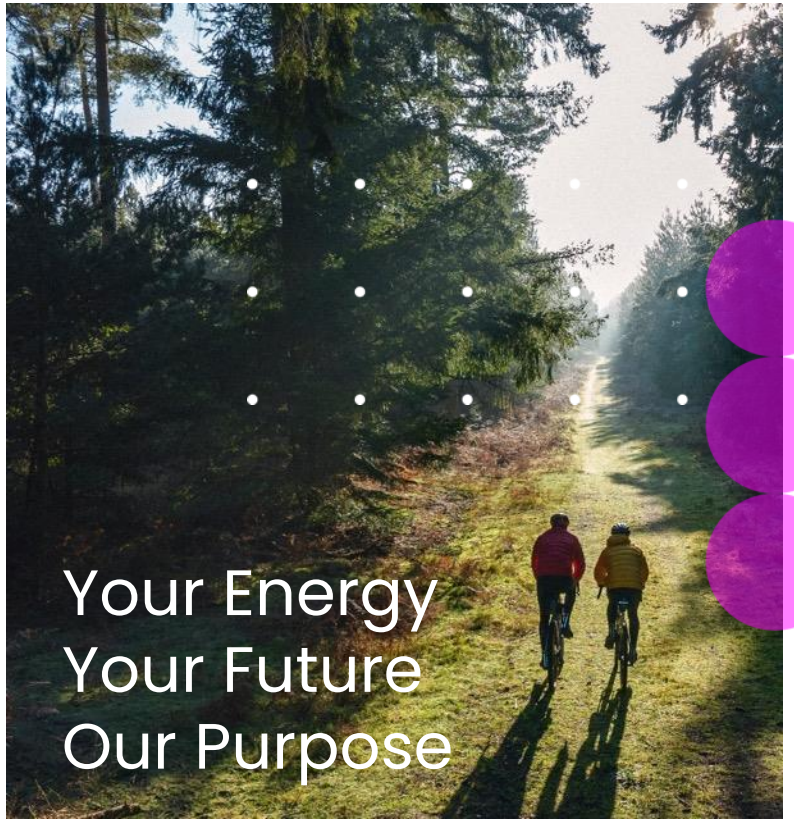
It is our job to transform the whole energy system, strategically planning the transition to a clean energy system, embracing new technologies and cleaner generation sources, always with the cost to the consumer in mind.

The opportunity

The way we use, store and source energy is evolving, and we have an opportunity in this period of change to shape an energy system that fosters economic growth and prosperity for Great Britain, creating jobs and building skills.

The plan

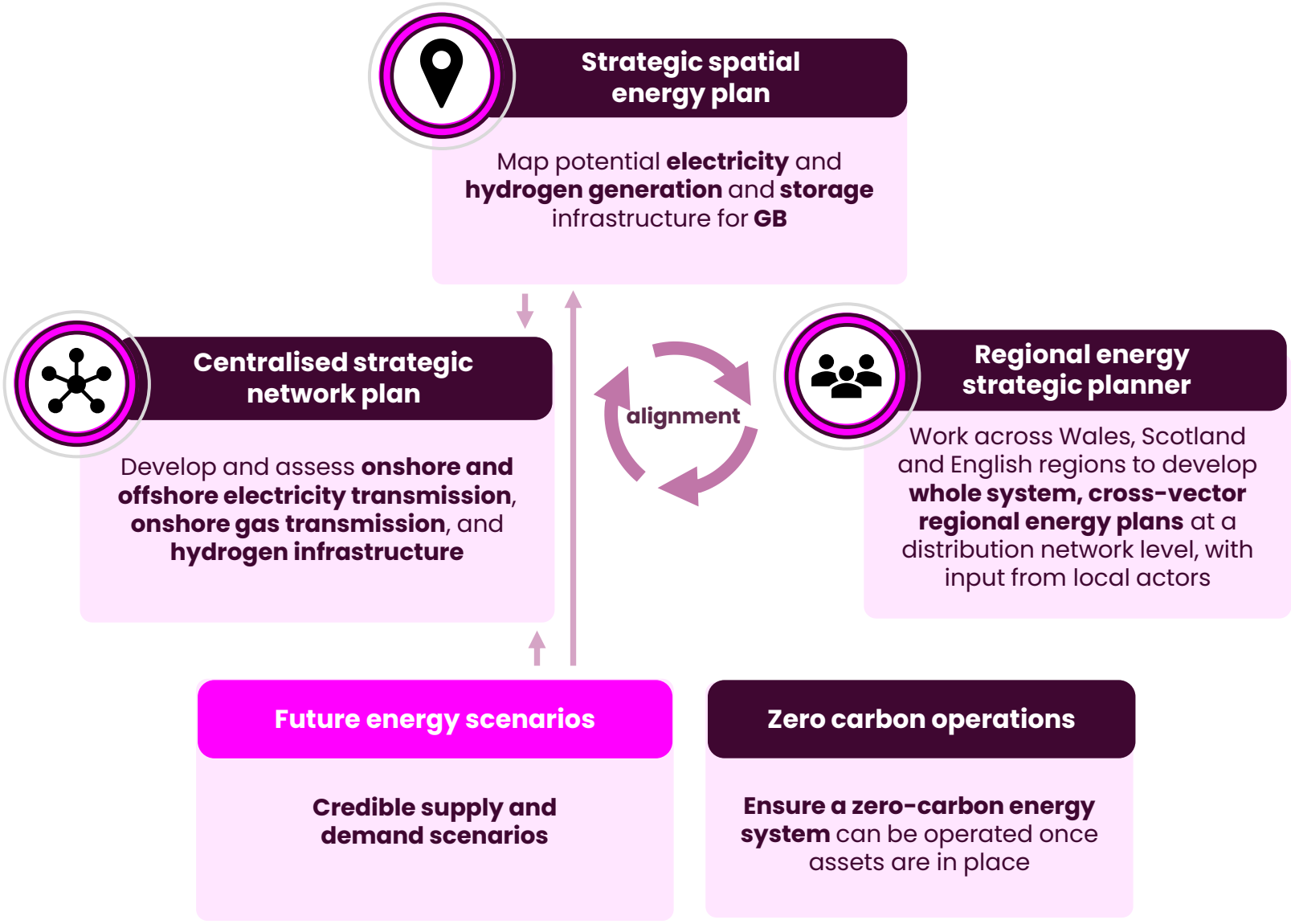
Having recently published how we intend to deliver spatial energy planning, we are now consulting on proposals for how transmission networks should be planning to transfer this energy to where it's needed over the next 25 years.



NESO
National Energy System Operator

Strategic energy planning (SEP)

Join Q&A at Slido.com #9057891



NESO National Energy System Operator

Join Q&A at Slido.com #9057891

Whole system CSNP

Today, our **energy networks** cover onshore and offshore **electricity transmission**, international **electricity interconnectors**, and **onshore gas**.

Electricity networks need to keep growing, so we must get ready to **support an expanded power system**.

While gas demand is likely to reduce, **we still need some supply**.

And there may be **more demand for hydrogen in future**, which will affect the electricity and gas networks.

Ensure efficient energy network development by holistically planning the onshore and offshore electricity networks, and strategic gas and hydrogen networks.

Plan strategically, ahead of need, to enable investments required to ensure reliable, clean and affordable energy.

Accelerate delivery of network by providing certainty on the needs case and strategic parameters of options to support planning and regulatory processes.

Conduct a consistent, robust and transparent assessment on a broad range of network options considering multiple assessment criteria.

NESO
National Energy System Operator

Join Q&A at Slido.com #9057891

Whole system framework

1	Drive	The Strategic Spatial Energy Plan (SSEP) will be used and complimented by the Future Energy Scenarios (FES), by the CSNP to plan the energy networks required for the wider transfer of electricity, gas, and hydrogen.
2	Identify	The CSNP will provide a view of the current capability and future needs of the networks to inform network options development for each energy vector.
3	Develop	Considering each vector's system requirements, a range of reinforcement options will be identified and put forward by NESO, Network Owners, and broader parties, as appropriate.
4	Appraise	Options will then be assessed across multiple assessment criteria to determine the best design across GB. Required reinforcements will progress into the delivery phase.
5	Plan publication	A draft plan will be published, and a consultation window will provide an opportunity to shape the final CSNP publication. Where required, this will include statutory consultations for environmental assessments.
6	Deliver	Following publication of the final CSNP, the required reinforcements will progress through detailed design, consenting and delivery. An ongoing change control process will ensure delivery in line with the plan.

NESO National Energy System Operator

Join Q&A at Slido.com #9057891

Delivery of a whole system CSNP

To reflect different regulatory and engineering considerations, the current proposal is that the whole system CSNP will consider all three vectors, but with different levels of detail

- Electricity transmission
- Gas transmission
- Hydrogen transmission & distribution*

All three vectors will present a whole-system approach, aligning on assumptions, language, modelling approaches and assessment methodologies.

*Currently, no distinction is made between transmission and distribution for the hydrogen network. For the initial CSNP we expect to cover all common carriage systems, but not single-party connection systems.

NESO National Energy System Operator

Join Q&A at Slido.com #9057891

Hydrogen network planning approach

We propose a three-tier approach for hydrogen network planning

- National strategic view models: informed by the hydrogen flows between zones from the SSEP outputs.
- Industrial cluster systems models: considering initial hydrogen supply and demand projects.
- Broader industrial view models: these are informed by both of the previous two approaches and will consider the buildout of hydrogen networks beyond initial supply and demand connections

No hydrogen market exists, but hydrogen storage is likely to be a vital part of a hydrogen system at some point in the future and hence we propose to include it in the CSNP.

Join Q&A at Slido.com #9057891

The CSNP framework applied to hydrogen network planning processes

Across the three vectors, CSNP will use the same framework to identify network needs, develop options, appraise options, and to make a decision or recommendation.

Identify

- **SSEP** determines the need for GB hydrogen transport & storage
- **FES** supports and augments the analysis

- Use **SSEP zones** to model flows across boundaries
- Consideration given to gas network **RIIO zones**

Develop

- Expect **multiple parties** to put forward options (licenced parties, 3rd party, NESO)
- Both **repurposing** of gas assets and **new build** options to be developed

Appraise

- **Consistent approach** to gas and electricity, where possible
- Considers **impact on gas network** of repurposed options
- Assessment criteria includes:
  - **Economic**
  - **Environment**
  - **Social**
  - **Deliverability**

Deliver

- NESO provides analysis and an optimal network solution for hydrogen network build decisions
- **DESNZ's HTBM & HSBM** to confirm funding allocations

NESO National Energy System Operator

Identify

Join Q&A at Slido.com #9057891

The identify process will be undertaken by NESO. It will take input from the SSEP and model hydrogen flows across boundaries of the SSEP zones. Consideration will need to be given to impacts on boundary flows on the gas network RIIO zones.

Purpose

We will need to define future system requirements for hydrogen based on input from the energy pathways we are considering from the SSEP and the Future Energy Scenarios. To get hydrogen from where it is produced to where it is used, a hydrogen network will require sufficient transfer capability to move this energy.

The primary part of the assessment is to identify the required network capacity to transport hydrogen.

NESO National Energy System Operator

Develop

Join Q&A at Slido.com #9057891

The options developed here could be proposed by regulated energy system participants or be put forward by NESO or other third parties.

Purpose

The CSNP will need to consider a range of options for meeting the identified hydrogen network capability and storage needs. Options for both repurposing of existing gas network assets and new build hydrogen assets will need to be developed. We will consider repurposing and new build options, dependent on SSEP outputs.

The primary part of the assessment is to develop suitable hydrogen network options, both repurposed and new build, that can meet the identified hydrogen network needs.

NESO National Energy System Operator

Appraise

Join Q&A at Slido.com #9057891

The appraisal process will be undertaken by NESO. It will consider the suitability of options developed and assess them, considering impacts on the wider energy system, for example the effect on the gas network of repurposing pipe(s) for hydrogen transport.

Purpose

The appraisal of options for hydrogen is to assess the suitability of proposed investment options that could meet the identified hydrogen network needs. For hydrogen, we intend to provide analysis of network options to identify optimal solutions including comparison of repurposed and new build options.

The primary part of the assessment is to assess the submitted options considering economic, environmental and social impacts as well as deliverability.

NESO National Energy System Operator

Deliver

Join Q&A at Slido.com #9057891

NESO is not the final decision maker on which options to take forward as they will be supported via the DESNZ Hydrogen Transport and Storage Business Models (HTBM & HSBM) and as such require a decision from the Secretary of State.

Purpose

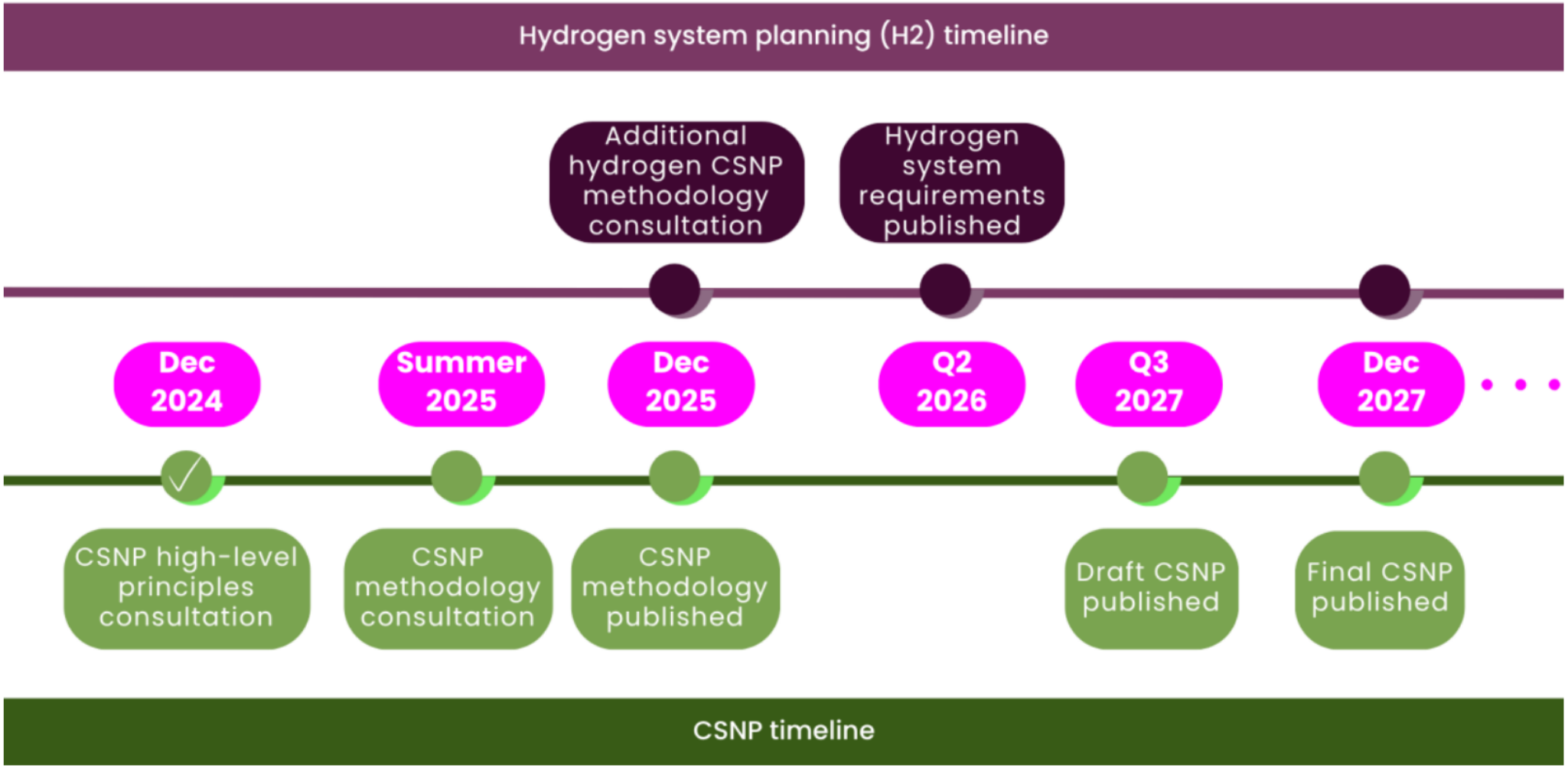
NESO's strategic planning of hydrogen transport and storage infrastructure aims to help inform DESNZ decisions relating to the HTBM and HSBM and hydrogen allocation rounds, noting that this may also be relevant for other hydrogen business models.

The primary part of the delivery is to set out our analysis and identify optimal hydrogen network solutions as part of our whole energy system planning approach, with no formal recommendations for specific hydrogen projects and delivery timescales.

NESO National Energy System Operator

Plan timeline

Join Q&A at Slido.com #9057891



Stakeholder engagement

Join Q&A at Slido.com #9057891

We will engage with stakeholders using the established Strategic Energy Planning (SEP) expert working groups. These groups include industry, societal interest, environmental, marine and land spatial planning.

They serve as an engagement channel that:

- facilitates networking among members
- provides a clear overview of the CSNP
- tests understanding
- gathers data and feedback
- ensures deliverable outputs
- offers opportunities for stakeholder review

Who will we engage with?

NESO National Energy System Operator

Immediate next steps

Join Q&A at Slido.com #9057891

Catch up on recording of our technical webinars to learn more about the specific aspects to the proposals.

Gas planning	22 July	10am
Electricity planning	22 July	2pm
Broadening participation	23 July	10am
Appraising network options	23 July	2pm
Offshore Coordination	24 July	10am

Leave us consultation feedback through our CSNP surveys:

- Whole system network planning
- Electricity network planning
- Gas network planning
- Hydrogen network planning

Consultation closes 1 August 2025 → Final methodology 30 September

NESO National Energy System Operator

Public

Q&A

Join Q&A at
Slido.com
#9057891

NESO
National Energy
System Operator