

DESNZ CCUS future network strategy consultation response

1. Who are you responding on behalf of, and what is your interest in this call for evidence?

The British Geological Survey is a world-leading geological survey and global geoscience organisation, focused on public-good science for government and research to understand earth and environmental processes.

We are the UK's premier provider of objective and authoritative geoscientific data, information and knowledge to help society to use its natural resources responsibly, manage environmental change and be resilient to environmental hazards.

Our research includes the study of carbon dioxide (CO₂) storage and we are recognised as a European centre of excellence in this field. We have a dedicated carbon capture and storage (CCS) team that is active in several related research areas including:

- characterisation and capacity estimation of potential underground storage reservoirs
- potential chemical interactions of injected CO₂ with the surrounding rocks
- storage site monitoring technologies and integrated monitoring strategies
- assessment of long-term site performance, including evaluating consequences of potential leakage

<https://www.bgs.ac.uk/geology-projects/carbon-capture-and-storage/>

2. In responding you confirm that you consent to members of the team reaching out for clarifications on responses provided, please provide contact details.

Please direct all enquiries to BGSPolicy@bgs.ac.uk. We will put you in contact with our experts.

3. In responding you confirm that you give permission for your anonymised responses to be shared with external advisors, ALBs and regulators where appropriate for the purpose of analysis.

Yes

4. What are the key positive drivers for investment from your perspective that would remove the need for RSA and GSP support?

To maintain the UK advantage of a 'pipeline' of assessment of UK sites, particularly saline aquifers, we recommend investment in pre-commercial research appraisal of prospective sites (up to Storage Readiness Level 4). The UK national geological storage capacity is not only significant, but also better understood with many sites at a higher level of storage readiness (Akhurst et al., 2021) relative to the storage resource of other European countries (EGDI, 2025). The current and increasing readiness, associated with the NSTA CO₂ storage licensing rounds, informs capacity appraisal and its availability when needed to store CO₂. The number of UK sites already at Storage Readiness Level 4 and above (EGDI, 2025), known from prior industry and research investigations, gives the UK the advantage of lower investment cost for site development. This advantage extends to the appraisal and maturation of new UK stores in the 2030s of capacity sufficient for future import of CO₂ for a commercial European CCUS market (Abel et al., 2024).

A predictable and growing CO₂ supply stream, either from UK or import, is the key positive driver that would reduce or remove requirement for future Government support. Assurance that storage projects currently under development will receive a steady CO₂ supply would allow flexibility in their financial operating models.

Recent BGS work (Abel et al., 2025) highlighted that ~ 7 Gt of storage capacity was available in the existing licence areas. Whilst investment in pre-commercial appraisal of prospective sites is advocated to ensure storage space continues to meet demand, there needs to be strategic delivery of significant captured CO₂ volumes to the existing licence blocks. This may include short term investment in cluster-based capture developments, to ensure shared transport and storage costs and infrastructure, whilst providing opportunities for access to include additional capture projects.

References

Akhurst et al., [Storage Readiness Levels: communicating the maturity of site technical understanding, permitting and planning needed for storage operations using CO₂](#) 2021.

EGDI, [Pan-European Atlas of Sustainable Geo-energy Capacities, Carbon Storage Potential, CO₂ Storage Traps](#), 2025

Abel et al., [Quantification of the UK CO₂ storage export potential for a carbon capture and storage service](#), 2025

5. What do current and prospective network operators predict needs to be done to mitigate and manage future demand fluctuations and stranded asset risks?

NA

6. How can commercial insurance products be tailored to better characterise the unique risks associated with CO₂ transport and storage, such as leakage and stranded asset risks?

The potential probabilities and consequences of leakage have been the focus of many studies since the first concepts for CCS were developed. As a result, there is a large body of evidence on the features, events and processes that can lead to leakage. It is strongly recommended that DESNZ works with the insurance industry and storage developers to assimilate, integrate and openly share this research knowledge to help constrain containment risks. Based on our long-term experience of studies assessing various aspects of geological leakage processes, impacts and mitigation, BGS, as an impartial research-based organisation, could provide this leakage review to the insurance sector. Previous discussions with major insurers highlighted their belief that storage developers were better placed to fund such a knowledge-transfer initiative. Although a relatively simple task, the potential benefit would be significant in reducing current uncertainty around containment risks.

7. How can cross-sector collaboration (from financiers and insurance providers) be optimised to enhance financing and investment in future CO₂ networks?

NA

8. Should government evolve the nature of support made available to future T&S networks, to help enable market transition? Please set out your rationale and suggest any steps that could be taken.

The Consultation notes that there are high upfront capital expenditures which may reduce industry's appetite for investment. For storage developers, there is a significant upfront investment, of £10m's value, in detailed geological appraisal that is required before an application for a storage permit can be made. Award of storage permit is a precursor to being able to take Final Investment Decision. As the UK transitions away from oil and gas production and seeks to maximise the economic opportunity provided by our theoretical storage capacity, saline aquifer storage will be increasingly required.

To reduce these high upfront capital costs for industry, supporting more entrants in the emerging CO2 storage business, it is proposed that pre-commercial appraisal of the storage resource is undertaken. This reduces costs by identifying and appraising geological regions of the UK Continental Shelf which offer significant theoretical storage capacity but are currently economically uncertain. A similar approach has previously been undertaken in the oil and gas sector, where prospects were independently reviewed by the BGS, to support upcoming licensing rounds. Furthermore, this pre-commercial appraisal will help to provide initial de-risking of potential projects and enable more strategic prioritisation in infrastructure growth – both leading to further cost-savings and increasing the confidence of industry seeking to invest in CCS.

This pre-commercial appraisal, undertaken independently by BGS, should include the production of data packages that allow informed investment decisions by industry. This approach takes advantage of The National Geological Repository – the national archive of subsurface data. Using this resource of drillcore, rock samples specimens, logs and reports, £1.2 billion has been saved in siting research for CCS, and supported £21 billion in investment.

9. How can co-investment from bodies such as NWF/GBE best play a role in deploying future CO2 networks and help enable market transition?

NA

10. How can the evolution of the Code and capacity products be optimised to enhance network utilisation and reduce reliance for the T&S operator, on external financial support mechanisms?

NA

11. What specific flexible capacity products, interruptible offerings and/or network access would be required by different user types to best address the inefficiencies caused by seasonal fluctuation or another other reason for variable CO2 flows under the current Code?

NA

12. Does industry see a need for government to help define wider commercialisation priorities for the Network Code? Or are priorities sufficiently clear that industry can deliver on them, outside of or through an Ofgem SCR?

NA

13. What are the key considerations for spatial planning and optimisation when integrating CCUS with wider energy and industrial systems, particularly in relation to existing and new infrastructure for hydrogen and natural gas?

CO₂ storage will compete with other [transition technologies](#) such as offshore wind, energy storage, hydrogen production/storage as well as with existing oil and gas infrastructure for the same offshore and near-shore acreage – above and below the ground.

Effective spatial planning – including the subsurface space - is therefore needed to: avoid conflicts, realise co-location synergies (shared ports, cables, pipelines, platforms), safeguard environmental receptors, maximise the use of the UK's pore space and seabed, and sequence infrastructure build-out so projects are technically and commercially viable.

This requires an effective 3D mapping programme to position wind lease areas, cable corridors, shipping lanes, protected habitats, existing oil & gas infrastructure and potential onshore landing/port sites, alongside the mapped subsurface opportunities (porous reservoir extents, distribution of sealing units, faults, fractures, etc.). Developing a clear understanding, and grading, of reservoir suitability and seabed requirements for stand-alone and proximal energy transition technologies will highlight the key storage zones that should be reserved.

A clear opportunity exists to generate cross technology policy that prioritises strategic development and optimisation. Assurance of early-stage storage space for CO₂ (or hydrogen), or seabed acreage for wind, would support the technology roll-out, de-risking foundational projects and ensure storage planning across the portfolio of energy transition technologies. This approach would allow later flexibility, and support opportunities for co-location. BGS' renewables portfolio tool shows where potential areas of overlap exist (see <https://www.bgs.ac.uk/news/goldilocks-zones-geological-super-regions-set-to-drive-annual-40-billion-investment-in-jobs-and-economic-growth/>).

The UK should prioritise the planning and development of shared trunk infrastructure to reduce both costs and spatial footprints. The benefits of developing synergies include: co-location at landfall, shared offshore platforms for hydrogen production and CCS, tiered geological storage opportunities in the subsurface and a wider stakeholder understanding of the opportunities and challenges of proximal technology development. The findings should be developed alongside a robust data gathering and modelling programme. Combining engineering and environmental cost and impact models, with geological mapping and subsurface parameterisation is a necessary first step. Scenario and stochastic approaches to capture uncertainty in wind deployment, hydrogen demand CO₂ volume supply and geological settings will generate operational, environmental and social data to support understanding.

The Managing the Environmental Sustainability of the Offshore Energy Transition (MOET) project ([Managing the Environmental Sustainability of the Offshore Energy Transition](#)) is producing environmental, social and economic research aimed squarely at these planning questions. The project is mapping subsurface and seabed requirements for offshore wind, hydrogen and CO₂ storage and developing solutions to plan and site the required infrastructure. Its outputs (datasets, decision frameworks and engagement findings) are directly usable as inputs to spatial optimisation and permitting processes.

14. How can the resilience and redundancy of CO2 networks be enhanced to mitigate the risks associated with single-point failures and ensure continuous operation during maintenance or unforeseen outages?
NA
15. Is there potential for different roles and responsibilities on the planning of future network build-out and new connections? What would the advantages and disadvantages be of any alternatives?
NA
16. What benefits, disbenefits, complexities and challenges do you believe disaggregation of the Licence will bring?
NA
17. Do the two operator models as presented above show merit and meet expectations for a wider system model approach? Are there any significant benefits or challenges that either model presents from your perspective? Are there any other models you would propose?
NA
18. What broad provisions/concepts within the Code and accompanying contractual arrangements do you believe require further evolution to support the unbundling of network entities and manage the cross-chain risks that unbundling might create?
NA
19. What can the UK learn from the various delivery approaches in use by nearby countries, and could any learnings be beneficially applied in the UK context? Please include thoughts in respect of operating model implications.
NA
20. How do respondents envision the incorporation of non-government backed operators and users being realised and what do you believe are the key requirements for their inclusion in a timely manner?
NA
21. What key enabling factors/steps does industry see as being needed for a market transition phase to enable growth in a self-sustaining market? Are there any other significant considerations, benefits or challenges that you believe could impact market transition that have not been discussed within this document?
BGS research indicates if all licenced capacity becomes fully operational there will be sufficient capacity from 2028 for UK net zero (Abel, et., 2025) It is reassuring that nominations for the next CO ₂ licensing round have been called by NSTA as this allays the concerns raised by BGS research findings of a risk that UK CO ₂ capture rates will exceed available appraised storage capacity in the late 2020s (Abel et al., 2025). Delay in the operation of first projects will increase this likelihood, noting some of the first round of licenced areas have already been 'put to one side' (Energy Voice, 10 September 2025).

However, early appraisal and licensing of additional capacity, as second and subsequent CO₂ licensing rounds, will reduce this risk.

A comparison of the volumes of CO₂ supplied from power generation, industry and domestic sources with modelled licensed storage capacity demonstrates the capacity developed by the Track-1 and Track-2 projects will be insufficient for planned UK capture (Abel et al., 2025). These findings emphasize the importance of the current and planned appraisal and licensing rounds, leading to operation of CO₂ storage projects outside of the industrial cluster process, to provide sufficient UK capacity to achieve net zero.

A benefit for a future UK CCUS market for storage of European CO₂ is the increased visibility of our national storage resource and storage readiness level by inclusion in the online European CO₂ storage atlas (EGDI, 2025). UK stores and their storage readiness level (see response to Question 4) is visible to European Commission to inform their emissions reduction planning. Also visible to European national planners for countries who plan CO₂ capture but will not have their own appraised capacity available at a sufficiently early date. For example, the national strategy for France is to access CO₂ storage facilities in the North Sea and Mediterranean, by bilateral agreement, until French storage capacity is developed by 2030 (Ministere de l'economie,2024).

References:

Abel et al., [Quantification of the UK CO₂ storage export potential for a carbon capture and storage service](#), 2025.

EGDI, [Pan-European Atlas of Sustainable Geo-energy Capacities, Carbon Storage Potential, CO₂ Storage Traps](#), 2025

Ministere de l'economie, des finances et de la souverainete industrielle et numerique, État des lieux et perspectives de déploiement du CCUS en France, 2024

22. What does industry believe is within their power to do to aid in market transition as discussed in this document?

NA