

A Response to DESNZ Call for Evidence on [Greenhouse Gas Removals: Input to the Independent Review](#)

Dr Wassim Dbouk

20/06/2025

Executive Summary

In response to this call for evidence on Greenhouse Gas Removals: Input to the Independent Review by DESNZ, I provide evidence and policy recommendations in relation to the following question:

- **Question 7:** What are the barriers to and enablers of GGR deployment in the UK?
- Policy Recommendations are listed below on Page 3.

Response Author:

Dr Wassim Dbouk – Research Fellow, Southampton Marine and Maritime Institute- University of Southampton

I am a researcher in marine and maritime policy and a UN Climate Change negotiator with a background in maritime law, a broader interest in sustainable development, and expertise in translating research into policy-informing evidence. I am currently involved in a multi-disciplinary research project as part of the Industrial Decarbonisation Research and Innovation Centre (IDRIC - <https://www.linkedin.com/company/idricuk/>), where I am researching the legal and regulatory aspects of the transport of CO₂ to support the implementation of the UK Government's Carbon Capture Utilisation and Storage (CCUS) plans.

Response to Q7: What are the barriers to and enablers of GGR deployment in the UK?

The UK's ability to deliver on its greenhouse gas removal (GGR) and net zero ambitions is fundamentally dependent on the successful deployment of carbon capture and storage (CCS) at scale. Central to this is the rapid development of CO₂ shipping infrastructure. Shipping is not a peripheral or future option, it is an essential, immediate enabler of the UK's CCS strategy.

The central role of CO₂ shipping in UK CCS

The Department for Energy Security & Net Zero (DESNZ), in its [2023 policy paper](#), explicitly recognises that achieving a “flexible and open access” Transport and Storage (T&S) network requires multiple methods of CO₂ transport, with non-pipeline transport (NPT), and shipping in particular, playing a pivotal role. This is especially true for industrial clusters without feasible pipeline connections to offshore storage, such as the Solent, where [shipping offers a viable, cost-effective route to the UK's extensive North and Irish Sea storage sites](#). Even clusters with direct pipeline access will need shipping infrastructure to receive CO₂ from other regions, making port-based shipping facilities indispensable across the CCS value chain. By 2035, shipping is expected to support the transport and storage of at least 15 million tonnes of CO₂ per year from UK sources alone.

Unlocking cross-border opportunity

Building on this domestic necessity, the UK is uniquely positioned to become a cross-border hub for CO₂ storage, offering geostorage services to European neighbours. The [CCSA's Delivery Plan 2035](#) estimates the UK could import an additional 20 million tonnes of CO₂ annually from continental emitters by 2035. Realising this opportunity depends on the ability of UK ports to safely and

efficiently aggregate, temporarily store, and transfer large volumes of liquefied CO₂ (LCO₂) arriving by ship.

Ports as critical multi-modal infrastructure hubs for enabling CCS in the UK

Ports are therefore positioned as critical [multi-modal infrastructure hubs](#), where both domestic and imported CO₂ will be aggregated, conditioned, temporarily stored as liquefied CO₂ (LCO₂), and transferred to offshore storage sites.

However, this vision is fundamentally constrained by significant regulatory gaps and misalignments that undermine both investment attractiveness and public confidence:

1. Control of Major Accident Hazards (COMAH) Regulations 2015

COMAH is designed to prevent and mitigate major accidents involving dangerous substances at UK establishments. However, it currently excludes CO₂ from its list of regulated substances and specifically exempts temporary storage associated with transport in ports. This exclusion means that, despite the potential for large-scale LCO₂ releases to cause serious harm (e.g., asphyxiation, cryogenic burns), port-based storage of CO₂ is not subject to the same rigorous safety standards as other hazardous substances. The Health and Safety Executive (HSE) has acknowledged knowledge gaps regarding the major hazard potential of CO₂ in dense and supercritical phases, but has so far not extended COMAH to cover these new CCS risks. This regulatory gap leaves port operators and harbour authorities without a clear legal duty to prevent or respond to major accidents involving LCO₂, creating uncertainty for investors and raising legitimate public concerns about safety.

2. Dangerous Goods in Harbour Areas Regulations (DGHAR) 2016

DGHAR governs the safe transit and handling of dangerous goods in ports, drawing on international standards such as the International Maritime Organization's [IMDG Code](#), which classifies liquefied CO₂ as a non-flammable, non-toxic gas. While DGHAR confers wide powers on harbour masters to manage risks, including the authority to deny entry or require removal of vessels carrying dangerous goods, these powers are general and not tailored to the scale and frequency of LCO₂ shipping anticipated under the UK's CCS plans. The anticipated increase in CO₂ carrier traffic will introduce new operational hazards and logistical challenges that are not fully addressed by existing codes or guidance. There is a pressing need for the Maritime and Coastguard Agency (MCA), in collaboration with the CCS sector, to develop a dedicated Marine Guidance Note (MGN) that provides practical, risk-based protocols for the safe handling, storage, and transfer of LCO₂ in ports, ensuring that all stakeholders are equipped to manage the unique risks posed by CCS shipping.

3. Environmental Permitting Regulations (EPR) 2016

The EPR's CCS-specific regime (section 6.10) was designed primarily for CO₂ capture and storage activities occurring on the same site, leaving a regulatory blind spot for temporary LCO₂ storage at ports, especially when capture and storage are geographically separated. Attempts to regulate these activities under the EPR's waste and water discharge provisions are fraught with legal and practical ambiguities, as these regimes were not designed for the scale, nature, or operational realities of CCS logistics. As a result, port-based LCO₂ storage often falls outside any coherent environmental permitting framework, creating fragmented oversight, legal uncertainty for operators, and inconsistent protection standards. This not only complicates compliance and investment decisions, but also undermines public trust in the robustness of environmental safeguards for CCS.

Implications for investment and public perception

These regulatory gaps have a direct and negative impact on the UK's attractiveness as a destination for GGR investment. Investors require clarity, certainty, and consistency in the regulatory environment, especially when deploying novel infrastructure at scale. The absence of a fit-for-purpose framework for port-based LCO₂ storage and shipping increases perceived risk, deters capital allocation, and slows project development.

Just as importantly, public perception is shaped by confidence in the safety and environmental governance of new technologies. Communities are unlikely to support the expansion of CCS infrastructure, particularly the construction of large-scale LCO₂ storage at ports, unless they are assured that robust, transparent, and enforceable regulations are in place to manage health, safety, and environmental risks. Without such assurance, public resistance could delay or derail critical projects, undermining both domestic decarbonisation and the UK's ambition to lead in cross-border CO₂ storage.

Recommendations

To address these challenges and unlock the full potential of CO₂ shipping for CCS, I recommend:

- Amending COMAH to include CO₂ as a named dangerous substance and to remove the exclusion for temporary storage associated with transport in ports, ensuring that all major accident risks are subject to rigorous prevention and response standards.
- Expanding the EPR's CCS-specific regime to explicitly cover CO₂ conditioning, liquefaction, and temporary storage at ports, while excluding CO₂ from waste and water discharge provisions to prevent regulatory overlap and confusion.
- Developing a dedicated Marine Guidance Note (MGN) under the leadership of the MCA, in collaboration with the CCS sector, to provide practical, risk-based protocols for the safe management of LCO₂ shipping and storage in ports, tailored to the scale and complexity of anticipated CCS operations.

Conclusion

CO₂ shipping is indispensable to the UK's CCS plans, enabling both domestic decarbonisation and the creation of a new market for cross-border CO₂ storage. The necessary expansion of port-based LCO₂ storage and handling brings regulatory and public perception challenges that must be addressed now. Modernising the regulatory framework will be essential to attract investment, safeguard public trust, and unlock the full potential of the UK as a European leader in greenhouse gas removal technologies.