



Accelerating a Europe-wide CO₂ storage market

Executive summary

December 2024



Executive summary

Carbon capture, utilisation and storage (CCUS) is a core element of decarbonisation and climate change plans in Europe and beyond. This paper sets out why enabling the transport and storage of captured carbon dioxide (CO₂) between the European Union/European Economic Area and the United Kingdom is crucial to effective and timely emissions reduction, how it will reduce the cost of reaching net zero, and how governments and the European Commission can make it happen.

Carbon capture and storage prevents CO₂ from industry and power generation reaching the atmosphere, and can also remove CO₂ from the atmosphere. CO₂ can be captured from point sources or from the air, then securely and permanently stored in geological formations in the subsurface. There is often a mismatch within countries between the amount of CO₂ they need to capture and the amount they are able or willing to store, so the ability to use geological CO₂ storage in other countries is essential.

An integrated EU/EEA-UK cross-borders CO₂ storage market can provide cost-efficient, close-at-hand and rapid storage solutions for industrial emitters. The European Commission recognises this and has put in place a framework that enables member states to store their captured CO₂ in other parts of the European Union (EU) and the European Economic Area (EEA). This supports countries with limited availability of CO₂ storage to decarbonise using CCS and enables countries with available CO₂ storage to provide it as a service.

Currently, transporting CO₂ across the EU/EEA-United Kingdom (UK) border for permanent storage

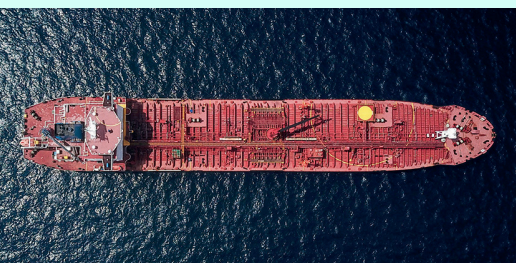
is technically possible, but not feasible due to policy barriers, including that CO₂ captured in the EU/EEA, but stored outside

that jurisdiction would not be recognised under the EU emissions trading system (ETS) as having been stored. Therefore, the responsible party would still be liable to surrender allowances for their captured and stored CO₂- and effectively pay twice. This means that EU/EEA countries are unable to take advantage of the fact that the UK has significant CO₂ storage potential in the North Sea and that the cost of storing CO₂ in the UK would be lower than in other countries.

A study carried out by Xodus Group on behalf of the Carbon Capture and Storage Association (CCSA), demonstrates that **emitters in EU member states with access to the North Sea would stand to gain significantly if EU/EEA-UK cross-border transport and permanent geological storage of CO₂ was supported and enabled by governments.** This is due to the high quality and large capacity of available storage in the UK-Southern North Sea (SNS) region that could accommodate CO₂ volumes captured in mainland Europe, and the reduction in transport distances to the UK compared to other options.

The table opposite shows the estimated average cost* to emitters of storing their CO₂ offshore under scenarios where EU/EEA-UK cross-border CO₂ transport and storage is and isn't available.

The research found that UK stores are among the most cost-effective and well-located in Europe, so enabling access to these means **emitters in the EU are likely to see considerable cost savings** compared to the status quo. **UK emitters too would benefit from slightly lower storage costs** due to the efficiency and savings from having more resilient networks that are likely to be developed in a near-term timeframe. CO₂ volumes from Europe can be critical to unlocking the business case for investing in new CCS Clusters, hence allowing European emitters, including those in the UK, to access CCS networks to decarbonise their operations. This will also spur investments in new CO₂ transport and storage projects in less industrialised UK areas, where having CO₂ volumes from Europe could be crucial to developing new projects at competitive costs. Moreover, the benefits to countries that make their storage resource available to others go beyond the savings seen by their emitters: most obvious is the revenue upside of selling the storage service, but the list of benefits should also consider jobs-creation in new locations – both direct and in the supply chain – determined by accelerating the growth of their CCUS industry.



Estimated cost to emitters of offshore CO₂ transport and storage

| | Estimated unit cost to emitters | | Estimated unit cost reduction with EU/EEA-UK cross-border transport and storage | |
|-----------------------|--|---|---|----------------------|
| | Without EU/EEA-UK cross-border CO ₂ transport and storage | With EU/EEA-UK cross-border CO ₂ transport and storage | Cost reduction | Percentage reduction |
| Europe (EU, EEA & UK) | €52/t | €41/t | €11/t | 21% |
| EU | €57/t | €41/t | €16/t | 28% |
| UK | €40/t | €39/t | €1/t | 3% |
| Norway | €59/t | €56/t | €3/t | 5% |

Average cost to emitters of offshore storage under each scenario, in 2040, in € per tonne CO₂.

The research demonstrates that Europe as a whole would benefit in a scenario where access to UK storage is enabled. In 2040, in particular:

- **Emitters in Europe using offshore CO₂ storage would benefit from a 20% cost saving (€11/t).** With the market expected to grow to 243[†] MtCO₂pa by 2040, this would represent €2.7 billion in annual savings, accruing to emitters using storage in the North Sea.
- **Emitters in the EU-27 countries could, on average, benefit from a €16/t reduction in the cost for offshore transportation and storage (T&S) of CO₂. This represents a 28% reduction in transport and storage costs.** With the EU alone projected to need 164 MtCO₂pa of offshore CO₂ storage by 2040, this would represent €2.6 billion in annual savings.
- **The UK would benefit from lower CO₂ storage costs for its emitters due to CCS projects with a higher scale factor,** as well as the ability to make the most of its geology by offering CO₂ storage to support other countries and the associated economic benefits through tax receipts and job retention and creation that this would bring.

- **Reduction in transport and storage costs for North-West European (NWE) emitters are shown to be even greater than the average percentage (28%) mentioned above for the EU-27 countries.**

The algorithm found that it would be cost-effective for EU/EEA-UK cross-border CO₂ transport and storage to be used as soon as it becomes available: in a scenario where this happens straight away 16 MtCO₂pa from the EU would use UK storage by 2030.

- **Any delay in enabling cross-border solutions would lock emitters into higher-cost storage,** which would endure for the lifetime of their project.

CO₂ storage projects are progressing in the EU, Norway and the UK, with the first sites expecting to begin storing captured CO₂ in 2025. Enabling EU/EEA-UK cross-border CO₂ transport and storage would enable a more resilient and efficient system overall, and give emitters across Europe more, lower cost options for storing their CO₂. **We must act quickly before higher cost options are locked in, or companies move their operations outside Europe, and the opportunity to prevent Europe's deindustrialisation is lost.**

* Note that the calculation of the cost to emitters takes in capital expenditure, operational expenditure and the cost of capital for the CO₂ transport and storage facilities. It only includes the offshore element of CCS: transport from a port location (or pipeline terminal at the shore) to the store, plus the storage itself. It does not include the cost of capturing CO₂, or the cost off any onshore transport to the terminal.

† 243MtCO₂pa is the total volume of CO₂ from the EU, UK and Norway that is expected to be stored offshore, calculated as part of Xodus' analysis. The calculation uses the methodology used by the JRC applied to the UK and Norway.





The Carbon Capture and Storage Association (CCSA) is the lead European trade association focused on accelerating the commercial deployment of carbon capture, utilisation and storage (CCUS).

We work with our members, governments and other organisations to ensure CCUS is developed and deployed at the pace and scale necessary to meet net zero goals and deliver sustainable growth across regions and nations.

The CCSA has over 120 member companies that are active in exploring and developing different applications of carbon capture, CO₂ transportation by pipeline, ship and rail, utilisation, geological storage, and other permanent storage solutions, end-users of the technology and those in the supply chain, as well as members from management, legal and financial consulting sectors.

www.ccsassociation.org