

TEN-T:

Transport of CO₂ to permanent storage: A missing piece in Europe's industrial decarbonization plan

1 Flexible and low-cost CO₂ transport to storage solutions play important role on path to reach net-zero by 2050

Nearly all modelling scenarios towards EU climate neutrality by 2050 highlight the key role of CO₂ capture, transport and storage¹. While several such projects are under way in the EU, current rates of project development and deployment are insufficient to meet the needs for net-zero by 2050.

To spark market development and project deployment, the full carbon capture, storage and transport to storage value chain must be supported. Currently, transport of CO₂ to storage via pipeline, and storage projects themselves, can access both administrative support mechanisms and funding through the Connecting Europe Facility (CEF). But, other transport modalities such as ship, barge, rail and truck do not have the same access to support and funding. As a relatively low-cost alternative with more flexibility, compared to pipelines, and with European cross-border benefit potential, the lack of support for multiple transport modalities results in negative market signals and continued high investor risk - delaying market development and vital emission reduction on the path to net-zero.

All four of the carbon capture and storage projects awarded funding by the EU's Innovation Fund are planning to make use of non-pipeline modalities such as CO₂ shipping, highlighting the importance of these flexible options for first-mover projects.

2 Equitable access to CO₂ storage crucial for regional cohesion and market development

Mobile transport modalities such as rail, truck, ships and barges, are key to ensure equitable access either directly to storage or to pipelines linked to storage. Given the unequal distribution of CO₂ storage sites across Europe and the significant cost and investor risk associated with immobile transport infrastructure such as pipelines, mobile transport modalities can help avoid regional disparities in access to storage sites.

This will ensure equal opportunities for industrial decarbonization across Europe. By making it possible for smaller industrial emitters to start decarbonizing, mobile transport modalities for CO₂ will also substantially contribute to wide-scale market development, reducing the overall cost of carbon capture and storage.

3 TEN-T: Risk of missed opportunity to optimize synergies and foster decarbonization

The TEN-T proposal from the European Commission so far includes no mention of the importance played by multiple modalities transporting CO₂ to storage. This is despite clear references in the legal text of the TEN-T on the importance of possible synergies with other networks, such as the TEN-E.

The TEN-T therefore also misses the direct and indirect contributions of CO₂ capture, storage and transport to storage in decarbonizing the transport sector. Carbon capture and storage enables industry to decarbonize at a quicker pace, reducing the reliance on renewables and freeing up low-carbon power for other applications including electrification in the transport sector. It is also vital in the production of low-carbon hydrogen, kick-starting a market for hydrogen-derived fuels such as ammonia – in sectors such as marine and shipping.

If not amended, the TEN-T promises to not only be a lost opportunity, but to send negative market signals, keeping or even worsening perceived investor risks in projects transporting CO₂ to storage via ship, rail, truck and barge.

¹ See, among others, the findings of the [European Commission](#), the [Intergovernmental Panel on Climate Change](#) and the [International Energy Agency](#).

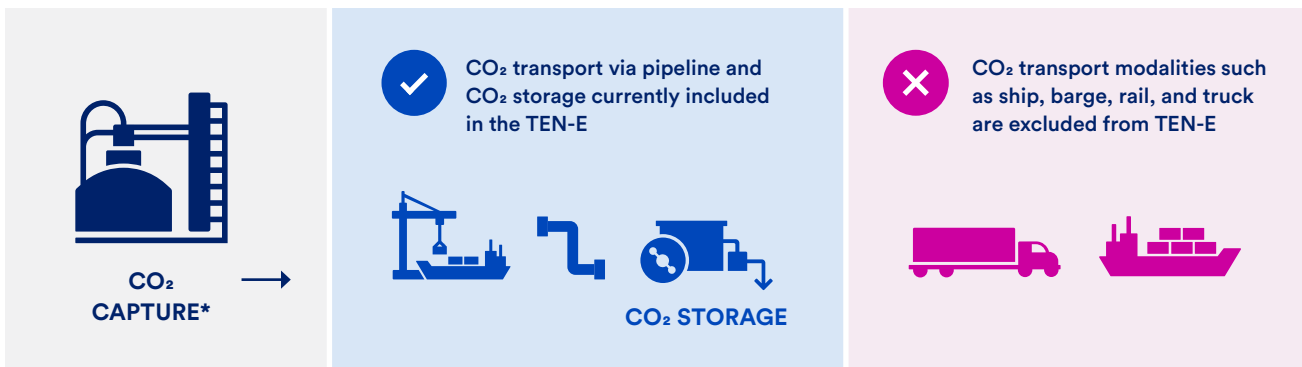
4 Solution

The European Commission's proposal for the TEN-T Regulation must therefore be amended to:

1. Reduce investor risk in the private market by granting PCI status to multiple modalities transporting CO₂ to storage.
2. Enable rapid market development by administrative, permit granting and public consultations support mechanisms granted to PCI projects.
3. Contribute to actual project deployment by funding support offered by CEF to PCIs.

While storage is included in the provisional agreement for TEN-E, recognition and support for multiple transport modalities is still lacking. This reduces flexibility and increases the overall cost of decarbonisation.

**Examples include, but are not limited to, Industrial CO₂ capture, Direct Air Capture, waste incinerators, etc.*



Multiple and mobile modalities transporting CO₂ to storage: key to net-zero by 2050

Nearly all modelling scenarios towards EU climate neutrality by 2050 highlight the key role of CO₂ capture, transport and storage². In particular, the technology will be important for harder-to-abate industrial sectors like steel, cement and lime, as well as chemicals. Scaling CO₂ capture, transport and storage is also crucial to provide low-carbon hydrogen for sectors that cannot be directly electrified.

While several carbon capture and storage projects are under way in the EU, current rates of project development and deployment are insufficient to meet the needs for net-zero by 2050. The aim is within reach if the necessary steps are taken to facilitate the investment-appeal of the full value chain of CO₂ capture, storage and transport to storage.

Transport of CO₂ to storage can take place both through mobile and immobile infrastructure. While immobile transport of CO₂ through pipelines is eligible for both administrative and funding support mechanisms in the EU, these mechanisms are sorely lacking for mobile transport modalities such as ship, barge, rail and truck. This is despite clear recognition of the importance of multiple transport modalities on the path to net-zero in both the EU Sustainable Finance Taxonomy, the revised EU ETS and the TEN-E Regulation.

² See, among others, the findings of the [European Commission](#), the [Intergovernmental Panel on Climate Change](#) and the [International Energy Agency](#).

Flexible and low-cost solution to spark market development and cost-reduction

For many industrial emitters looking to decarbonize, Carbon capture and storage is the most efficient, and in some cases the only, solution. The substantial cost and inflexibility of constructing a pipeline transporting CO₂ to storage can be a market barrier preventing emitters from starting to capture their CO₂, even if storage sites are plentiful. This is particularly true for smaller emitters, far away from storage sites or industrial clusters connected to storage sites.

Mobile transport modalities such as rail, truck, ships and barges, are key to ensure access either directly to storage or to pipelines linked to storage. By making it possible for smaller industrial emitters to start decarbonizing, mobile transport modalities for CO₂ can substantially contribute to wide-scale market development reducing the overall cost of carbon capture and storage.

Equitable access to CO₂ storage sites across Europe

Sites appropriate for geological permanent storage of CO₂ are not equally distributed amongst the Member States of the European Union. Those countries not able to store CO₂ within their borders will need to transport CO₂ to the storage sites – often over great distances through different terrain.

Construction of pipelines to this end are not only timely and expensive, in some cases it is not possible. If possible, it requires massive volumes of CO₂ and an already highly developed market to reduce significant investor risk. One of the proposed solutions to this challenge has been a European CO₂ transport and storage network, consisting of different transport modalities connecting emitters and storage sites all over Europe.

Currently, however, the much relied-upon mobile transport modalities part of this network such as rail, truck, ship and barge, are under prioritized when it comes to support mechanisms – risking unequitable access to storage across Europe.

TEN-T Regulation: Action needed to avoid opportunities lost

The TEN-T regulation defines the projects eligible for important recognition as a Project of Common Interest (PCI), as well as administrative and funding assistance from the Connecting Europe Facility (CEF).

There are clear references in the legal text of the TEN-T on the importance of possible synergies with other networks, such as the TEN-E³. But despite this, the TEN-T includes no mention of the importance played by multiple modalities transporting CO₂ to storage, nor its direct or indirect contribution to decarbonize the transport sector. Carbon capture and storage enables industry to decarbonize at a quicker pace, reducing the reliance on renewables – freeing up renewables to where they can be more efficiently used: in the transport sector. It is also vital in the production of low-carbon hydrogen, kick-starting a market for hydrogen-derived fuels such as ammonia – in sectors such as marine and shipping

With the ongoing revision of the TEN-T Regulation, the time has come for the European Union to put its money where its mouth is, and provide important support for multiple transport modalities in the TEN-T. The signaling effect to the market of such a development would, on its own, reduce perceived investor risk and incentivize market development.

³ TEN-T Regulation Article 5.1(f)



Contacts / For more information:

Lina Strandvåg Nagell – Bellona Europa,
lina@bellona.org

Lee Beck, Clean Air Task Force,
lbeck@cleanairtaskforce.org