ZEP proposal for a regulatory framework for CO_2 transport infrastructure

Reaching net-zero greenhouse gas (GHG) emissions by 2050 is the ultimate objective and the main driver for EU climate action. To achieve this objective, climate change mitigation must be pursued as a matter of priority and urgency. Mitigation efforts must also be supplemented with removal of CO_2 from the atmosphere, including capture of CO_2 from both atmospheric or biogenic sources for safe and permanent storage.

Such large-scale deployment of CCS and CCU will require robust European non-discriminatory, open-access cross-border CO_2 transport and storage infrastructure to ensure that emitters in Europe can connect to permanent storage sites. The current immediate energy crisis in Europe further highlights the crucial need for this CO_2 infrastructure as a core part of the European energy system integration.

Currently, the EU has several different policies that highlight CCS/CCU and CO_2 infrastructure, such as the EU Taxonomy for Sustainable Activities, the TEN-E Regulation, and the EU ETS, but no overarching policy framework for CO_2 transport infrastructure development. ZEP believes that the European Commission (EC) should consider introducing such a regulatory framework, focused on the development of non-discriminatory, open-access CO_2 transport infrastructure that will complement the Directive on the geological storage of carbon dioxide. An efficient and transparent policy framework will be an important part of the framework needed to establish a clear legal and regulatory basis for planned projects, in particular for cross-border cooperation.

ZEP has proposed an EU CCS and CCU strategy where the focal point is the creation of a predictable and long-term framework for investors. This way, the strategy will be an important tool for the EC to safeguard European industrial activity, enabling industry to contribute to the decarbonisation towards climate neutrality. Collaboration between EU member states, the Commission, and industry will be required to address any challenges or barriers that may arise. The main focus of the strategy should be the successful development and large-scale deployment of cross-border, European CO_2 transport and storage infrastructure.

CO_2 transport infrastructure policy framework

A robust CO_2 infrastructure network will enable the development of clean and competitive industrial and energy sectors, as well as early large-scale volumes of low-carbon hydrogen and carbon dioxide removals. An enabling policy framework should include such elements as open, competitive, secure, and environmentally sustainable CO_2 infrastructure networks with unhindered cross-border flows, regional cooperation with integrated network planning, and harmonised standards. These elements and others are the focus of this paper, which aims at sketching key potential components of an EU regulatory framework for CO_2 transport infrastructure, including cross-border dimensions.

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List of elements that should be included in a regulatory framework for CO_2 infrastructure

CO_2 infrastructure network operator platform

Deployment of new CO_2 transport corridors and networks would benefit from integrated planning and consultation processes, in a similar way to those established for the gas, electricity and hydrogen sectors under the Fit for 55 policy proposals. An entity – incorporating emitters, transport providers and storage operators and with a mandate to consider value-chain regulatory issues and make formal recommendations to the EC – that enables coordinated CO_2 infrastructure planning, network design, and facilitates cross-border cooperation could enhance the deployment of new CO_2 networks. It could address regulatory and permitting barriers, in particular cross-border, and promote relevant standardisation across the value chain, including on CO_2 quality specifications and shipping of CO_2. A similar entity for hydrogen network development, ENNOH, was proposed in the EC's legislative proposals in the Hydrogen and Decarbonised Gas Market Package in December 2021.

The role of EU regulatory and stakeholder forums in developing CO_2 networks

The Madrid Forum for Gas and Florence Forum for Electricity are important mechanisms to drive stakeholder engagement and alignment on priority regulatory issues, including implementation of key regulations, development of network codes, and identification of barriers to cross-border interconnection and market integration. Such an approach could also be beneficial in support of developing new CO_2 networks, including cross-border pipeline connectivity and shipping, with the new CCUS Forum well-placed to provide this function for CO_2 infrastructure issues. A joint approach to developing Forum Conclusions can be helpful in achieving transparent alignment on the work programme, and a mandate to make progress on specific regulatory / policy challenges.

Regional Cooperation

In much the same way as hydrogen infrastructure development will be considered and developed using a regional approach, with coordination between relevant competent authorities and industry under the revised Gas Regulation, a similar regional approach for discussions around CO_2 infrastructure could trigger more efficient infrastructure cooperation and deployment, with a particular focus on integration between cross-border CCS systems. Regional cooperation is also a key mechanism to develop PCI projects for gas and electricity, with regional groups established to provide cross-border permitting coordination and to address regulatory barriers. Such regional cooperation for CO_2 infrastructure could be facilitated by the EC, either under the CCUS Forum or as part of any new infrastructure systems platform for CO_2 infrastructure.

It will also be important to consider the interaction between EU regulatory framework for cross-border cooperation on CO_2 infrastructure and the separate intergovernmental agreements under the London Protocol, in order to ensure consistency between the two and avoid complexity.

Integrated network planning

An important element under the Hydrogen and Gas Decarbonisation Package proposals is fostering integrated network planning and interaction between the electricity, gas and hydrogen sectors, in order to promote flexibility and resilience in the EU energy system. As part of a regulatory framework for CO_2 infrastructure, it will be important to ensure that CO_2 transport infrastructure also forms part of the joint approach to systems integration and development, since CO_2 infrastructure is an enabler not only of industrial decarbonisation but also such low-carbon gases as low-carbon hydrogen and synthetic methane. Work to integrate the role and scope of CO_2 transport infrastructure into energy network development planning, including integrated 10-year network development plans (TYNDP), should be undertaken as part of the regulatory framework for CO_2 transport infrastructure. This scope could cover both localised CO_2 grids, e.g. in coastal areas / ports, and also cross-border / regional CO_2 backbone infrastructure.

Public consultation and acceptability

The development and construction of new long-distance energy infrastructure often faces challenges regarding public acceptance. Mechanisms and best practices for inviting public consultation and integrating feedback into project planning are an important focus for existing energy systems operator forums in Europe, including ENTSOG and ENTSOE. A similar approach for CO_2 transport infrastructure, including the development of guidance on public engagement and support for new and repurposed infrastructure, may be an important element of the broader policy framework and should be integrated into the scope of any new platforms and / or the CCUS Forum.

Standards

Driving a standardised approach in relevant areas of the CCUS value chain will be important in promoting interconnections as well as cost efficient deployment of new infrastructure. Areas of potential focus for standards could be Monitoring, Reporting and Verification (MRV) of CO_2 metered as part of shipping operations; quality of CO_2 specifications; shipping and pipeline interconnection components, etc. Existing standardisation bodies are well placed to undertake this work, which would be an important element of the broader regulatory framework for CO_2 infrastructure.

Flexibility of approach

CCUS systems in Europe remain at an early phase, with projects at varying stages of development. Moreover, business models are still under development, with potential for innovation in the way the CCUS value chain come together to enhance efficiency, reduce cost and drive integration. For this reason, regulatory flexibility must be preserved, in order that CO_2 infrastructure providers and operators are not faced with complexity and cost to the detriment of efficient project implementation. The regulatory sandbox approach under the Innovation Fund could serve as a testing ground for approaches that could then be supported more broadly under the regulatory framework for CO_2 transport infrastructure.

ZEP's assumption is that the funding mechanism that has served its purpose well regarding existing network operator platforms, e.g. for electricity and gas, will serve equally well for hydrogen and CO_2 transport infrastructure.

Supporting delivery of Trans-European Network provisions on CO_2 infrastructure and NECPs

Recent integration of CO_2 storage into the scope of the TEN-E Regulation and incorporation of CCS in National Energy Climate and Energy Plans (NECPs) has helped to better support the role of CCS in achieving decarbonisation targets in Member States and at EU level. The Hydrogen and Decarbonised Gas Market Package contains provisions to assist Member States with implementation of the hydrogen provisions of TEN-E, as well as supporting delivery of the hydrogen components of the NECPs. Since CO_2 infrastructure also forms part of the new TEN-E and a number of NECPs, a similar link should be established between the regulatory framework for CO_2 infrastructure and achieving the CCS elements of the new TEN-E/ NECPs, in order to support their successful delivery. Given the crucial importance of non-pipeline transport of CO_2, such as transport by ship, this should be considered also for the TEN-T Regulation. The importance of CO_2 infrastructure qualifying for state aid should also be mentioned here.

Objectives

The regulatory framework for CO_2 transport infrastructure should – together with the Directive on the geological storage of carbon dioxide – establish the policy direction towards integrated European CCS systems, with unhindered cross-border flows of CO_2 and access for emitters to non-discriminatory, open-access CO_2 storage. The cross-border CO_2 infrastructure networks should integrate all relevant transport modalities, including pipelines and shipping, and be supported in their early development through relevant EU and national funding schemes. A regional approach to the development of CO_2 infrastructure can also target regulatory focus on specific barriers to cross-border coordination, as well as promote the connection of emitters and industrial clusters with storage providers located in different countries.

About the Zero Emissions Platform

The Zero Emissions Platform (ZEP) is a European Technology and Innovation Platform (ETIP) under the Commission's Strategic Energy Technology Plan (SET-Plan) and acts as the EU's technical adviser on the deployment of Carbon Capture and Storage (CCS), and Carbon Capture and Utilisation (CCU).

ZEP supports the European Union's commitment to reach climate neutrality by 2050, defined as net-zero greenhouse gas (GHG) emissions by 2050. To this end, CCS technologies represent readily available and cost-efficient pathways for the decarbonisation of industrial and energy sectors in the European Union. Some applications of CCU – where CO_2 is stored in a manner intended to be permanent – can also contribute to this goal.