20 March 2024

ZEP's response to the Industrial Carbon Management Strategy

The publication of the industrial carbon management strategy is a milestone for the deployment of carbon capture and storage in the EU. ZEP has historically called for an EU strategy dedicated to carbon capture and storage and carbon capture and utilisation. We are very pleased that the European Commission is presenting a clear way forward. Increasing funding and providing a regulatory framework for CO_2 transport is needed to reach the target set.

A landmark recognition for CCS and CCU

The publication of the Industrial Carbon Management Strategy on 6 February 2024 represents a critical step for carbon capture and storage (CCS) and carbon capture and utilisation (CCU). This roadmap clearly shows that CCS is unavoidable for Europe to reach climate neutrality. Some applications of CCU – where CO_2 is stored in a manner intended to be permanent – can also contribute to this goal. Finally, the deployment of carbon dioxide removals (CDR), such as bioenergy with carbon capture and storage (BECCS) and direct air carbon capture and storage (DACCS), remains a crucial component of the EU's climate toolbox.

No climate neutrality without CCS

As stated in the past Europe will not reach climate neutrality by 2050 without CCS. All reliable modelling scenarios, including those from the Intergovernmental Panel on Climate Change and the International Energy Agency, consider the deployment of CCS critical to reaching climate neutrality by 2050[1][2]. Achieving climate neutrality requires a major transformation of energy-intensive and process industries, such as cement, lime, steel, waste-to-energy, and chemicals. The Antwerp Declaration provides another clear reminder of the critical role of CCS and CCU in preserving Europe's industrial base and high-quality jobs and the need for strong funding instruments[3].

[1] Climate Change 2022: Impacts, Adaptation and Vulnerability, Intergovernmental Panel on Climate Change, 2022.
[2] Carbon capture, utilisation and storage, International Energy Agency, 2022.
[3] Antwerp Declaration, 2024.

Objective and modelling figures

The European Commission published the Communication 'Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society' and an accompanying impact assessment on 6 February 2024[4][5]. The Communication recommends a 90% net GHG emission reduction target compared to 1990 levels as the EU climate target for 2040, in line with ZEP's request[6]. This overarching target is broken down for CCS and CCU in the Industrial Carbon Management Strategy with the following modelling figures:

- 50 million tonnes of CO_2 captured annually by 2030 in the EU[7];
- 280 million tonnes of CO_2 captured annually by 2040 in the EU; and
- 450 million tonnes of CO_2 captured annually by 2050 in the EU.

Capturing 50 million tonnes of CO_2 per year, in line with the EU injection capacity objective under the Net Zero Industry Act, represents a large step that will only be achieved if adequate funding and regulatory conditions are rapidly put in place both at the EU and national level. This includes, for instance, stronger national subsidy schemes, a larger Innovation Fund programme, and a larger Connecting Europe Facility programme. The strategy states that *"values representing the average of scenarios* [scenario 2] *S2 and* [scenario 3] *S3 are reported"* to build the modelling figures. Clarifications regarding the modelling choices and the assumptions that underpin the different 2040 climate scenarios are necessary and crucial.

Funding and policy support is needed to achieve the strategy's objectives

The large-scale deployment of CCS is a *"large endeavour"*, as mentioned in the strategy, and will require large resources. The European Commission's strategy states that:

- an annual storage capacity of 50 million tonnes of CO_2 requires approximately €3 billion investments in CO_2 storage facilities;
- investment needs range between €6.2 and €9.2 billion for the transport infrastructure (pipelines and ships) associated with the 50 million tonnes target; and
- a funding shortfall of €10 billion by 2030 is expected for currently announced CCS projects[8].

[4] Communication 'Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society', European Commission, 2024.
[5] Impact assessment report, 2024.
[6] Submitted questionnaire responses, 2023.
[7] According to the European Commission modelling, CO_2 would predominantly come from industrial process emissions with a much smaller share of fossil fuel and biogenic emissions. CDR would exclusively come from BECCS. Approximately a couple of million tonnes of CO_2 would be dedicated to the production of e-fuels.
[8] The gap between carbon capture and storage ambitions and available funding, Carbon Limits and Clean Air Task Force, 2022. The analysis is based on project announcements as of January 2022 and assumes a carbon price increasing from €60 per tonne to €93 per tonne in 2030.

Addressing the funding gap

This assessment implies that billions of euros of public and private investments must be unlocked in the next five years to stay in line with the EU climate objectives and address the incentives put forward by the Inflation Reduction Act in the United States. The Communication on the proposed EU 2040 climate target states that *"an additional 1.5% of GDP compared to the 2011-2020 decade should be invested annually in the transition"*[9]. The strategy suggests the development *"of a possible important project of common European interest (IPCEI) for CO_2 transport and storage infrastructure"* as of 2024. An IPCEI could help close the funding gap and allow Member States to pool resources to develop a joint transport network. The strategy also proposes that the European Commission engage, as of 2024, with the European Investment Bank on financing of CCS and CCU projects. This second approach is strongly welcome and would avoid divergence between Member States. The next European Commission's commitment to these two proposals will be key. Finally, the European Commission foresees to *"develop policy options and support mechanisms for industrial carbon removals, including if and how to account for them in the EU ETS"*. ZEP welcomes the European Commission's commitment to investigate how permanent carbon removals could be accounted for and covered by emissions trading, among other options, as laid out in the revised EU ETS directive.

Other possibilities to close the identified funding gap include national support schemes, clear business cases, a more robust and stable EU ETS price combined with an effective carbon border adjustment mechanism, a substantial increase in the Innovation Fund and Horizon Europe programmes, and an increase in the Connecting Europe Facility. The next Multiannual Financial Framework represents a significant opportunity in that regard. Together with other signatories, ZEP has signalled the value of *"fostering a market for low-carbon products, with the inclusion of concrete demand and supply side policy initiatives"* adding that *"such initiatives targeting the demand and supply for low-carbon products will be crucial to advance industrial decarbonisation, including through the scale-up of European green lead markets"*[10].

CCS as a license to operate fossil fuel power plants

Based on the proposed EU 2040 climate targets, the strategy mentions *"the broader deployment of CO_2 capture power installations* [in 2040] *in a context where the overall use of fossil fuel in power installation is significantly lower towards 2050"* indicating the forecasted application of CCS on fossil fuel power plants. As stated in the consultation that preceded the strategy's publication[11][12], CCS can ensure clean flexibility to the European electricity grids and should be a requirement for the license to operate any power plant relying on fossil fuels[13]. CCS should not be aimed at prolonging fossil fuel-based power generation. The International Energy Agency stated that no new oil and gas fields can be

[9] Communication 'Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society', European Commission, 2024.
[10] Joint letter 'Call for concrete demand and supply side initiatives to promote a market for low-carbon products in the Industrial Carbon Management Strategy', 2024.
[11] Consultation 'Industrial carbon management – carbon capture, utilisation and storage deployment', European Commission, 2023.
[12] ZEP's response to the industrial carbon management strategy, 2023.
[13] Carbon capture and storage for clean flexibility, ZEP, 2022.

approved for development to reach net-zero emissions by 2050, with production falling *"from almost four-fifths of total energy supply today to slightly over one-fifth by 2050"*[14].

Carbon capture and utilisation

The strategy identifies CCU as its third pathway *"where industry uses captured CO_2 in synthetic products, chemicals, or fuels. Whilst initially using all types of CO_2, over time a strategic focus of utilisation value chains on capturing biogenic or atmospheric CO_2 will yield higher climate benefits"*. As highlighted by ZEP in the past, some applications of CCU – where CO_2 is stored in a manner intended to be permanent (e.g. in construction material) – can contribute to reaching climate neutrality by 2050. The strategy's CCU modelling figures foresee a large increase in CO_2 capture for utilisation with half of the CO_2 used in 2050. The proposed EU 2040 climate target foresees close to 90 million tonnes of CO_2 captured for e-fuel production in 2040. Clarifications are necessary regarding the assumptions that underpin these figures and the role of CCU in climate change mitigation.

Investment atlas of potential CO_2 storage sites

The proposal to set up an investment atlas of potential CO_2 storage sites is welcome and in line with ZEP's paper on the Net Zero Industry Act, which states that *"a high-quality European Storage Atlas will be instrumental to scale up the CO_2 storage capacity and the CCS value chain. The publication of areas where permitting is possible will greatly facilitate the work of storage operators and feed into the European Storage Atlas"*[15]. The cooperation with neighbouring countries, such as Norway and the UK, will be key. The focus should not only be on ensuring that the total injection capacity available is sufficient but also on bringing down costs by creating economies of scale via a Europe-wide storage market. Efforts aimed at mapping industrial emitters, transport infrastructure, and storage sites will help provide clarity and ensure an effective coordination of different projects.

A regulatory framework for CO_2 transport should be a priority

The strategy indicates that *"a possible future CO_2 transport regulatory package from 2024"* could be developed by the European Commission. ZEP has repeatedly called for a regulatory framework for CO_2 transport, including as co-chair of the CCUS Forum working group on CO_2 infrastructure, and welcomes this reference[16]. Commitment to developing this regulatory package within the next year will be crucial. Assessing the possibility of reusing existing infrastructure is also positive and could potentially reduce initial infrastructure costs. The development of emissions accounting rules to enable all means of transport of CO_2 is key and will ensure an adequate framework for non-pipeline transport solutions. The creation of minimum standards for CO_2 streams is in line with the findings of the CCUS Forum[17].

Carbon dioxide removals

[14] Net Zero by 2050 A Roadmap for the Global Energy Sector, International Energy Agency, 2021.
[15] ZEP paper on the Green Deal Industrial Plan and the Net-Zero Industry Act, 2023.
[16] ZEP proposal for a regulatory framework for CO2 transport infrastructure, 2022.
[17] CCUS Forum report 'An interoperable CO2 transport network – towards specifications for the transport of impure CO2', 2023.

The proposed EU 2040 climate target includes different modelling figures for emissions reductions, nature-based carbon removals, and industrial removals. However, separate targets for emission reductions, nature-based carbon removals and industrial removals are missing, which is not aligned with ZEP's consultation response[18]. The proposed EU 2040 climate target also foresees that industrial carbon removals would amount to more than 60 million tonnes of CO_2 in 2040. Clarity regarding the respective role of BECCS and DACCS, their respective contribution to permanent CO_2 storage and e-fuel production, and the assumptions underlying these figures are strongly encouraged.

The European Commission considers that *"the role of industrial removals [compared to land use removals] remains much more limited in the short run, given the need to fully develop some aspects of the technology to ensure large-scale deployment"*. ZEP still considers that a stronger reliance on industrial removals is to be recommended since the evolution of land use sinks is uncertain. ZEP considers that industrial removals should be relied upon primarily to counterbalance residual emissions rather than depending on uncertain and shorter-lived land sinks for that purpose. The development of high-quality credits is critical for industrial carbon removal activities is crucial and should be based on a robust, transparent, and complete quantification of the removed CO_2. The EU approach can provide a good basis for the development of similar approaches outside the EU. EU climate action should prioritise emission reductions over removals.

R&I

As indicated previously, an increase in Horizon Europe would ensure that the latest technologies are available for the large-scale deployment of CCS required to reach the proposed 2040 climate objectives. ZEP welcomes the strategy's indication that the Commission will continue to invest in R&I for CCS and CCU to contribute to standardisation and would "*boost EU research, innovation and early-of-a-kind demonstration for novel industrial technologies to remove CO_2*". ZEP would recommend enhanced efforts in R&I.

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 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.

[18] ZEP's response to the public consultation on the EU climate target for 2040, 2023.