European Commission - Questions and answers

Questions and Answers on the EU Industrial Carbon Management Strategy
Strasbourg, 6 February 2024

1. **What is industrial carbon management?**

Industrial carbon management involves the use of a range of technologies to capture, store, transport and use CO₂ emissions from industrial facilities, as well as to remove CO₂ from the atmosphere. The EU Industrial Carbon Management Strategy seeks to develop these technologies and the regulatory and investment framework to support them. It focuses on three main technological pathways:

- **Capture of CO₂ for storage (CCS):** where CO₂ emissions of fossil, biogenic or atmospheric origin are captured for permanent and safe geological storage;
- **Capture of CO₂ for utilisation (CCU):** where captured CO₂ is used to substitute fossil-based carbon in synthetic products, chemicals or fuels;
- **Removal of CO₂ from the atmosphere:** where biogenic or atmospheric CO₂ is captured by technological means and put into permanent storage.

**CO₂ transport infrastructure** serves as a key enabler for these three technologies and is necessary to establish a fully-fledged CO₂ market in Europe. Where captured CO₂ is not used directly at the place of capture, it will need to be transported for use in industrial processes (for example for construction products, synthetic fuels, plastics or other chemicals) or permanent storage. CO₂ can be transported by pipelines, ships, road or rail transport.

2. **Why is the Commission presenting this initiative and how is it related to the 2040 Climate Target Plan?**

The EU is committed to achieving climate neutrality by 2050 and it is implementing a comprehensive policy framework to reduce net emissions by at least 55% by 2030. The Commission has recommended today that the EU should seek to reduce greenhouse gas emissions by 90% by 2040, as a key milestone towards producing net zero emissions by 2050.

Achieving these targets will require decisive action across all economic sectors to reduce greenhouse gas emissions. The rapid development and integration of renewable energy, circularity, improved resource efficiency and alternative production processes are expected, among others, to play a major contribution.

However, some industrial processes and forms of transport or agriculture are more difficult or expensive to decarbonise, and the challenge to reduce emissions will increase as we approach the 2040 and 2050 targets. This is why there is a role to play for technologies to remove, capture, store and eventually re-use carbon.

The EU already has a number of policies in place to support the capture and storage of CO₂. However, to reach the 90% emissions reduction ambition for 2040 and achieve climate neutrality by 2050, the EU will need to significantly scale up its efforts at mitigating and managing carbon emissions. In the Net-Zero Industry Act, the Commission has proposed that at least 50 million tonnes of CO₂ per year can be stored geologically by 2030. Modelling results for the 2040 Communication indicate that approximately 280 million tonnes would need to be captured by 2040 and around 450 mtpa by 2050. The scale of this endeavour is large; 50 million tonnes of carbon is the equivalent of the annual CO₂ emissions of Sweden in 2022. However, the number of operational large-scale industrial carbon management projects in Europe is currently limited. A common EU-wide approach and vision are thus needed to establish a single market for CO₂ in Europe. This is why the Commission is today coming forward with a strategy aiming to establish a comprehensive framework on industrial carbon management.
3. What is the Commission proposing in the Industrial Carbon Management Strategy?

The Industrial Carbon Management Strategy highlights the need for ambitious and well-coordinated policies at national level, as well as strategic infrastructure planning and integration at EU level, underpinned by close cooperation between the EU and national administrations as well as businesses, civil society and research communities.

It will complement and complete existing EU policies and funding instruments, notably the CCS directive for geological storage, the EU's Emissions Trading System (ETS), the proposed EU certification framework for carbon removals, the Net-Zero Industry Act, as well as support for CO₂ transport infrastructure under the TEN-E Regulation for cross-border energy projects, the EU's Innovation Fund and the Connecting Europe Facility.

The Strategy sets out three different stages of developing industrial carbon management in Europe:

- For 2030, the strategic EU objective is the deployment of CO₂ storage capacity of at least 50 million tonnes per year, together with related transport infrastructure consisting of pipelines, ships, rail and road;
- By 2040, most regional carbon value chains should become economically viable to meet EU climate objectives and CO₂ should become a tradable commodity for storage or use within the EU's single market. Up to a third of the captured CO₂ will be used;
- After 2040, industrial carbon management should be an integral part of EU's economic system, and biogenic or atmospheric carbon should become the main source for carbon-based industrial processes or transport fuels.

As the best applications at national level are for Member States to decide, the EU's Industrial Carbon Management Strategy does not identify specific sectors for applying carbon capture in view of permanent storage or further utilisation. In general, industrial carbon management solutions will be most needed in 'hard-to-abate' sectors where mitigation options are limited. So far, according to the submitted draft National Energy and Climate Plans, the main applications for capturing CO₂ identified by Member States are in industrial processes including cement, steel and natural gas processing sectors, as well as in the production of electricity (especially from biomass) and of low-carbon hydrogen, refining processes, waste incineration and thermal heat production.

4. How do you plan to boost CO₂ transport infrastructure across the EU?

The volumes of CO₂ currently transported in the EU are limited in comparison to the future needs of industrial carbon management. Investments and planning will be needed to build a transport infrastructure fit to scale up CCS, CCU and industrial carbon removals. A new study carried out by the Commission’s Joint Research Centre (JRC), using the Commission modelling figures underpinning the 2040 Climate Target Communication, estimates that CO₂ transport infrastructure could span up to 7300 km and deployment could cost up to €12.2 billion by 2030, rising to around 19 000 km and €16 billion in 2040.

Uncertainty regarding future CO₂ volumes, complicated coordination across the value chains, and long permitting procedures constitute significant barriers for investors to move ahead with CO₂ transport projects today, especially pipelines – which can bring economies of scale but have high initial capital costs and long lead times. In the strategy adopted today, the Commission is therefore proposing to initiate preparatory work on a possible future CO₂ transport regulatory package to optimise its development and provide more certainty to investors.

The future regulatory framework could include issues such as market and cost structure, cross-border integration and planning, technical harmonisation and investment incentives for new infrastructure, third-party access, competent regulatory authorities, tariff regulation for transport assets and ownership models.

To optimise the benefits of capital spent on infrastructure, a future framework will also need to look at interactions with the electricity, gas and hydrogen sectors and the need for future spare capacity, including the mapping of the potential repurposing and re-use of existing infrastructure for CO₂ streams. Therefore, the Commission will assess to what extent it is possible to reuse or repurpose existing infrastructure for CO₂ transport and storage, when considering the priority for infrastructure needs of renewable gases, and, if so, what regulatory changes would be needed. In addition, the
Commission foresees to work towards proposing an EU-wide CO₂ transport infrastructure planning mechanism in cooperation with Member States and the CCUS Forum stakeholder platform as well as to develop emissions accounting rules in the context of the EU Emissions Trading System (ETS) to enable all means of transport of CO₂ and ensure liability for leakage.

The Commission will also support Member States in the design of a possible Important Project of Common European Interest for CO₂ transport and storage infrastructure via the JEF-IPCEI. In addition, it will continue to co-fund cross-border CO₂ infrastructure projects through the Innovation Fund and the Connecting Europe Facility.

5. How do you plan to support the uptake of CCS and CCU technologies, and industrial carbon removals?

The Commission plans to undertake several initiatives to support carbon capture and storage. Firstly, it will develop a platform for demand assessment and aggregation, with the aim of matching CO₂ suppliers with storage operators. Furthermore, it foresees to create and make available an investment atlas of potential CO₂ storage sites. Finally, it plans to develop guidance for permitting processes for CCS net-zero strategic projects to facilitate final investment decisions and improve financial security for project promoters.

For carbon capture and use, the Commission plans to assess options to increase the uptake of sustainable carbon as a resource in industrial sectors (including chemicals, advanced synthetic fuels, polymers, or minerals). It will also draw up a coherent framework to account for and support the deployment of innovative and sustainable CCU applications.

To stimulate the deployment of industrial carbon removals, the Commission plans to assess the establishment of overall objectives for carbon removals in line with the EU's 2040 climate ambition and the climate neutrality goal of 2050, with a view to reach negative emissions afterwards. It will develop policy options and support mechanisms for industrial carbon removals, including whether and how to account for them in the EU ETS. Support for research, innovation and early demonstration of novel industrial technologies to remove CO₂ under Horizon Europe and the Innovation Fund will also be boosted.

6. What are the funding opportunities available for these technologies?

Capturing 360-790 mt of CO₂ is estimated to generate a total economic value of €45-100 billion from 2030 onwards and help create up to 170,000 green jobs. However, to stimulate the development of this market, a combination of public and private funding will be necessary, at EU and national level.

Carbon management technologies are already supported under several EU programmes and funds, notably:

- **Innovation Fund**: By bringing to market the first innovative large-scale projects and reducing the costs for next generation projects, the EU Innovation Fund is the EU’s main funding instrument for the decarbonisation of industrial processes. To date, this Fund has provided support to 26 large and small-scale CCS and CCU projects worth more than €3.3 billion in grants, funded by revenues from the EU Emissions Trading System.

- **Connecting Europe Facility (CEF)**: This is the key EU support mechanism for the development of cross-border energy and transport infrastructure projects. So far, CEF has granted around €680 million to CO₂ projects of common interest.

- **Horizon Europe**: During the period 2007-2023, the Commission has invested more than €540 million in innovative CCUS solutions through its successive framework programmes for research and innovation (FP7, Horizon 2020 and Horizon Europe).

The Commission will continue to invest in research and innovation for all industrial carbon management technologies, including new solutions, to increase the availability of technologies on the market, and meet its mid- and long-term targets. Support will also continue via the CEF and the Innovation Fund. In principle, market-based finance for economically viable CCS and CCU projects can also be supported under the InvestEU Fund.

In October 2023, the Commission launched a Joint European Forum for Important Projects of Common European Interest (JEF-IPCEI) to focus on identifying and prioritising strategic technologies for the EU economy that could be relevant candidates for future IPCEIs. Member States
may therefore make use of the JEF-IPCEI as a platform for coordinated and transparent selection and design of a possible IPCEI on industrial carbon management. In addition, the Commission is planning to assess whether certain CO$_2$ capture installations, such as cement or lime production facilities, are mature enough and sufficient competition may be expected to move from project-based grant support to a market-based funding mechanisms, such as competitive bidding auctions as a service under the Innovation Fund. The Commission is also planning to assess investment needs in industrial carbon management up to 2040 and 2050, including the need for public funding and the role of EU funds, and to engage with the European Investment Bank on the financing of CCS and CCU projects.

7. How will you make sure that citizens and stakeholders are on board and international partners involved in efforts to establish an EU CO$_2$ market?

The EU and its Member States have a responsibility to stimulate an inclusive, scientifically informed and transparent debate on the development of these technologies, with the necessary involvement of local communities. The Commission will work with Member States to increase knowledge, awareness and public debate on industrial carbon management and will monitor the evolution of public opinion.

Stakeholders including public authorities, project developers, NGOs and civil society should be actively involved at all stages of policymaking and project implementation to avoid a one-way flow of information. Rewarding local populations for hosting carbon management infrastructure could also be considered. The Commission plans to work with the Member States to specify operating conditions for CO$_2$ transport and storage projects that can reward local communities for hosting them.

On top of stakeholders' involvement, international collaboration will also be necessary to maximise the potential of industrial carbon management for mitigating CO$_2$ emissions on a global scale. Against this background, the Commission is planning to promote harmonised reporting and accounting of industrial carbon management activities, to ensure they are accurately accounted for under the United Nations Framework Convention on Climate Change (UNFCCC) transparency framework; as well as working to ensure that international carbon pricing frameworks focus on the necessary emissions cuts while providing for carbon removals to tackle emissions in hard-to-abate sectors.

Furthermore, it will be essential to engage with third countries to ensure that their markets remain open to EU industry and technologies and vice versa, notably through public procurement markets. In this respect, the EU is already working closely with Members of the European Economic Area on industrial carbon management solutions. The first commercial cross-border agreement to capture CO$_2$ produced in the EU and ship it for storage in Norway has already been signed as part of the Northern Lights project.

For More Information

Press release

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