Scaling up CCS in Europe

CCS in a nutshell

- CCS is a proven technology and is essential to meet the Paris Agreement goals: there are 19 commercial projects in operation globally today.
- It is safe: risks of leakage are extremely low, with an estimated 99% containment over 1000 years.
- Europe is well-placed to benefit from CCS thanks to industrial clusters, extensive pipeline infrastructure and geological storage potential.

Policy recommendations

To scale-up CCS, Europe needs a fit-for purpose regulatory framework:

- Recognise CCS as a key technology in the European Green Deal and in the EU Industrial Strategy;
- Enable transportation of CO₂ as a commercial or regulated activity as part of gas market legislation;
- Ensure that CCS projects are eligible for EU funding (CEF, Horizon Europe, Innovation Fund);
- Encourage Member States to include strategies for CCS deployment in their National Energy and Climate Plans (NECPs).

Where can CCS make a difference?

- Emission cuts in industrial processes where mitigation potential is high, like steel, cement/lime, chemicals, and refining
- Low-carbon, flexible electricity from gas-fired power plants with CCS to complement an energy system with a growing share of variable renewables
- Large-scale production of hydrogen from natural gas with CCS, providing clean energy for industry, power, transport and heating
- Removal of CO₂ from the atmosphere by combining CCS with bioenergy (BECCS), using direct air capture (DAC), or through nature based solutions

1 Climate models from the IPCC, IEA and European Commission.
2 Global CCS Institute database here.
The role of CCS in global and EU 2°C and 1.5°C scenarios CO₂ stored in 2050

Pathways in the IPCC Special Report on Global Warming of 1.5°C, the IEA World Energy Outlook and the European Commission’s 2050 long-term strategy all show that CCS is essential to meet the 1.5°C target.

Today, there are two large-scale CCS facilities operating in Europe, capturing a total of 1.55 Mt CO₂ for storage.

To be on track for 1.5°C, one CCS facility capturing 1.5 Mt CO₂ would need to be added every week from now until 2050.

Why are support schemes still necessary?

As an emission reduction technology with significant potential, CCS needs public support to be scaled up.

This can be done by:

- Bridging the gap between the current carbon price and the cost of CCS. Public support can enable the early development of infrastructure for CO₂ capture, transport and storage.
- Accrediting low-carbon products and channeling investments into CCS activities.
- The need for public support will decrease as the carbon price increases, infrastructure is put in place, and economies of scale are achieved.

Towards new business models?

Past CCS project – Project-based

- Responsibility for capture, transport and storage borne by one actor
- High costs for one emitting installation
- Limited incentive to build infrastructure
- Public support schemes not targeted to specific segments

New CCS projects – Systemic approach

- Shared responsibility through separate business models for capture, transport, and storage
- Focus on emission clusters and achieving economies of scale
- Additional incentive to build infrastructure as infrastructure can be shared
- More focused public support schemes following lessons learned
Industrial emission clusters in Europe for CCS

Establishing shared CO₂ transportation and storage infrastructure with third party access will allow for cost-efficient use of this infrastructure by multiple parties.

Potential emission clusters in Europe are in Rotterdam, Yorkshire, Marseille, Teesside, Antwerp, La Havre, Skagerrak, Firth of Forth, Ruhr.

Which Regulatory Solutions for the EU?

**National Energy and Climate Plans (NECPs)**

Ensure Member States consider concrete deployment strategies and supportive policies for CCS in their final NECPs.

*Why?* Under the Regulation on the Governance of the Energy Union, Member States are required to develop NECPs outlining energy and climate policies to 2030 and 2050. In the draft NECPs submitted at the end of 2018, eleven EU Member States refer to CCS technologies, although many more have projects in the pipeline.

**Gas market legislation**

Enable gas infrastructure or other companies to transport CO₂ as a commercial or regulated activity overseen by National Regulatory Authorities (NRAs) with appropriate mandates.

*Why?* Restrictions on TSOs and DSOs to transport CO₂ hamper an optimal European network, necessary for Member States without sufficient storage capacity.

**EU Emission Trading System (ETS)**

Rewarding the transport of CO₂ by ship, train and truck in the EU ETS would help bring optionality and flexibility to CCS business models across Europe.

*Why?* The EU ETS currently only credit installations that transport their CO₂ to storage locations through CO₂ pipelines. However, it is also possible to transport CO₂ by ship, train and truck for installations that do not have access to a pipeline.

**Low-carbon product accreditation**

Promote a market framework for low-carbon products and services produced with CCS, including Guarantees of Origin and/or other accreditation schemes, to incentivise new business models and support market uptake.

*Why?* CCS can drastically reduce the carbon footprint of products such as steel, cement/lime, chemicals, and hydrogen, but a market framework to differentiate between high-carbon and low-carbon products is missing.

**Sustainable Finance**

Ensure CCS is recognised as economic activities contributing to climate change mitigation in the taxonomy developed in the context of the action plan on sustainable finance.

*Why?* There is a need to scale up CCS in the EU in order to deliver on long-term energy and climate objectives, and sustainable public and private investments should be channelled towards this activity.

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5 Article 49 of Commission Regulation 601/2012 on Monitoring and Reporting (MRR).

Overview of **existing** and planned CCS facilities

**Norway**
1. Sleipner CO₂ Storage*
2. Snøhvit CO₂ Storage*
3. Northern Lights*

**Republic of Ireland**
4. ERVIA

**UK**
5. Acorn*
6. Caledonia Clean Energy
7. H21 North of England*
8. Liverpool-Manchester Hydrogen Cluster
9. Net Zero Teesside*
10. Humber Zero Carbon Cluster*
11. Liverpool Bay Area CCS Project*

**France**
12. Lacq*
13. DMX Demonstration in Dunkirk*

**Belgium**
14. Leilac
15. Port of Antwerp*

**Sweden**
16. Preem CCS*

**The Netherlands**
17. Porthos (Port of Rotterdam)*
18. Aramus (Ijmmond)
19. Aramis (Den Helder)
20. Magnum (Eemshaven)*

**Croatia**
21. iCORD*
22. CO₂ EOR Project Croatia*
23. Bio-Refinery Project*

**Italy**
24. CCS Ravenna Hub*

*Project where IOGP members are involved. Projects listed in bold are in operation.

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We serve industry regulators as a global partner for improving safety, environmental and social performance. We also act as a uniquely upstream forum in which our members identify and share knowledge and good practices to achieve improvements in health, safety, the environment, security and social responsibility.

**Contact:**

Nareg Terzian, Senior Manager, Strategic Communications & Media, T: +32 2 790 77 73, M: +32 470 90 59 62, E: ntz@iogp.org

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