ZEP Briefing – ESABCC post-2030 climate policy recommendations

The European Climate Law created the European Scientific Advisory Board on Climate Change (ESABCC) in 2021 to *"serve as a point of reference for the Union on scientific knowledge relating to climate change by virtue of its independence and scientific and technical expertise"* (link to the regulation).

The ESABCC published a new report on 18 January 2024 to provide post-2030 policy recommendations to reach climate neutrality in the EU (link to the report). Excerpts can be found hereafter.

Key recommendations

- Policy inconsistency: *"The use of carbon capture technologies and hydrogen should not lead to **unnecessary fossil gas infrastructure lock-ins**."*
- *"The deployment of carbon capture and utilisation/storage (CCU/CCS), hydrogen, and bioenergy should be targeted towards activities with **no or limited alternative mitigation options**."*

General policy gap

- *"**Residual emissions** (e.g. in agriculture or industry) that motivate the use of carbon capture and storage (CCS) are currently **not defined** at the EU or Member State level."*

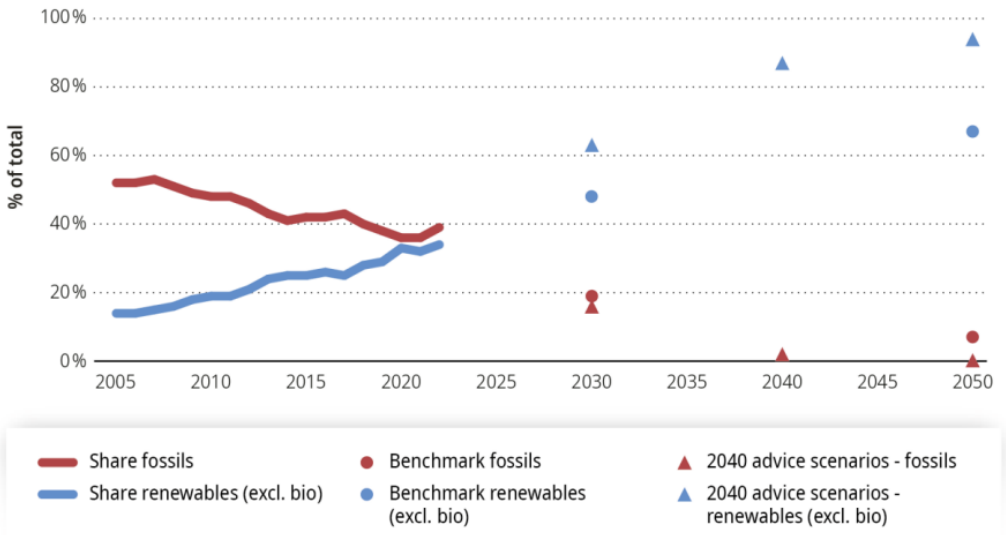
Identified mitigation levers

- *"Apply CCU/CCS in a number of industrial processes and the fossil fuel electricity sector **where non-fossil mitigation options have been exhausted**, based on a scientifically led definition of residual emissions."*

Scenarios

- *"The use of **fossil fuels**, notably coal and fossil gas, for public electricity and heat generation will be **almost phased out in 2040**, with the remaining emissions abated through carbon capture or CDR."*
- *"The use of fossil gas to generate electricity or heat is compliant with the **taxonomy criteria** as long as it replaces other fossil fuels and meets specific emission and efficiency thresholds. These **thresholds are too high**, however, potentially leading to exaggerated capacity additions, given that electricity generation from such plants should be marginal in the decarbonised energy systems, even if emissions can be captured through CCU/CCS."*

Figure 14 Indicator E2 – shares of fossil-based and renewable energy sources (excluding biomass) in the total electricity mix



Notes: Historic data refers to gross electricity generation reported in the Eurostat energy balances. The 2030 benchmark and breakdown are based on the Fit for 55 MIX scenario. The 2050 benchmarks are based on the MIX Scenario from the Climate Target Plan impact assessment (see figure 46). For 2040, the benchmark refers to the High renewable energy iconic pathway of the Advisory Board's 2040 advice.

Sources: Eurostat energy balances (2023b), Climate Target Plan impact assessment (EC, 2020s), Fit for 55 MIX scenario (EC, 2021v), Advisory Board 2040 advice (ESABCC, 2023b).

Figure 1. Shares of fossil-based and renewable energy sources (excluding biomass) in the total electricity mix.

Low-carbon hydrogen

- *"Electricity use in producing hydrogen for storage (power to gas) and its subsequent reconversion to electricity is very resource-intensive because of the low round-trip efficiency of the process. The use of fossil gas in the production of hydrogen will only be feasible if it involves carbon capture and storage (CCS) or CDR".*
- *"**Fugitive emissions** from gas pipelines and bioenergy **make it difficult to reach the EU's net zero target** by deploying fossil gas in combination with carbon capture and biomethane".*

Assessment

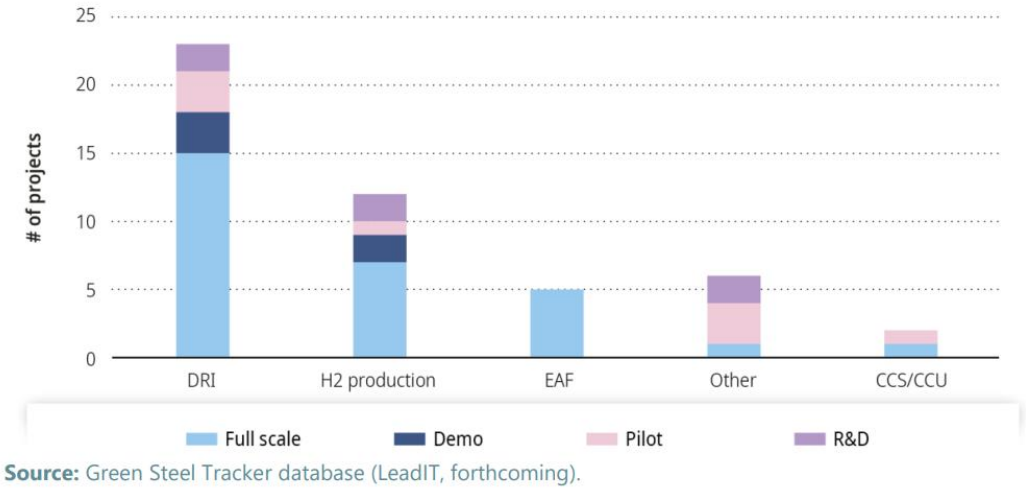
Several techno-economic aspects of CCU/CCS deployment guided this assessment of EU policies in terms of their consistency with climate neutrality.

- *"The contribution of CCU/CCS to the decarbonisation of energy supply depends on **costly investment**."*
- *"**Fugitive CH4 emissions** are associated with the increased demand for fossil gas driven by CCS applications".*

- *"Facilities equipped with CCU/CCS are **more energy intensive** and may **increase cooling water usage** significantly compared with their unabated counterparts".*
- *"There is an inverse correlation between the level of CCU/CCS deployment in energy generation and the need to expand **electricity transmission**."*
- *"Only limited long-term geological storage capacity for CO2 is accessible so far across the EU. The **mismatch between capture and storage capacity** and the failure of coordination in Europe are growing."*
- *"The need for new infrastructure can be limited through the geographical **clustering** of industrial activities."*
- *"CCS has relatively **little advantage** over a system without CCS in terms of **energy system costs**."*

CCS in steel

Two projects currently relate to CCS/CCU:

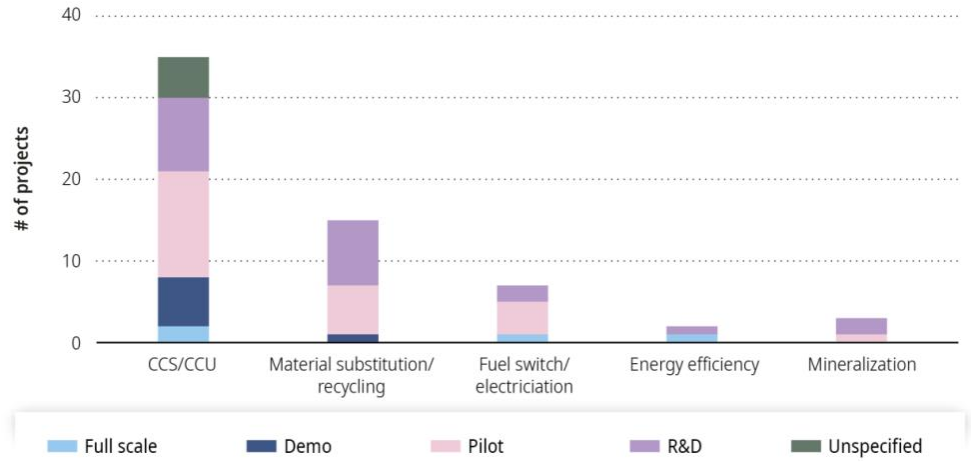


Source: Green Steel Tracker database (LeadIT, forthcoming).

Figure 2. Low-carbon projects in the steel sector.

CCS in cement

More than half of the current projects relate to CCS/CCU.



Source: Cembureau's online map of innovation projects (Cembureau, n.d.).

Figure 3. Number of low-carbon projects in the cement sector by technology group and project scale.

EU ETS

- Policy gap: *"Not yet a clear strategy to prepare the carbon market for when the cap – which determines the amount of **emission allowances** allocated to the market – **reaches zero**, which will occur before 2040"*
- *"The functioning of EU ETS, when the emissions cap for stationary installations is approaching or equalling zero, needs to be clarified shortly (including the potential role of carbon removals)."*
- *"The EU also should develop **alternatives to free allocation** to address the risk of carbon leakage for sectors not yet covered by the Carbon Border Adjustment Mechanism."*

Next steps

- *"Member States' updated national energy and climate plans (**NECPs**) should […] demonstrate **enough ambition** to enable the achievement of the EU's energy and climate objectives."*
- The ESABCC will publish a report on carbon dioxide removals (CDR) in 2024.