

ZEP response to the consultation on the Low-Carbon Industrial Technologies Prospect Report

In response to the report '**Pilot, Industrial technology prospect report. R&I evidence on EU development of low-carbon industrial technologies**', published by DG RTD and the Joint Research Centre (JRC) in June 2021, the Zero Emissions Platform wish to make a submission.

The role of CCS, CCU, CDR and low-carbon hydrogen

The report mentions the role of CCS and CCU as key technologies to enable the cost-efficient decarbonisation of energy-intensive industries, where emissions might be difficult to abate. CCS technologies involve capturing CO₂ produced by large industrial and energy plants, transporting the CO₂ and storing it permanently deep within rock formations. CCU technologies present different levels of maturity, depending on the final product. Life Cycle Assessments and further scientific evidence describing their climate mitigation potential will be needed to make a case for these technologies.

There is a need to further strengthen the following points in the report:

- CO₂ transport and storage infrastructure and CCS are instrumental for the production of low-carbon hydrogen from natural gas, which will play a key role in paving the way towards a European hydrogen economy, as the only opportunity to deliver early, large-scale quantities of hydrogen to industries and thus kickstarting a cost-efficient decarbonisation.
- CCS can also enable large-scale CO₂ removals using DAC and sustainable biomass. Both reductions and removals will be necessary to meet the target of climate neutrality by 2050.

Enablers and hurdles for CCS/CCU deployment in Europe

To create the best opportunities for Europe to cost-efficiently reach climate-neutrality by 2050, during the next decade there is a need to support early deployment of, and establish the foundation for, a European, low-carbon CCS industry. Some applications of CCU – where CO₂ is stored in a manner intended to be permanent – can also contribute to this goal.

Specific challenges for the large-scale, industrial deployment of CCS and CCU can be framed as follows:

- *Getting the commercial framework right:* Making CCS and CCU investable technologies for industry and energy stakeholders requires an appropriate policy and legal framework that provides long-term predictability for private investments and a reliable business model. The standardisation and regulatory issues, such as incentives for innovative technologies, and the support for capital expenditure and operational costs, will be crucial for the development of CCS, CCU

technologies in Europe. Other barriers – such as legal challenges, liabilities related to storage and social acceptance, etc. – also need to be tackled.

- *Accelerating timely deployment at scale of CCS and CCU technologies:* Early deployment of industrial-scale CCS and CCU projects as well as accelerated development of European cross-border CO₂ transport and storage infrastructure is vital to connect CO₂ emitters with CO₂ storage sites. Further mappings of CO₂ sources and investments in CO₂ storage appraisal are critical to develop European CO₂ storage capacity, to reduce costs of CO₂ storage and evaluate risks associated with storage. Combining existing datasets with specific analyses of industrial areas or plants, supported by the use of artificial intelligence, is recommended.
- *Driving costs down – through R&I, learning by doing and economies of scale:* To ensure the development of industrial-scale CCS and CCU by 2030, the reduction of the cost of current CCS/CCU technologies (both CAPEX and OPEX) is necessary. R&I activities are also vital to support new, innovative technologies for CO₂ capture with higher capture rates at industrial sites and power plants, including Direct Air Capture.
- *Informing EU citizens regarding the benefits of CCS and CCU:* It is crucial to bring all societal actors on board and to showcase the benefits of CCS and CCU technologies for the European society as a whole, as well as for European citizens.

Industrial CCS projects are coming forward in Europe

It is now crucial to support this positive progress and the further development of industrial projects and clusters to ensure that they move forward into deployment and operation. This is a great opportunity to bring forward best practices across other European industrial hubs and clusters. The positive developments highlighted so far will subsequently be the foundations for further industrial decarbonisation, attracting other CO₂ emitters from across Europe and building on the existing CO₂ transport and storage infrastructure.

There is also a need to support industrial CCS projects that are coming forward in Europe. For successful projects, regional ambition is often matched by national support through industrial decarbonisation mechanisms such as the SDE++ (Netherlands), the Norwegian CLIMIT mechanism and several CCS eligible industrial decarbonisation grants in the UK.

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) under Horizon2020 R&I programme (grant agreement 826051).

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 CO₂ is stored in a manner intended to be permanent – can also contribute to this goal.