Running the last mile

CCS and CCU as key enablers of the energy transition of EU industry

7th ACT Knowledge Sharing Workshop
5th October 2023, Paris

Zero Emissions Platform







- The Zero Emissions Platform
- State of CCS and CCU in Europe
- The role of CCS and CCU in the path to net-zero
- Research and innovation challenges
- Partnerships

Zero Emissions Platform – mission



The **Zero Emissions Platform** (ZEP) is a European Technology and Innovation Platform (ETIP) under the **European Strategic Energy Technology Plan** (SET-Plan)

- SET-Plan is a European programme to accelerate the development of low-cost & low-carbon technologies
- SET-Plan brings relevant stakeholders together, including governments and ETIPs (such as ZEP)
- CCS and CCU are among 10 priority actions identified by the SET-Plan to accelerate the EU's energy transformation and aim to become the global leader in the green transition
- ZEP is the official adviser to the European Union on the deployment of CCS and CCU





EU/EEA highlights – 2023 a crucial year



- EU Industrial Carbon Management Strategy Q4 2023 (?)
 - Consultation 31 August CCUS Forum in Denmark 27-28 November
 - Report on CO2 T&S infrastructure + "An Interoperable CO2-Transport Network – Specifications for Transported CO2"
 - Net-Zero Industry Act (NZIA) March 2023
 - CCS included: focus on technologies and storage, planning
 - 50 Mtpa by 2030 CO2 storage capacity objective Oil&Gas obligation
 - Member States to build up capacity: Reporting on storage and project progress, Supporting on access to finance, admin, Permit process maximum 18 months
- National Energy and Climate plans end-June France and Germany
- Monitoring reporting verification after reviewed ETS and CBAM

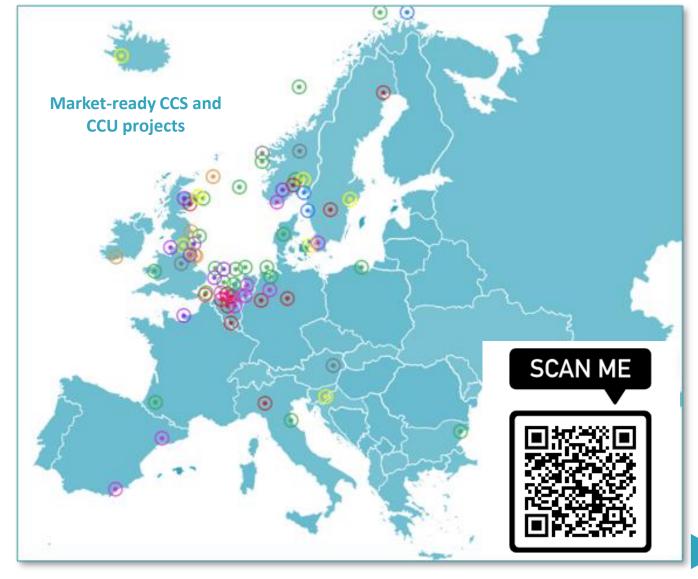




CCS and **CCU** projects in Europe



- **56 CCS and CCU projects** currently under development in broader Europe (EU27+ Norway+ Iceland)¹
- 20 CCS and CCU projects financed under the EU Innovation Fund
- 1 project reached Final Investment
 Decision (Longship Project, Norway)¹
- 1 project expecting FDI in the next weeks (Porthos, Netherlands)



^{1.} CATF. "A Vision for Carbon Capture, Utilisation and Storage in the EU." May 2023.

^{2. 4} projects in the first call (2021), 7 in the second (2022), 9 in the third (2023).

Implications of large-scale CCS and CCU



- Theoretical CO2 storage capacity in EEA: 262-1520 GtCO2/year
- Current industrial emissions in EEA: 780 MtCO2/year
- Maximum industrial CCS in EEA: 520 MtCO2/year
- Additional non-industrial CCS (hydrogen, biomass...): 720
 MtCO2/year³
- To be consistent with the 1.5° goal of the Paris Agreement, the EU needs by 2030⁴:
 - o 230-430 MtCO2/yr of CO2 removals in 2030
 - o 930-1200 MtCO2/yr of CO2 removals by 2050
 - EUR 14 billion/yr in CCS and CCU investments
- o CCS and CCU are key to preserve the over 8 million jobs in hard-toabate sectors in Europe while creating new value chains and jobs⁵

^{3.} CATF "Unlocking Europe's CO2 Storage Potential. Analysis of Optimal CO2 Storage in Europe." July 2023.

^{4.} ZEP "How much CCS and CCU will be needed in 2030? – Objective: for Europe to be on track to reach climate-neutrality by 2050". July 2018. 5. Global CCS Institute. "Safeguarding Jobs and Industrial Competitiveness in Europe through CCS."

Partnerships in CCS and CCU





- CCUS SET Plan: Strategic Energy Technology Plan, a public-private venture set up in 2007 by the EU to foster the deployment of CCS and CCU.
 - Zero Emissions Platform

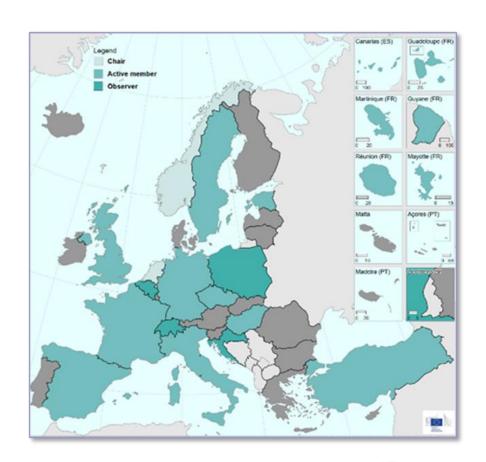
EERA European Energy Research Alliance

EERA CCS: CCS-related joint programme (JT)
 of the European Energy Research Alliance,
 member-based organisation of research
 centres focused on energy.



CCUS SET-PLAN - ACCELERATING THE TRANSITION

- CCUS SET-Plan Implementation Plan (IWG9) chaired by the Netherlands, Norway, and ZEP
- Accelerating the transition through greater
 coordination EU, national, industrial and academic research
- All parts of CCUS value chain, including low-carbon hydrogen and CDR
- Updated CCUS targets: 50 MtCO2/yr abated by CCS in
 2030





CCUS SET-PLAN 2030 TARGETS

50 Mtpa abated by CCS in 2030

15 commercial-scale CCS projects linked to industrial CO₂ sources, 10 having completed a FEED study and 5 having made an investment decision

10 commercial-scale CCS projects operating in the

power sector

Commercial-scale CCS projects

At least 3 pilots of capture technologies at TRL 7-8 in different industrial applications, and 6 pilots at TRL 5-6

Capture

At least 6 new CO₂ storage sites in preparation or operating in different settings. 9 more sites to be appraised by 2030

Storage

SET-Plan countries completed national and regional CCS roadmaps for the development of dedicated CO₂ transport infrastructure

At least 10 EU Project of Common Interest (PCI) for CO₂ transport infrastructure

CO2 transport infrastructure

Several demonstration installations producing CO₂-based fuels, chemicals and materials by 2030

First large scale CCU commercial installations enabled by supportive regulatory framework and financial measures at national and EU level

CO2 utilisation

An up-to-date and detailed inventory of the most suitable and cost-effective geological storage capacity in Europe

Storage

All EU countries identified the need for CCS/CCU as part of their strategy for their transition towards net-zero by 2050

In MS strategies



Research & Innovation Challenges



- R&I priorities to bring CCS and CCU at scale⁶:
 - CO2 capture: flexibility, integrated systems, multi-user capabilities
 - CO2 transport: networks, quality standards, CO2 impurities
 - **CO2 storage:** remote emitters, monitoring, performance standards, storage capacity mapping, legacy wells;
 - Cross-cutting: capacity building of regulators, metering, social acceptance, life cycle assessment etc.



Research & Innovation Challenges



- ZEP and EERA identified the following recommendations for investments in R&I⁶:
 - Extend CCS to new industries while reducing costs
 - CCS for flexible power generation
 - CCS for hydrogen production (i.e. blue hydrogen)
 - Engineered carbon removals (BECCS, DACCS)
 - Creation of a EU-wide storage market
 - Role and scale of CCU applications
 - Public-private partnerships (ex. SET Plan)



Any questions?

Joop.hazenberg@zeroemissionsplatform.eu

Secretary General, Zero Emissions Platform

