



HORIZON EUROPE

THE EU
RESEARCH & INNOVATION
PROGRAMME 2021 – 27

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UNIT: CLEAN ENERGY TRANSITION

*Research and
Innovation*



Towards Clean Energy Transition in the EU

- **In line with the EU's goal of net-zero GHG emissions by 2050 switching of fossil fuel energy to renewable and zero carbon energy is necessary as this represents roughly three quarters of the EU emissions of CO₂.**
- **This transition needs to take place without hampering the environment but also without reducing the availability and affordability of energy for all its users.**
- **The remaining fossil fuel and energy-intensive industries need to be fully decarbonised through CCUS.**

EU policy tools for CCS and CCU

- **The EU Climate Law, Fit for 55 package, Energy System Integration Strategy and Hydrogen Strategy**
- **REPowerEU**
- **Trans-European Energy Networks**
- **Sustainable taxonomy**
- **CCS Directive**
- **EU ETS**
- **EC Communication "Sustainable Carbon Cycles", EC will propose an EU regulatory framework for the certification of carbon removals by end 2022**
- **Horizon Europe, Innovation Fund, Connecting Europe Facility**
- **NewGenerationEU – European recovery budget**
- **Strategic Energy Technology (SET) Plan: Implementation Working Group 9, New Research and innovation targets**

Carbon capture, utilisation and storage (CCUS)

- **CCUS will play crucial role in Horizon Europe/EU Green Deal in particular for the transition of energy-intensive industries and the power sector towards climate neutrality**
- **Particularly important in those industries where other alternatives do not yet exist**
- **If CCUS combined with sustainable biomass, it could create negative emissions**
- **Low carbon hydrogen from natural gas with CCUS in transitional phase towards H2 from renewable sources**
- **CCUS for industrial clusters**
- **Demonstration of the full CCUS chain**
- **Conversion of captured CO2 to useful products**

Expected Impacts generated by CCUS R&I (1)

- Accelerated rollout of infrastructure, in particular for CCUS hubs and clusters.
- Continuing knowledge and best practice sharing activities, in particular on connecting industrial CO₂ sources with potential bankable storage sites and installations using CO₂, providing greater confidence for decision makers and investors.
- Proven feasibility of integrating CO₂ capture, CO₂ storage and CO₂ use in industrial facilities and to maximize the efforts to close the carbon cycle. Demonstrating these technologies at industrial scale should pave the way for subsequent first-of-a-kind industrial projects.

Expected Impacts by CCUS R&I (2)

- **Reduced cost of the CCUS value chain, with CO₂ capture being still the most relevant stumbling block for a wider application of CCUS. Develop innovative technology for CO₂ conversion to reduce the need for pre-concentration and/or purification.**
- **Adequate frameworks for Measurement, Monitoring and Verification (MMV) for storage and use projects, to document safe storage and for public acceptance of the technology.**
- **Further research in DACCS and BECCS as CO₂ capture technologies in combination with CO₂ storage in order to develop cost-effective carbon removals in view of achieving the net zero targets.**
- **Assess the environmental impacts and risks, in the short, medium and long term, of CCUS technologies.**

CCUS Topics in the Horizon Europe WP 2021-2022

- **Integration of CCUS in hubs and clusters, including knowledge sharing activities (2021)**
 - Total indicative budget 2 Mio €, Coordination and Support Action (CSA)
 - 1 new project will start in 2022
- **Cost reduction of CO₂ capture – new or improved technologies (2021)**
 - Total indicative budget 30 Mio €, Research and Innovation Action (TRL 6)
 - 2 new projects will start in 2022
- **Decarbonizing industry with CCUS (2022)**
 - Total indicative budget 58 Mio €, Innovation Action (TRL 7-8)
 - 2 new projects are expected to be selected.

CCUS in the Horizon Europe WP 2023-2024

Topics are in preparation in consultation with member states on CCUS and CDR including CO₂ transport, utilization and storage and DACCS and BECCS.

Clean Energy Transition Partnership (CETP)

- **The CETP aims to empower the energy transition and contribute from a R&I perspective to the EU's goal of becoming the first climate-neutral continent by 2050.**
- **CETP builds on SET plan implementation working groups and on the energy relevant ERA-NETs**
- **The activities of ACT ERA-NET initiative on CCUS will be continued under the Transition Initiative 3 from CETP partnership.**
- **The opening of the call is expected to be in September 2022.**
- **The CETP grant agreement has a fixed starting date 1 May 2022**

The CDR Mission: Objective

“Enable CDR technologies to achieve a net reduction of 100 million metric tons of CO₂ per year globally by 2030.”



**CARBON DIOXIDE
REMOVAL**
MISSION

The CDR Mission: Scope

- Technological CDR approaches, including:
 - Direct Air Capture (DAC)
 - Biomass with carbon removal and storage
 - Enhanced mineralization
- Emphasis on secure CO₂ storage and conversion into long-lived products.

The CDR Mission: Activities

1. Methodologies for lifecycle analyses (LCAs) and technoeconomic analyses (TEAs)
2. RD&D for lower TRL CDR technologies
3. Lessons learned from first-generation CDR projects and business models

The CDR Mission: Coalition

Co-leads



Canada



Saudi Arabia



United States

Members



Australia



European Commission



India



Japan



Norway

+ Ongoing engagement with industry, innovators, academia

The CDR Mission: Next Steps

1. Innovation Roadmap
2. Mission Action Plan
3. Co-design projects with members and partners

For More Information

- Mission Innovation: <http://mission-innovation.net/>
- CDR Mission: <http://mission-innovation.net/missions/carbon-dioxide-removal/>

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Thank you!

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