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.**

European Commission

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.

European Commission

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 CO_2 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 CO_2 storage and conversion into long-lived products.

MISSION INNOVATION
Catalysing Clean Energy Solutions for All

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

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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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