

Long-term R&D Recommendations

Niels Peter Christensen
Task Force Technology

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European Technology Platform for Zero Emission Fossil Fuel Power Plants

KEY RECOMMENDATIONS



The European Union (EU) is now leading the world in the implementation of an ambitious demonstration programme for CO₂ Capture and Storage (CCS) as a critical technology for combating climate change. The goal: to ensure CCS is commercially viable by 2020. But while individual components of the CCS value chain are already proven – ready for scale-up and integration – further R&D into next-generation technologies must also be initiated *immediately* to enable rapid and wide deployment post-2020.

To this end, experts within the European Technology Platform for Zero Emission Fossil Fuel Power Plants (ZEP) have identified key areas for improvement, together with the main strands for R&D to 2030 and beyond. To ensure maximum effectiveness, this should be coordinated at a national and EU level and include key learnings from the EU demonstration programme. Technologies still at an early stage should also be included since sudden technology breakthroughs cannot be foreseen, but are the outcome of dedicated R&D.

2020, 2030 and beyond



Second-generation CCS technologies (2020-2030): technologies brought to commercialisation within this period are likely to be based on improvements and refinements of first-generation technologies employed pre-2020. Some new technologies, currently in the R&D phase, should reach the demonstration or even commercial phase.

Third-generation CCS technologies (post-2030):

technologies brought to commercialisation within this period are likely to be based on optimised and refined first- and second-generation technologies. In particular, demonstration phase, second-generation technologies should become commercialised. New technologies, which today could be in R&D infancy, should reach the demonstration phase and then become commercially available.

CO2 capture



R&D activities for CO2 capture should focus on improving and developing new and competitive capture technologies in order to reduce cost and energy consumption, including:

- Undertaking further R&D on the current portfolio of capture technologies – post-combustion, pre-combustion and oxy-fuel – and identify improvements in those closest to commercial maturity. Investigating novel technologies and the novel use of known technologies
- For all technologies, identifying additional areas of improvement in reliability, availability, maintainability and flexibility (e.g. in terms of fuel or operation).

Key topics

New CO2 sorption media and processes for post-combustion * Integrated processes for pre-combustion and oxy-fuel * Plant integration for all three capture technologies * Oxygen production for pre-combustion and oxy-fuel * Improving combustion, flue gas treatment and CO2 cleaning for oxy-fuel * Improving and up-scaling gasifiers, hydrogen-gas turbines, carbon monoxide-shift and CO2 capture for pre-combustion * CO2 compression

CO2 transportation and storage



R&D activities for CO2 transportation and storage should focus on enhancing technologies and methodologies expected to facilitate wide-scale deployment, including:

- Developing a complete transportation infrastructure, including industrial sources of CO2
- Improving methodologies for assessing storage options and their capacities
- Optimising storage capacity and efficiency.

Key topics

Deep saline aquifer storage * CO2-related well technologies * CO2 storage reservoir capacity assessment * Monitoring and modelling the storage reservoir, and geology surrounding it, all the way up to the surface * Management of the CO2 storage complex * Mitigation and remediation * Assessment of environmental impacts * Land planning and infrastructure

Areas in which CO₂GeoNet could contribute



Storage site network – help set network up & extract knowledge

Science brochures in relevant languages

- what can we learn from other onshore storage sites?
- what can we learn from natural gas storage?
- what can we learn from naturally occurring CO₂

Work with ZEP on R&D strategy and storage cost estimation

Provide expert testimony - repudiate junk science publications

With CO₂Net EAST and the GeoCapacity project partners, take storage mapping and capacity assessment forward.