Research, development and demonstration of CCS technology to pave the way for full scale CCS in Norway

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Abstract

CLIMIT is a programme for research, development and demonstration of carbon capture and storage technologies (CCS). The programme is carried out in cooperation between the Research Council of Norway, which handles CLIMIT R&D, and Gassnova, which handles CLIMIT Demo.

CLIMIT’s primary objective is to contribute to the development of CCS technologies and solutions.

CLIMIT has supported development of CCS technology in Norway for more than ten years. The knowledge and solutions created during this time have laid the technological foundation for building full-scale CCS projects in Norway. CLIMIT has also made significant contributions to CCS development outside Norway’s borders.

The current CLIMIT Programme Plan for 2017-2022 is focused on improved technological solutions through international cooperation. More cost effective solutions will be relevant in both the short and long term, and must be applicable beyond our own.

CCS technology is available today. However, there are not many players that consider CCS to be a profitable climate measure. Some countries, including Norway, are therefore at the forefront when it comes to utilizing the technology through development of early full-scale CCS projects. These activities are important for promoting innovation, spreading the technology and steering technology development.

The CLIMIT programme has identified three focus areas:
A. Early full-scale CCS value chain in Europe
B. Large-scale storage of CO₂ on the Norwegian shelf in the North Sea
C. Future solutions for CCS

The main objective of this paper is to give a broad overview of the CLIMIT RD&D portfolio within capture, transport and storage and how it has laid the ground for future CCS deployment.

The programme covers the entire development chain from research to demonstration. All aspects of the value chain from industrial processes with integrated CO₂ capture, to transport and storage of CO₂ are covered. The programme is open to projects aimed at capture of CO₂ from power
generation, as well as other industrial sources. The requirement for long-term storage means that the programme can also support development of technology that utilises CO₂ to make new products, provided the CO₂ is not subsequently being released into the atmosphere.

CLIMIT is a key instrument in the national CCS effort. The programme helps create a network of players that accumulate and spread expertise, and strengthen international CCS cooperation. The programme also contributes to a comprehensive national portfolio within CCS technology development.

The projects that are granted support from the programme must contribute to reducing the costs and risks associated with CO₂ capture, transport, and long-term storage.

CLIMIT prioritize development of enabling capture technologies that has the potential to be more effective and with lower cost than today's more mature technologies. The CLIMIT program see an increasing interest in focusing on CO₂ capture from industry and how to integrate the capture technology to the industrial processes benefitting on e.g. utilize waste heat sources to the capture cycle. Within storage research is focused on optimized methods for injection of CO₂, improved understanding of physical and chemical processes in the reservoir and methods to detect the movement of the plume. There are also projects focusing on enhanced oil recovery (EOR) as a potential commercial driver for CO₂ storage.

CLIMIT contributes to competence and research capability within universities, institutes and industries with synergies to other national and international CCS instruments. International cooperation has high priority as the cross-Atlantic cooperation with American and Canadian capture and storage projects, and cooperation with Australia within the field of transportation/pipelines. CLIMIT also supports the ERA NET Cofund within CCS, called ACT (Accelerating CCS Technologies) where 9 countries collaborate on more rapidly mature technologies for commercialization. The synergies between CLIMIT and international partners will be elaborated in the full paper.