

Danish Carbon Capture and Storage Related Activities

Prepared by: Søren Frederiksen, Ministry of Climate and Energy, Danish Energy Agency, Denmark
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The Danish companies Maersk Oil and Maersk Tankers are aiming to develop a CCS project together with the owners of a Finnish powerplant. CO₂ will be captured at the Finnish Meri-Pori power plant and transported in purpose built tanker vessels to gas and oil fields in the Danish part of the North Sea for injection/storage and possibly enhanced oil recovery (EOR) from the oil field. Planned volumes are app. 1.2 million tons CO₂ annually. Final decision on investment is expected in 2011-2012.

The power company Vattenfall is investigating the possibility of a CCS project at their 380 MW combined heat and power plant at Aalborg in the northern part of Denmark. The project uses post-combustion amine-based CO₂ capture, and a 28 km pipeline for transport of the CO₂. Storage will be in a deep onshore saline aquifer. 2D seismic mapping completed, and further investigations are planned, but the project has been postponed. Permission to store CO₂ has been applied for.

The Danish company DONG Energy is involved in the CESAR project. In the CESAR project, the pilot CO₂ post-combustion capture plant (established as part of the CASTOR project) at the Danish power station Esbjergværket will be further developed and used to test more effective solvents.

Denmark is a member of the IEA Greenhouse Gas R&D programme, and thus supports the activities in this programme in relation to CCS.

The Geological Survey of Denmark and Greenland (GEUS) are actively involved as member in a series of international networks on CCS:

- CO₂GeoNet Association – European Network of Excellence focussing on geological storage of CO₂. Members currently comprise 13 institutes from the ‘old’ EU. CO₂GeoNet Association has submitted 3 applications for FP7 projects with GEUS as partner. CO₂GeoNet Association is also taking part in applications to IEA GHG applications to identify and review the potential methods for quantifying CO₂ leakages from a geological storage site from the ground or seabed surface. Coordinator is BGS UK.
- CO₂NET – The network of CCS stakeholders across Europe: 19 members from 19 countries. Functions as EU network until end 2005 and there after open for all interested members. Coordinator is Technology Initiatives Ltd UK.
- ENeRG (European Network for Research in Geo-Energy) – GEUS participate in the network on basic and applied research and technological activities related to the exploration and production of energy sources and on CO₂.
- EuroGeoSurvey – GEUS participate in the Task Force on CO₂.

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- AQUA DK - EFP07-II project dealing with geological storage of CO₂ in Danish reservoirs. The main focus is on development of methods for CO₂ capture from the atmosphere and geological storage, and on the chemical reactivity of the reservoir sediments and reservoir sea integrity. Project Manager: GEUS (project period 2009-2013).
- BIGCCS - International CCS Research Centre is one of eight centres established by the Norwegian Research Council 2008 under the scheme of Environmentally Friendly Research Centres (CEER). The main objective of the BIGCCS Centre is to contribute to the ambitious targets of the Climate Agreement adopted by the Norwegian Parliament in February 2008. The BIGCCS Centre focuses on

sustainable power generation from fossil fuels based on cost-effective CO₂ capture, safe transport, and underground storage of CO₂. With 21 partners, a period of eight years, and a budget of NOK 400 million, the BIGCCS Centre is the largest CCS R&D project in Europe.

- CASTOR – Major EU RTD project on capture and minor activities on storage. Coordinator is IFP France. GEUS leads activity on geological storage potential assessment in 8 Central and Eastern European countries). The project started in 2004 and ended in 2009.
- CO₂ ReMoVe – Major EU project with a view to monitoring, verification and regulatory framework as based on real cases (Sleipner, Snöhvit, In Sala, Ketzin). Coordinator is TNO NL.
- CO₂SINK – Major EU RTD/demo of CO₂ pilot injection test in Ketzin near Berlin. Coordinator is GFZ Potsdam. The project started in 2004 and ends in 2010. GEUS participate with modelling and predictions in the Ketzin CO₂ storage experimental site.
- COACH – EU RTD project to start a strong and durable cooperation between Europe and China to respond to the fast growing energy demand of China. The projects started November 1st 2006 and ended on October 31st 2009. COACH (Cooperation Action within CCS China-EU) is a project funded by the European Commission under the Memorandum of Understanding signed in February 2006 on Near Zero Emissions Coal (NZEC) demonstration plant in China. The overall objective of this project was to evaluate the feasibility of the deployment of CO₂ Capture and Storage (CCS) in China.
- DYNAMIS – A major EU project in preparation with a view to developing pathways for Europe's future ZE power generation and the hydrogen society. Coordinator was Sintef Norway. The project started in 2006 and ended in 2009.
- ECCO - European Value Chain for CO₂ is a European research project partly funded by the European Commission under the 7th framework programme for research (7FP). There are 19 partners (SINTEF ER, SINTEF PR, TNO, JRC, IFP, GEUS, NTNU, BELLONA, PEL, STATOIL, VRD, DONG, UZAGREB, INA, MOL, PIE, EON, RWE). The project aims to accelerating the development of CO₂ Capture and Storage. The main objective is to establish recommendations for a European infrastructure for CCS, to identify how CCS can become economically viable. The project started in 2008, and the main results are expected by September 2011.
- GeoCapacity – The GeoCapacity project started on January 1st 2006 and ended on December 31st 2008. The project was dealing with assessment of geological CO₂ storage capacity in 14 countries (to supplement the previous 8 countries which comprised the GESTCO project). Cooperation on capacity assessment and methodologies with P.R. China was a part of the project. Coordinator was GEUS.
- A study for planning a pilot project for CO₂ EOR in a Danish oilfield has been initiated. The project is supported by the Danish High-Technology Foundation, and led by DONG Energy (ongoing)