



CCOP CO₂ Storage Mapping Program (CCS-M)

**Case Study Country Tour in Norway, 5-10 May 2015
(Stavanger, Oslo and Trondheim)**

Introduction:

The CCOP CO₂ Storage Mapping Program, or CCS-M is a 4-year capacity building Program on Carbon Capture and Storage (CCS) to benefit the Member Countries of CCOP. The goal of CCS-M is to enable the government organizations in the CCOP Member Countries in mapping for the geological storage of CO₂ to:

- Provide a high level overview of the potential for large-scale CO₂ storage;
- Enhance their capacity and capability in the assessment of geological sites for the safe and long-term storage of CO₂; and
- Increase their understanding of the potential of CO₂ for enhanced oil/gas recovery.



The CCS-M Program is currently implementing the case study activities through series of workshops and training courses related to the application of the CCS-M Guideline on the methodologies for selecting geological storage and estimation of storage capacities. Topics on the use of CO₂ for enhancing oil/gas recovery are also included in the workshops.

Objectives:

The purpose of the visit to Norway is to build technical capacity of the China case study team at SINOPEC that will be hosting the CCS-M China case study workshop sometime in the second half of 2015. The visit will take place in the period 5-10 May 2015 (departing 5 May) and was participated by case study countries (China and Malaysia) together with the CCS-M Program Coordinator from the CCOP Technical Secretariat (CCOP TS).

The study tour program covered visits to industrial sites, research centres and academic institutions in Norway. The sequence of visits and the travel logistics was arranged by PETRAD in consultation with the CCOP TS.

Delegation:

CCS-M case study countries

	Name	Position	Organization	Country
1	Mr ZHOU Qingfan	Division Director	SINOPEC	CHINA
2	Dr LUN Zengmin	Vice Div. Director	SINOPEC	CHINA
3	Dr. SHENG Xiujie	IT EXPERT	SINOPEC	CHINA
4	Dr NIU Jun	Senior Engineer	SINOPEC	CHINA
5	Mr Kamal Azlan B A GHAFAR	Senior Manager, MPM	PETRONAS	MALAYSIA
6	Mr Simplicio P. CALUYONG	CCS-M Coordinator	CCOP TS	Philippines

PETRAD, Norway

	Name	Position	Organization	Country
1	Mr Geir Egil EIE	Managing Director	PETRAD	NORWAY

2	Mr Claes B REKSTEN	Project Director	PETRAD	NORWAY
3	Mr. Lars TVETER	Project Director	PETRAD	NORWAY
4	Ms Anna WALLERSTEDT	Admin and Finance	PETRAD	NORWAY

The Tour was conducted through a combination of meetings and facility tours in Stavanger, Oslo and Trondheim. Also included in the Program were visits to historic / tourist sites of the cities visited.

Stavanger, 6 May 2015



The delegations were welcomed at PETRAD with an introduction to Norway and an update on CO2 for IOR/EOR and CCS activities. The CCS activities were presented by Ms Wenche Tjeta Johansen, Assistant Director for Exploration of the Norwegian Petroleum Directorate (NPD) that also covers an overview of the CO2 Storage Atlas.



NPD and CCOP have a long and successful history of cooperation in various capacity building projects related to oil and gas resource management. Currently, NPD is the technical partner and adviser of CCOP in the CCS-M Program and have provided resource persons to conduct /facilitate some of the CCS-M training courses. After the meeting at PETRAD, the delegation visited the National EOR/IOR Center, University of Stavanger (UIS) where a briefing was conducted on the activities of the Center and also the various geoscience programs offered by UIS.

The Stavanger meetings were capped by a visit to the International Research Institute of Stavanger (IRIS) one of the world renowned research Institute in Norway on activities related to petroleum, new energy, marine environment, biotechnology, social science and business development. Dr Roman Berenblyum

provided a presentation on the various activities of the Institute and specific areas where CCOP and IRIS can have cooperation through the CCS-M Program.

Oslo, 7 May 2015



The delegation traveled to Oslo, the Capital City of Norway to meet with the DNV-GL CCS team led by Mr Mike Carpenter, Principal Consultant for CCUS. It is important to note that DNV have actively provided resource persons during CCS-M training courses in Bali, Indonesia (May 2013) and Shanghai, China (Oct 2013) specifically on the topic CO₂ for EOR technologies and recommended practices for CO₂ geological storage.

The Oslo visit included stops for siteseeing at the Vigeland Park, Holmenkollen (hill overlooking Oslo) and Frognersteren.

Trondheim, 8 May 2015

The delegation visited SINTEF's Petroleum Research Institute and had a chance to meet with the management of the Institute who provided information about the works done by SINTEF and the BIGCCS Center on CO₂ for EOR and geological storage. Also present during the Meeting was Dr Erik Lindberg, who pioneered the CCS (storage) in Norway.

While in Trondheim the delegation had the opportunity to visit NTNU (Norwegian University of Science Technology), the City Cathedral and Old City, and other interesting sites.

Summary:

The study tour provided valuable information and insights about Norway in general and the research activities related to CCUS, particularly the CO₂ for EOR technologies and the development of the Storage Atlas of Norway. The meetings with the key persons in the Institutes visited offered opportunities for future collaboration in the form of providing knowledge resources to CCOP during the conduct of CCS-M activities.

The delegate members were very grateful to PETRAD for organizing the study tour, the Ministry of Foreign Affairs for providing the funding and CCOP TS for coordinating the travel. Thank you also to the management representatives and key researchers in the Institutes / Organizations visited (NPD, UIS, IRIS, DNV-GL, and SINTEF).