

# What's on 2013-1

# BIGCCS

International CCS  
Research Centre

[www.bigccs.no](http://www.bigccs.no)

## New KPN projects under BICCGS

Two competence building projects (KPNs) have been granted BIGCCS researchers and are intended added to the BIGCCS project portfolio in the near future. The projects are:

### Novel hybrid membranes for post combustion CO<sub>2</sub> capture in power plant and industry (HyMemCOPI)

This project focuses on post-combustion CO<sub>2</sub> capture, replacing the traditional solvent /amine technology (consisting of absorber, heat-exchanger, and regeneration units) with membranes separating CO<sub>2</sub>. The project seeks to improve the cost and energy efficiency of CO<sub>2</sub> capture and develop a new generation CO<sub>2</sub> capture technology with large potential improvements.

*HyMemCOPI* takes the advantages of polymer membranes (flexibility, processability and low cost) and makes a breakthrough improvement in the membrane performance for CO<sub>2</sub> capture by integrating multifunctional nano-sized particles in the polymer matrix. The project aims to gain understanding of the transport phenomena in hybrid membrane materials, considering the effect of multifunctional nano-sized materials which will enable improved fabrication of low cost and high performance hybrid membranes for CO<sub>2</sub> capture.

SINTEF Materials and Chemistry and NTNU are main partners, and will collaborate closely with leading research groups in USA and Germany.

*Project manager Dr. Partow Henriksen  
SINTEF Materials and Chemistry*



### BIGCLC Phase III

*The BIGCLC Phase III* project, a four-year project (2013 – 2016), continues the ongoing BIGCLC Phase II project, which is task 1.7 of BIGCCS.

The main aim of the new project is to bring the Chemical Looping Combustion (CLC) technology to the next level of maturity by filling important knowledge gaps. Extensive research has been carried out over the last decade investigating expensive oxygen carriers (like e.g. nickel oxides). Results from operation of realistic, optimized oxygen carriers are lacking in the literature.

Preceding work (Phase I and II), had paved the ground for establishing SINTEF/NTNU as a leading actor on the border of applied and fundamental CLC research. This is due to top-class research on the materials science aspect (SINTEF Materials and Chemistry), resulting in patents and novel carrier formulations, and to work performed on the process side at SINTEF Energy Research and NTNU, such as the innovative design and installation of a 150 kW rig based on industrial solutions.

Combining this knowledge on reactor systems, materials technology and system simulations, the goal in *BIGCLC Phase III* is to enable CLC technology that deliver CO<sub>2</sub> capture at low cost, high capture rate and low efficiency penalty. CLC is regarded as a possible breakthrough CO<sub>2</sub> capture technology. The need for more scientific research in the field of oxygen carrier optimization in realistic environments is widely acknowledged. There is also a lack of fundamental understanding related to part of the particle behaviour in fluidized bed reactor systems. All these aspects will be focused in *BIGCLC Phase III*.

International collaboration with Stanford in the US is one example of important scientific excellence that will be brought into the project.

*Project manager Øyvind Langørgen  
SINTEF Energy Research*



## First BIGCCS PhD completed

Alexandre Morin was the first BIGCCS doctoral candidate to defend a thesis in 2012. His work has improved the foundation for the precise calculation of flow in and out of CO<sub>2</sub> transport pipelines.

Dr. Morin has studied models for the flow of multiphase CO<sub>2</sub> in pipes, as well as the mathematical theory behind such models. He has contributed to the development of accurate and efficient numerical methods for solving model equations using a computer.

One of the principal motivations for the work was the desire to understand the phenomenon of running fractures in pipelines, so that such incidents can be avoided in an economically feasible way.



Professor Inge R. Gran at NTNU's Department of Energy and Process Engineering was principal tutor for the doctoral studies, assisted by Svend Tollak Munkejord, Chief Scientist at SINTEF Energy Research. Dr. Morin is employed as a research scientist at the Gas Technology Department, SINTEF Energy Research.

*PhD Alexandre Morin,  
SINTEF Energy Research*

## The 7th Trondheim CCS Conference

TCCS-7, or the 7th Trondheim CCS Conference, is staged June 4-6 2013 in Trondheim, and is organized by SINTEF and NTNU. Approximately 260 abstract are received, more or less level with 2011, indicating a solid interest also this time. The last conference had 425 participants.

All authors of oral and poster presentations are invited to submit full scientific papers for journal publication in Energy Procedia. Papers must be submitted by June 1, 2013.



More information and registration details can be found at:  
**Conference website: [www.sintef.no/tccs-7](http://www.sintef.no/tccs-7)**

### Contacts:

Centre Director, Mona Mølnevik, [mona.j.molnevik@sintef.no](mailto:mona.j.molnevik@sintef.no)  
Centre Manager, Rune Aarli, [rune.aarli@sintef.no](mailto:rune.aarli@sintef.no)  
Deputy Centre Manager, Jon Magne Johansen,  
[jonmagne.johansen@sintef.no](mailto:jonmagne.johansen@sintef.no)

## SINTEF and NTNU CCS Award

The second SINTEF and NTNU CCS Award will be presented at the TCCS-7. The Award is given to individuals for outstanding achievements within the field of carbon capture, transport and storage (CCS), and includes a stipendium of NOK 25,000, a plaque, and free participation at the next TCCS conference.



Award information and nomination form are found at the TCCS-7 Conference website. The deadline for nominations is April 20.

*Winner of the first SINTEF  
and NTNU CCS Award (2011),  
Dr. Erik Lindeberg,  
SINTEF Petroleum Research*

## Nordic CCS Summer School

With funding from Nordic Innovation and the Top-level Research initiative, NORDICCS stages the Nordic CCS Summer School 2013 from August 18 through 23.

The Summer School is a one-week intensive course in CO<sub>2</sub> capture, transport and storage, on the topic "CCS in the Nordic countries".

The course has a distinct industrial focus that will be ensured by involving lecturers from industry as well as a one-day excursion to the CO<sub>2</sub> capture plant at Technology Centre Mongstad (TCM).

The course is primarily intended for PhD/Post.doc students and industry researchers with CCS competence. However, students at the Master level can also apply. Applicants must be enrolled at a Nordic university or be working with a Nordic company.

The course will qualify for three academic credit hours, and requires an exam. Attendance is free of charge. The deadline for application is May 15 2013.

More information at: [www.sintef.no/NORDICCS/CCS\\_SummerSchool](http://www.sintef.no/NORDICCS/CCS_SummerSchool)

## Calendar of Events

- April 25: BIGCCS Board meeting at Mongstad, Norway
- May 15: BIGCCS Task Leader Seminar, Trondheim, Norway
- June 4-6: TCCS-7, Trondheim, Norway
- Aug. 18-23: NORDICCS CCS Summer School, Mongstad and Trondheim, Norway
- Sept. 25: BIGCCS Consortium Day 2013
- Sept. 26: BIGCCS PhD Seminar
- Sept. 26: BIGCCS General Assembly