

CO2 Emissions Reduction Strategies

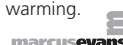
Carbon Capture and Storage: Opportunities and Challenges

Berlin, Germany

13th–14th
September 2007

“Carbon Capture and Storage: meeting the low carbon challenge and fighting climate change”

Oil companies and utilities must address the very real worries people have over the effects of global warming.



Attending this premier **marcusevans** conference will enable you to:

- Reduce carbon emissions through CO2 capture
- Hear about the EU's regulatory framework and funding opportunities for CCS
- Learn from the newest clean coal power plant projects and implementations
- Analyse different approaches to make plants capture-ready
- Discuss geological storage operations and projects as well as EOR through CO2

Benefit from Case Study Presentations by:

- **BP Alternative Energy** addressing BP's CO2 reductions programme and the Salah storage project
- **Hydro Oil and Energy** analysing CO2 capture from gas fired power plants
- **RWE Power** implementing an IGCC carbon capture and storage project
- **Enel Produzione** sharing their strategy for zero emission power generation
- **RWEnPower** assessing carbon capture options for new build pulverized coal fired power plants
- **Nuon** investing in the future with the multi-fuel IGCC power plant
- **Statoil**, discussing 10 Years of CO2 Storage at Sleipner

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In the Chair

Ulla Pettersson
Managing Consultant
E for Energy Management Consulting

Speakers Confirmed

Dr. Pierre Dechamps
DG Research – Energy Conversion
and Transport
European Commission

Dr. Carl-W. Hustad
President & CEO
CO2-Global AS, Norway

Henrik Solgaard Andersen
CO2 Capture R&D Manager
Hydro Oil and Energy – Norway

Iain W. Wright
CO2 Project Manager
BP Alternative Energy – UK

Dr. Frank Schwendig
Head of New Technologies Unit
RWE Power – Germany

Dr. Michael Whitehouse
Commercial Projects Co-ordinator, R&D Team
RWE Npower – UK

Dr. Pietro Barbucci
Head of Research Unit
Technical Area Research
Generation & Energy Management Division
Enel Produzione – Italy

Richard Beavis
Senior Process Engineer: CO2 Capture
HSE/Exploration & Production
Technology Group
BP – UK

Dr. Nick Riley MBE, C.Geol., FGS
CO2Geonet Co-ordinator
Head of Sustainable & Renewable Energy
British Geological Survey – UK

Rudolph Blum
General Manager, R&D
DONG Energy – Denmark

Prof. Erling Stenby
Chair of the IEA Collaborative
Project on EOR
Director of the Centre for Phase Equilibria
and Separation Processes
Technical University of Denmark

Nyame de Groot
VP Emissions Global Commodities
Essent Energy Trading – The Netherlands

Robert de Kler
Head Technology Development & Control
**Nuon Technical & Project
Development – The Netherlands**

Francisco García Berra
R&D Deputy Director
ELCOGAS – Spain

Dr. Ruud van den Brink
Manager Hydrogen Production
& CO2 capture
**ECN (Energy Research Centre
of the Netherlands)**

Dr. Jon Gibbins
Senior Lecturer, Energy Technology for
Sustainable Development Group
Imperial College London – UK

Dr. Ing. Tore A Torp
Adviser CO2 Storage, Research Centre
Statoil, Norway

Dr. Alfred Tacke
Chairman of the Managing Board
STEAG, Germany

Day 1

13th September 2007

Booking Line

Tel: +31 (0) 20 531 2800

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08:30 Coffee and Registration

09:00 Chair's Opening Remarks

Ulla Pettersson

Managing Consultant

E for Energy Management Consulting

ACHIEVING A CLEANER AND ENERGY EFFICIENT POWER PLANT

09:10 **Keynote Address**

European Commission Policy and Initiatives

- Role and scope of new technologies in the EU environmental policies
- EU ambitions and funding opportunities for research and development
- The greenhouse gas issue: EU policies and actions for zero emission coal plants
- International agreements: collaborating with emerging economies

Dr. Pierre Dechamps

DG Research – Energy Conversion and Transport

European Commission

CLEANER COAL TECHNOLOGIES

09:50 **CASE STUDY**

RWE's IGCC CCS Project – Strategy and Opportunities

- Achieving cleaner coal-fired power generation: where to invest?
- Learn how to optimise your investments in IGCC and gasification technologies
- CO2 capture: learning from an implementation strategy

Dr. Frank Schwendig

Head of New Technologies Unit

RWE Power – Germany

10:30 Morning Coffee

11:00 **CASE STUDY**

The Development of PF Fired High Efficiency Power Plant (AD700)

- High-efficiency coal-fired power plants development and perspectives
- Improved thermodynamic design combined with development and qualification of new nickel-based materials
- Enables steam parameters above 700 °C and 350 bar resulting in efficiencies of more than 50 %
- Describing the present state and future possibilities

Rudolph Blum

General Manager, R&D

DONG Energy – Denmark

11:40 **CASE STUDY**

Nuon Magnum Multi-Fuel IGCC Power Plant Project: Investing in the Future

- Electricity production sector in 20 years time: three possible scenarios, one flexible strategy
- Addressing sustainability: coal gasification technology and biomass
- Environmental performance and IGCC concept
- Flexibility, profitability and environmental performance
- Investigating options to apply the CO2 capture process to the newly designed IGCC

Robert de Kler

Head Technology Development & Control

Nuon Technical & Project Development – The Netherlands

12:20 **Case Study**

IGCC and CCS at Puertollano Plant

- Advantages and disadvantages of IGCC
- Ten years of experience of the largest coal based IGCC
- The benefits of CCS from IGCC

Francisco García Peña

R&D Deputy Director

ELCOGAS – Spain

13:00 Luncheon

14:00 Coffee and Networking

CARBON CAPTURE AND STORAGE TECHNOLOGIES AND PROJECTS

14:30 **Avoiding Carbon Lock for New Coal Power Plants – the Importance of Being Capture-Ready**

- New coal power plants, however efficient, risk locking us into perhaps 50 years of unacceptably-high emissions
- This can be avoided by making new plants capture-ready, so carbon dioxide capture and storage can be added in the future without unnecessary cost barriers
- Pulverised coal plants appear to be at least as suitable for retrofitting capture in the future as IGCC
- Discussing techniques to give pulverised coal plants a flexible capture-ready capacity that can take advantage of the latest technologies
- Developing retrofit capture technologies is also an essential part of a strategy to give rapid emission reductions in the 2020's

Jon Gibbins, Hannah Chalmers and Mathieu Lucquiaud

Energy Technology for Sustainable Development Group

Imperial College London – UK

15:10 **CASE STUDY**

A Practical Assessment of Carbon Capture Options for New Build Pulverised Coal-Fired Power Plant in the UK

- A description of RWE npower's feasibility study on carbon capture options for UK plant
- An operator's perspective on technical and economic issues for oxyfuel and post-combustion capture
- Identification of uncertainties and a description of future development strategy through to demonstration

Dr. Michael Whitehouse

Commercial Projects Co-ordinator, R&D Team

RWE Npower – UK

15:50 Afternoon Tea

16:20 **Novel Technologies for Pre-Combustion CO2 Capture**

- Developing novel technologies in this area (membrane reactors, sorption-enhanced reactions with integrated CO2 capture)
- Hardware development (membranes, catalysts, CO2 sorbents, reactors, etc.)
- Systems integration of these technologies in power plants (calculation of efficiency penalties and CO2 capture costs)

Dr. Ruud van den Brink

Manager Hydrogen Production & CO2 capture

ECN (Energy Research Centre of the Netherlands)

17:00 **CASE STUDY**

-30 % CO2 Emissions - High Efficiency Power Plants as the best Answer to Climate Change

- Walsum 10 / 750 MW / 800 million Euro: commercial operation 2010
- 2020 a new generation of power plants - efficiency above 50%
- Carbon sequestration not as successful: storage problems, loss of efficiency, public protest
- Expanding energy production from renewable energies: biomass, geothermal energy, biogas

Dr. Alfred Tacke

Chairman of the Managing Board

STEAG, Germany

17:40 **PANEL DISCUSSION**

Comparison of Carbon Capture and Sequestration with Renewable Energy Technologies

- Analysing structural and economical aspects
- Discussing the EU's perspective and incentives
- Examining the different ecological aspects

The panel will be joined by key speakers from the day

18:20 Chairperson's Closing Remarks and End of Day One

14th September 2007

08:30 Coffee and Registration

09:00 Chair's Opening Remarks

Ulla Pettersson

Managing Consultant

E for Energy Management Consulting**CARBON CAPTURE AND STORAGE TECHNOLOGIES AND PROJECTS**09:10 **CASE STUDY****BP's CO2 Reductions Programme**

- In Salah geological storage project (In Salah Gas Joint Venture's participants are BP, Sonatrach and Statoil)
- Industrial-scale integrated projects for power generation
- CO2 capture and storage at Peterhead (UK) and Carson (California)

Iain W. Wright

CO2 Project Manager

BP Alternative Energy09:50 **CASE STUDY****CO2 Capture from Gas Fired Power Plants**

- Covering pre-combustion, post-combustion and oxyfuel concepts for primarily gas fired power plants
- Definitions, technology options and economics
- Evaluation of carbon capture plant flexibility
- Technological and economic comparison of CO2 capture technologies including development and potential evaluations

Henrik Solgaard Andersen

CO2 Capture R&D Manager

Hydro Oil and Energy – Norway

10:30 Morning Coffee

11:00 **CASE STUDY****The FP6 CACHET Project – Sharing of Results from Year 1**

- Outlining project objectives, participants and work programme
- Highlighting results from experimental units constructed and operated in year 1
- Describing flowsheeting, optimisation and integration of the novel technologies under development
- Highlighting other technologies identified with a potential to meet the programme objectives
- Describing the work programme for the remaining 2 years

CACHET is a 3-year, integrated research project, funded by the European Commission that aims to develop technologies to reduce greenhouse gas emissions from power stations by 90%. The overall goal of the project is to develop innovative technologies for hydrogen production from natural gas, halving the cost of low-carbon energy. The hydrogen produced can be used to provide energy, with water as the only by-product.

Richard Beavis

Senior Process Engineer: CO2 Capture

HSE/Exploration & Production Technology Group

BP – UK11:40 **CASE STUDY****Enel's Strategy for Zero Emission Power Generation**

- Zero emission power generation from coal
- Analysing the zero micropollutant project, the CO2 post-combustion capture and sequestration demo project and the oxy-coal combustion project
- Power from hydrogen and innovative renewable technologies

Dr. Pietro Barbucci

Head of Research Unit, Technical Area Research, Generation & Energy Management Division

Enel Produzione – Italy**Business development opportunities**

Does your company have services, solutions or technologies that the conference delegates would benefit from knowing about? If so, you can find out more about the exhibiting, networking and branding opportunities available by contacting our sponsorship division.

Duncan Ellis on +31 205 31 2865,
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STORAGE OPTIONS AND ENHANCED OIL RECOVERY12:20 **Underground CO2 Storage: It's Already Happening**

- Existing CO2 underground storage operations
- Analysing lessons learnt so far
- What do we need to know?
- Managing risk
- Addressing regulatory issues
- How rapidly do we need to deploy new projects?
- What if we fail?

Dr. Nick Riley MBE, C.Geol., FGS

CO2Geonet Co-ordinator

Head of Sustainable & Renewable Energy

British Geological Survey – UK

13:00 Luncheon

14:00 Coffee and Networking

14:30 **CASE STUDY****10 Years of CO2 Storage at Sleipner - We Know it is Safe How?**

- The Sleipner field - Why capture the CO2
- 1 Mt CO2 stored yearly under European R&D scrutiny
- Outcome of the 11 years of injection and R&D
- What else and next from Statoil?

Dr. Ing. Tore A Torp

Adviser CO2 Storage, Research Centre

Statoil, Norway15:10 **CO2 for EOR – Do's and Don'ts**

- Analysing what is possible and what is dangerous from a technological point of view
- Opportunities and risks associated with this technology
- Addressing cost issues

Prof. Erling Stenby

Chair of the IEA Collaborative Project on EOR

Director of the Centre for Phase Equilibria and Separation Processes

Technical University of Denmark

15:50 Afternoon Tea

16:20 **CO2 for EOR in the North Sea (CENS) Present Status and Future Roadmap**

- Historical perspective: early concepts for a CO2 transportation infrastructure and barriers to implementation
- Present project status: status of the CO2 business today, feasibility studies, investment decisions and the emerging regulatory and commercial framework
- The business case for CO2-EOR in the North Sea
- Strategy for phased deployment of a CO2 infrastructure

Dr. Carl-W. Hustad

President & CEO

CO2-Global AS, Norway**THE REGULATORY FRAMEWORK**17:00 **CASE STUDY****Are sustainability and CSR the Triggers to the Voluntary and Mandatory Markets to Merge after 2012?**

- Differences / similarities voluntary and mandatory markets
- How will the voluntary market become more transparent, credible and standardised
- Overcoming the challenges of sustainability and real reductions vs economic optimisation
- Will sustainability and CSR (corporate social responsibility) bring the voluntary and mandatory market together and create market differentiation by technology / methodology?
- How does Essent deal with voluntary and mandatory markets and sustainability in particular

Nyame de Groot

VP Emissions Global Commodities

Essent Energy Trading – The Netherlands17:40 **PANEL DISCUSSION****Attendees will have the opportunity to raise questions about the presentations of the day for an open debate**

- Discussing the perception of the general public
- Public awareness and acceptance
- Seeking government assistance and contributions from the authorities

The panel will be joined by key speakers from the day

18:10 Chairperson's Closing Remarks and End of Conference