

# GEO ENeRGY

Promoting *R&D capability* in the service of European Industry

## CO2NET EAST – Expansion of European Carbon Dioxide Knowledge Transfer Network

On 1<sup>st</sup> May 2004, the EU was enlarged to current 25 member states and a further enlargement (to 27 members) will take place on 1<sup>st</sup> January 2007. This enlargement has further intensified the challenge of reducing CO<sub>2</sub> emissions in Europe. The Kyoto Protocol obligates the EU to cut CO<sub>2</sub> emissions by 8 % by 2008–2012 (compared to 1990) and larger reductions may be required thereafter. At the same time energy demand is rising and our reliance on fossil fuels is unlikely to diminish in the near future. As a result of this paradox, the big challenge is to reduce carbon dioxide emissions from fossil fuels using CO<sub>2</sub> capture and geological storage (CCS), a technology capable of making huge cuts in CO<sub>2</sub> emissions to atmosphere in the near future.

CO2NET EAST is a new project co-funded by the European Commission within the 6th Framework Programme (FP6). It is a Co-ordination Action proposed as a mechanism to involve the new EU Member States and Associated Candidate Countries in the current European CCS networking activities, particularly in the existing Carbon Dioxide Knowledge Transfer Network (CO2NET), which was initiated and funded by the EC 5th Framework Programme as the leading European CCS networking forum.

CO2NET EAST will contribute to the European CCS networking by:

- Providing membership support to new CO2NET member organisations from EU new Member States and Associated Candidate Countries to enable them actively participate in annual seminars and other networking activities;
- (Co-)organising several CO2NET events (seminar, workshops) in new Member



- Disseminating knowledge and raising awareness of CO<sub>2</sub> capture and storage technologies in new Member and Candidate Countries;
- Establishing links amongst CCS stakeholders in new Member and Candidate Countries and with other EU countries using the existing

networks, i.e. CO2NET, ENeRG and links with the Technology Platform for Zero Emission Fossil Fuel Power Plants.

The project will be built on East-West cooperation, helping the new Member States to add to the co-ordination effort to fast-track the development

and commercialisation of CCS technology for Europe.

CO2NET EAST was started on 1 October 2006 for a period of 3 years. The project consortium is composed of 7 R&D institutions representing 5 new EU Member States and 2 Associated Candidate Countries + 1 strong industrial partner (Statoil) responsible for mainly organisational tasks. The 7 Central & Eastern European partners are:

- Czech Geological Survey (Czech Republic – project co-ordinator)
- University of Zagreb - Faculty of Mining, Geology and Petroleum Engineering (Croatia)
- Eötvös Loránd Geophysical Institute (Hungary)
- Dionýz Štúr State Geological Institute (Slovakia)
- Institute of Geology at Tallinn University of Technology (Estonia)
- PBG - Geophysical Exploration Company (Poland)
- National Institute for Marine Geology and Geoecology (Romania)

These institutions can be designated as the pioneers in implementing the CO<sub>2</sub> capture and storage concept in their countries. They are also representing their countries in ENeRG, where their mutual cooperation resulted in the development and submission of this proposal.

The EC funding was used to initiate the project where further industrial sponsors will be sought. The industrial funds will be used to encourage participation of more stakeholders from new EU Member States and Associated Candidate Countries (in addition to project consortium members), especially SMEs, research institutions, universities and governmental bodies, in European CCS networking activities.

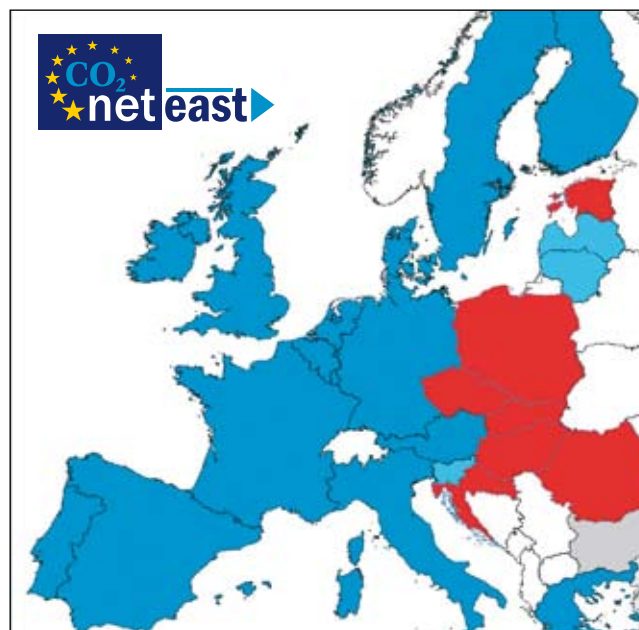
Vit Hladik

### CO2NET EAST workshop

Introduction to Carbon Capture  
and Storage Principles

27–28 February 2007, Zagreb, Croatia

<http://www.co2neteast.rgn.hr>

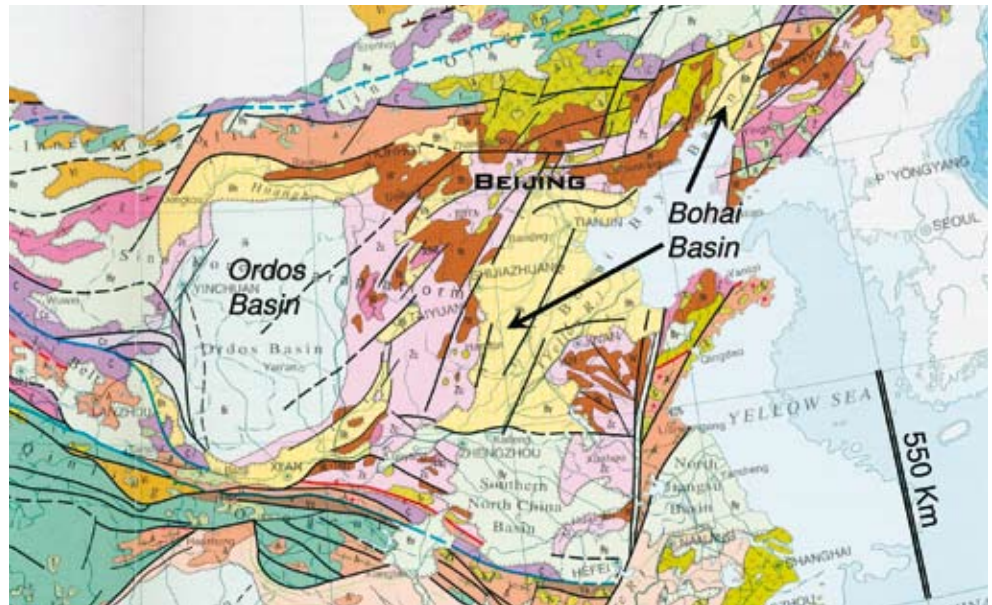


Geographic impact of CO2NET EAST

# Cooperation with China on CO<sub>2</sub>

## New China – EU/UK initiatives

An international workshop on 'Near Zero Emission Coal-Power Generation with CO<sub>2</sub> Capture and Storage in China' was held in Beijing in early July 2006. The workshop was attended by more than 80 Chinese representatives, 70 European participants and 5 scientists from APEC (the Asia-Pacific Economic Cooperation). The workshop was organised jointly by the UK (DEFRA and DTI), China's Agenda 21 Centre and the EU. The meeting, which was the biggest event on CCS so far in China, considered the potential for CO<sub>2</sub> capture and storage in the Chinese power sector. The first day of the workshop was dedicated to a wide range of technical presentations, while day two comprised a number of syndicate exercises aimed at identifying the needs required for an assessment of China's CCS potential as well as identifying priorities for China/UK/EU cooperation. Representatives from British government organisations announced a new bilateral near-zero Emission initiative. This will be coordinated with



Tectonic setting of the Bohai Basin in the Chinese geological context [source: Ren Jishun and Liu Zhigang (2002) – Tectonics of China, in Geological Atlas of China, compiled by Ma Lifang et al. Geotectonic map of China p. 38–39. Geological Publishing House, Beijing]

EU activities, such as the new COACH (Cooperation Action within CCS China-EU) project. This project will cover cooperation on CCS issues as well as education and training. The project will be initiated

in Beijing in November 2006 and will probably focus on the geology of the Ordos Basin.

**Initiating the EU GeoCapacity project in China**  
The EU GeoCapacity FP6

project started earlier this year. The Chinese participants are Tsinghua University, Beijing (the 3E Energy Institute in collaboration with Institute for Geology and Geophysics) while BRGM and GEUS are the EU partners. The objective of the EU GeoCapacity project is to conduct assessment of regional and local potential for geological storage of CO<sub>2</sub> in a number of countries, and initiate collaboration with China. Due to its proximity to Beijing, the Bohai Basin was chosen for a basin scale pilot study. This basin, with a size of 800 × 300 km, is centred on the Bohai Bay, and locally sediment thicknesses may reach 8000 m. The Bohai Basin extends over five administrative provinces and it is the catchments area of two major rivers. The database inventory of major CO<sub>2</sub> emission point sources is now in progress. In the near future, storage capacity will be examined and as part of the project work, a number of training courses are planned in Beijing.

Niels Peter Christensen  
(GEUS, Denmark) and  
Yves-Michel Le Nindre  
(BRGM, France)



Photo Jens Hetland (SINTEF)

## ENeRG – European Network for Research in Geo-Energy

### ENeRG president

ENeRG president for 2006 is Dr. Ludovit Kucharic from Dionyz Stur State Geological Institute, Bratislava, Slovakia. Contact: [kucharic@geology.sk](mailto:kucharic@geology.sk)

**ENeRG secretariat** is run by Dionyz Stur State Geological Institute, Bratislava, Slovakia. Contact person: Dr. Julia Kotulova <[kotulova@gssr.sk](mailto:kotulova@gssr.sk)>

**ENeRG website:** <http://www.energnet.com> is maintained by National Institute for Marine Geology and Geoecology – GeoEcoMar, Bucharest, Romania. Contact person: Dr. Andrei Oltean <[andrei@nextnet.ro](mailto:andrei@nextnet.ro)>

### ENeRG Newsletter – GEO ENeRGY

The Newsletter is published by Czech Geological Survey (CGS), Prague, Czech Republic

Editor: Dr. Vít Hladík <[hladik@gfb.cz](mailto:hladik@gfb.cz)>

Layout: Hana Převrátilová

Computer typesetting: Petr Maděra

Language review: Fatosh Gozalpour & Patrick Corbett (Heriot-Watt University)



# Alternative Energy Resources, Mitigation of the Environmental Impact, through Methane Extraction in the Mecsek Mountains Coal Seams (Hungary)

Alternative energy resources such as coalbed methane (CBM) increasingly become important world-wide due to the depletion of fossil fuel resources and high oil price. Methane extraction from coal seams has now reached an industrial scale. The classical CBM extraction method is co-production of methane gas and groundwater. A higher efficiency (> 50 %) can be achieved with new innovative methods, such as CO<sub>2</sub>-ECBM (methane production from coal seams enhanced by CO<sub>2</sub> injection), which is near to commercial scale application in the USA and Canada. A version of this method is the injection of flue gas emitted by power plants, where CO<sub>2</sub> component of the flue gas remains underground absorbed by the coal, driving methane out from the coal structure into the cleat system. In this process the methane production as a source of energy can be coupled with the

storage of CO<sub>2</sub> (a greenhouse gas).

We plan to adapt and test this process in the abandoned stopes and virgin coal complexes of the Mecsek coal field using flue gas from the Pecs thermal power plant in Hungary. This will be the first CO<sub>2</sub> storage pilot project in Hungary. The Mecsek coal field is the largest hard coal complex in Hungary, with a coal reserve of 980 million tonnes, and recoverable gas reserve of about 28.5 billion cu.m. The Rotaqua Ltd., GreenLab Ltd., Pannon Thermal Power Plant ZRt., University of Miskolc and ELGI participate in the consortium. The micro-pilot approach will be used in this project, where the same well (bore hole) will be employed for initial flue gas injection and later methane production. Two test boreholes will initially be drilled and the gained experience will be used for more elaborated multi-hole pilot tests.

The success of this project in storing CO<sub>2</sub> will help Hungary to meet its commitment under the Kyoto Protocol. Furthermore, this project is in line with the air pollution prevention programme of the European Union. This

project is managed by the Rotaqua Ltd and national R&D grants are also being sought for the basic and applied research stages of the programme.

*Janos Foldessy  
(University of Miskolc, Hungary)*



Location map of the test site, the numbered polygons are the methane exploration blocks

## National CCS Projects in Germany

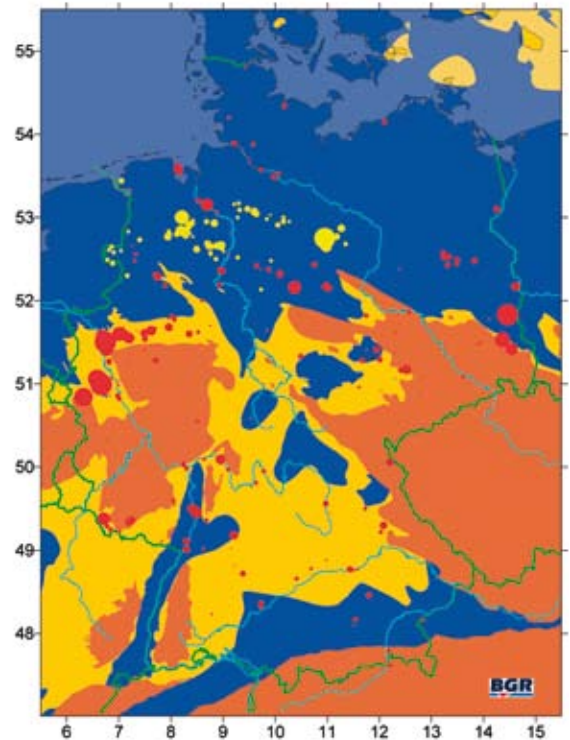
The National Climate Protection Programme 2005 of the German federal government (<http://www.bmu.de/english/climate/downloads/doc/35833.php>) contains various measures to reduce CO<sub>2</sub>-emissions. Though CCS is not listed among the measures at present, the government has recognized the potential of CCS for further necessary emission reductions. Thus, two programmes have been launched to support research and development activities for CO<sub>2</sub> emission reduction, capture and storage.

The COORETEC programme is dedicated to the development of new power plants with reduced emissions. Emission reduction shall be achieved by efficiency improvements of existing technologies and also through novel power plants including capture and storage of CO<sub>2</sub>. The COORETEC programme is co-ordinated by the Federal Ministry of Economics and Technology. Further information can be obtained at <http://www.fz-juelich.de/pti/projekte/index.php?index=1365>.

Within the Geotechnologien programme, jointly financed by the German research

foundation DFG and by the Federal Ministry of Education and Research, one research theme "Investigation, Use and Protection of the Underground" is mainly dedicated to geoscientific research on underground storage options for CO<sub>2</sub>. The ten joint research projects cover a variety of topics. Mature gas fields and aquifers are a promising option for CCS. Basic research is dedicated to some options with possible future storage potential, or options with additional benefits: enhanced gas recovery, storage in abandoned coal mines or sulphate formations, acid mine water treatment, and microbial conversion of CO<sub>2</sub> in depleted gas reservoirs. Several projects are dedicated to the development of geotechnical methods and devices for CO<sub>2</sub> monitoring and safe storage operation. Further information on the programme can be obtained at <http://www.geotechnologien.de>.

Apart from national programmes, several companies are preparing projects to capture and store CO<sub>2</sub> onshore in Germany. Vattenfall has started building a 30 MW oxy-fuel pilot plant, yet without storage. Large-scale power plants with CCS should follow by 2015 to 2020. RWE announced



Sedimentary basins (blue) and natural gas reservoirs (yellow) with CO<sub>2</sub> storage potential in Germany. CO<sub>2</sub> storage is not suitable in areas with alpine and variscan basement (brown) covered by less than 1 km of sediments (ochre). Large industrial point sources are shown in red.

plans building a 450 MW IGCC power plant that should be ready for capture and storage of CO<sub>2</sub>

by 2014. Another demo project has been announced by E.ON.  
*Franz May*

# ACCSEPT: Acceptance of CO<sub>2</sub> Capture, Storage Economics, Policy and Technology

The overall aim of the FP6 ACCSEPT project is to contribute to the timeliness and responsible application of CCS in the EU region. Objectives of the project are assessing EU social acceptance of CCS and assisting the establishment of CCS guidelines for the EU Emission Trading Scheme (ETS) and other regulatory instruments. Furthermore the project is identifying and addressing gaps in existing socio-economic studies.

ACCSEPT (coordinated by DNV) started in January 2006.

An initial review was published in the spring of 2006, which included legal, regulatory, economic, social and cross-cutting issues. The report serves as a preliminary gap analysis in the project (<http://www.ecn.nl/publications/default.aspx?nr=ECN-C--06-026>). The project has also developed a user survey in cooperation and dialogue with a set of tier 1 stakeholders. The dialogue ensures relevant and optimal results. The survey (in English) is available at [www.accsept.org](http://www.accsept.org) and it can be accessed until end of December 2006.

(It is appreciated if you can participate. More responses will improve our basis and analysis for future work.)

In assessing social acceptance a set of ideal "end images" will be constructed that constitute the main components of a working regulatory regime for CCS in Europe.

ACCSEPT will produce recommendations for guidelines as frameworks are required to provide society with the long-term assurance that CCS is being implemented and

followed up in a responsible and safe fashion.

The gap analysis will focus on how different regimes can be rendered optimal under different future energy scenarios; the current and potential deficiencies in key thematic areas (e.g. excessive costs, lack of private sector investment, environmental risks, negative perceptions, etc.) that impede the realisation of the optimal regime.

Contact: Ole Andreas Flagstad ([ole.andreas.flagstad@dnv.com](mailto:ole.andreas.flagstad@dnv.com))

## ENeRG Prize Winners

At the EAGE/EUROPEC meeting in Vienna, the ENER organization gave two student prizes worth € 1000 for contributions to improving the understanding of subsurface science and engineering for Geoenergy applications. Francois Schaub (Ecole des Mines de Paris) won the prize for best paper with his contribution: "Geostatistical Impedance Simulation after

Pre-Stack Depth Migration". Milana Ayzenberg (NTNU, Trondheim) won the prize for best poster with her contribution: "3D Diffraction Modelling in Multilayered media in terms of Surface Integrals". The ENeRG Network will be offering the same prizes at the EAGE/EUROPEC meeting in London in June 2007.

Patrick Corbett

## The ENeRG Network

### Country representatives

#### AUSTRIA

Prof Karl Millahn  
University of Leoben  
[karl.millahn@mu-leoben.at](mailto:karl.millahn@mu-leoben.at)

#### BULGARIA

Prof Georgi V. Georgiev  
Sofia University  
[ggeor@gea.uni-sofia.bg](mailto:ggeor@gea.uni-sofia.bg)

#### BOSNIA AND HERZEGOVINA

Prof Hazim Hrvatovic  
Zavod za geologiju Sarajevo  
[zgeolbih@bih.net.ba](mailto:zgeolbih@bih.net.ba)

#### CROATIA

Prof Bruno Saftic  
University of Zagreb  
[bsaft@rgn.hr](mailto:bsaft@rgn.hr)

#### CZECH REPUBLIC

Dr Vit Hladik  
Czech Geological Survey (CGS)  
[hladik@gfb.cz](mailto:hladik@gfb.cz)

#### DENMARK

Niels Peter Christensen  
Geological Survey of Denmark and Greenland (GEUS)  
[npc@geus.dk](mailto:npc@geus.dk)

#### ESTONIA

Dr Alla Shogenova  
Tallinn University of Technology  
[alla@gi.ee](mailto:alla@gi.ee)

#### FRANCE

Georges D. Mosditchian  
Institut Francais du Pétrole (IFP)  
[georges.mosditchian@ifp.fr](mailto:georges.mosditchian@ifp.fr)

#### GERMANY

Dr Bernhard Cramer  
Federal Institute for Geosciences & Natural Resources (BGR)  
[b.cramer@bgr.de](mailto:b.cramer@bgr.de)

#### GREECE

Dr George H. Hatziyannis  
Institute of Geology & Mineral Exploration (IGME)  
[ghatziyannis@igme.gr](mailto:ghatziyannis@igme.gr)

#### HUNGARY

Endre Hegedüs

Eötvös Lorand Geophysical Institute (ELGI)  
[hegedus@elgi.hu](mailto:hegedus@elgi.hu)

#### ITALY

Ing Sergio Persoglia  
National Institute of Oceanography and Experimental Geophysics (OGS)  
[spersoglia@ogs.trieste.it](mailto:spersoglia@ogs.trieste.it)

#### LITHUANIA

Dr Saulius Sliupa  
Institute of Geology and Geography  
[sliupa@geo.lt](mailto:sliupa@geo.lt)

#### THE NETHERLANDS

Chris te Ströet  
Netherlands Institute of Applied Geoscience TNO – National Geological Survey  
[chris.testroet@tno.nl](mailto:chris.testroet@tno.nl)

#### NORWAY

Prof Jan-Erik Karlsen  
International Research Institute of Stavanger (IRIS)  
[jek@irisresearch.no](mailto:jek@irisresearch.no)

#### POLAND

Dr Adam Wojcicki  
PBG – Geophysical Exploration Company  
[wojcicki@waw.pdi.net](mailto:wojcicki@waw.pdi.net)

#### PORTUGAL

Virgilio Cabrita da Silva  
Ministry of Economical Activities and Work – Directorate General for Geology and Energy  
[virgilio.cabrita@dge.pt](mailto:virgilio.cabrita@dge.pt)

#### ROMANIA

Dr Constantin S. Sava  
National Institute for Marine Geology and Geoecology – GeoEcoMar  
[savac@geoecomar.ro](mailto:savac@geoecomar.ro)

#### SERBIA

Dr Snezana Komatina-Petrovic  
Geophysical Institute, NIS-Naftagas  
[unabojan@eunet.yu](mailto:unabojan@eunet.yu)

#### SLOVAKIA

Dr Ludovit Kucharic  
Dionyz Stur State Geological Institute  
[kucharic@geology.sk](mailto:kucharic@geology.sk)

#### SLOVENIA

Marjeta Car  
GEOINŽENIRING d.o.o.  
[m.car@geo-inz.si](mailto:m.car@geo-inz.si)

#### SPAIN

Roberto Martinez Orio  
Geological and Mining Institute of Spain (IGME)  
[ro.martinez@igme.es](mailto:ro.martinez@igme.es)

#### UK – England

Dr Nick Riley  
British Geological Survey  
[njr@bgs.ac.uk](mailto:njr@bgs.ac.uk)

#### UK – Scotland

Dr Fatosh Gozalpour  
Heriot-Watt University  
[fatollah.gozalpour@pet.hw.ac.uk](mailto:fatollah.gozalpour@pet.hw.ac.uk)

#### Other members

AGH University of Science and Technology (Poland)

Albanian Geological Survey (Albania)

ARMINES (France)  
Chalmers University of Technology (Sweden)

Christian-Albrechts-University Kiel (Germany)

ENERGI E2 A/S (Denmark)

ERICo Velenje (Slovenia)

Freie Universität Berlin (Germany)

Gasunie Trade & Supply (The Netherlands)

Geological Survey of Montenegro (Montenegro)

Geophysical Institute of the

Academy of Sciences

of the Czech Republic

(Czech Republic)

Groupement Europeen de

Recherches Technologiques sur les Hydrocarbures – GERTH (France)

Hellenic Petroleum S.A. (Greece)

Hungarian Geological Survey (Hungary)

Institute for Mining, Geotechnology and Environment – IRGO (Slovenia)

Instituto Superior de la Energía (Spain)

KEANE Offshore Integrity Ltd. (Ireland)

MEERI PAS (Poland)

Miligal, s. r. o. (Czech Republic)  
National Observatory of Athens (Greece)

National Technical University of Athens (Greece)

Odegaard A/S (Denmark)

PETROM – Geological Exploration Research and Design Center (Romania)

Polish Geological Institute (Poland)

Premogovnik Velenje d.d. (Slovenia)

Robert Gordon University (UK)

Romanian Academy – „Sabba

S. Stefanescu“ Institute of

Geodynamics (Romania)

RTH – Rudnik Trbovlje-Hrastnik

d.o.o. (Slovenia)

Technical University Clausthal

(Germany)

Technical University of Denmark

(Denmark)

University of Aberdeen (UK)

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(Serbia)

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University of Ljubljana (Slovenia)

University of Milano (Italy)

University of Patras (Greece)

University of Pisa (Italy)

University of Porto (Portugal)

University of Trieste (Italy)

Vrije University Amsterdam

(The Netherlands)