



# CO2NET EAST

**CO2 capture and storage networking extension  
to new member states**

**EU FP6 CO-ORDINATION ACTION**

**Vít Hladík – Czech Geological Survey**

[www.geology.cz](http://www.geology.cz)



**Česká geologická služba**

**1**



## Main objective

- *to extend the existing European CO<sub>2</sub> capture and storage (CCS) networking activities to EU new Member States and Associated Candidate Countries*

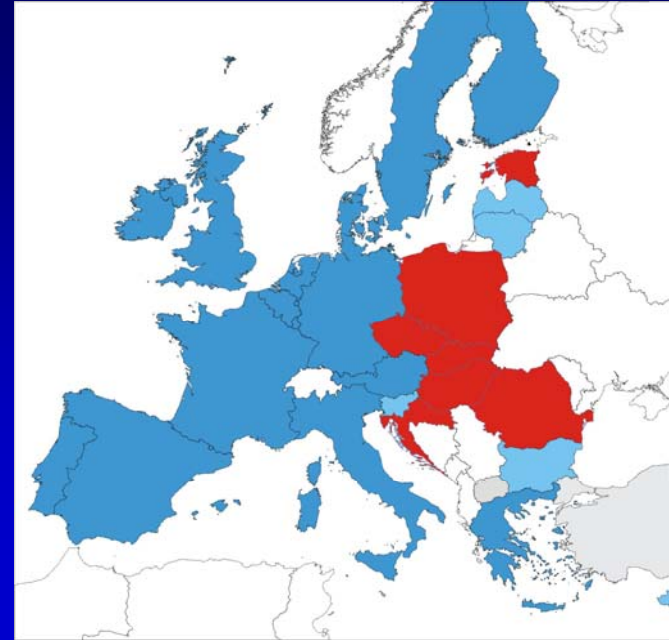


## PROJECT OVERVIEW

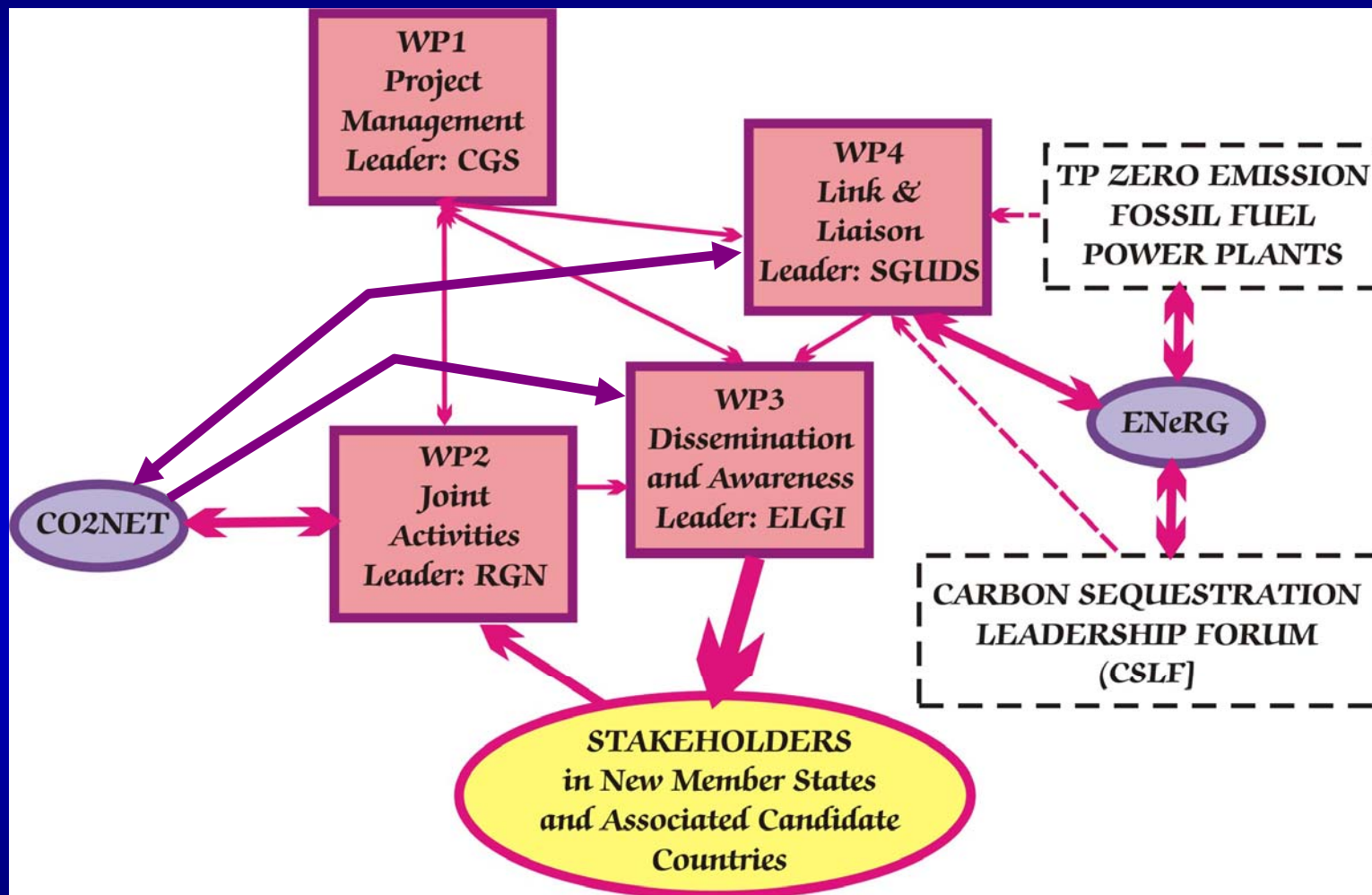
- Budget 320 000 €+ Support Fund (filled by sponsors)
- EC funding 294 000 €
- Project duration 36 months
- Project starting date 1 October 2006

## Project consortium:

1. Czech Geological Survey  
(Czech Republic)
2. University of Zagreb - Faculty of  
Mining, Geology and Petroleum  
Engineering (Croatia)
3. ELGI - Eötvös Loránd Geophysical Institute (Hungary)
4. Dionýz Štúr State Geological Institute (Slovakia)
5. Institute of Geology, Tallinn University of Technology (Estonia)
6. PBG - Geophysical Exploration Company (Poland)
7. GeoEcoMar - National Institute for Marine Geology and  
Geoecology (Romania)
8. StatoilHydro (Norway)



# Project scheme





## WP2 – Joint activities

### CO2NET EAST WORKSHOPS:

- Zagreb (Croatia) – 27-28 February 2007
- Bratislava (Slovakia) – 3-4 March 2009

CO-ORGANISATION OF THE CO2NET ANNUAL SEMINAR IN 2008 (Warsaw, 46 participants from New Member States and Candidate Countries)

SUPPORT FOR CO2NET MEMBERS FROM NEW MEMBER STATES AND CANDIDATE COUNTRIES

## CO2NET EAST WORKSHOP ZAGREB FEBRUARY 2007

- 91 participants from 22 countries, predominantly from New Member States and Candidate countries
- 24 presentations by „top“ speakers incl. EC and representatives of big EC-funded CCS projects, attended by comprehensive discussions
- press conference
- broadcast on CCS in Croatian radio



# CO2NET EAST SUPPORT FUND

- run in parallel to the project, not as its direct part
- filled by sponsors
- supporting CO2NET members from New Member States and Candidate Countries by:
  - covering membership & seminar fees
  - supporting travel to CO2NET & CO2NET EAST events

Main sponsors:



Sponsors:





# LIST OF ASSOCIATED PARTNERS

Institution	Type of institution	Seat	Country
Central Mining Institute	R&D	Katowice	Poland
Polish Academy of Sciences - Mineral and Energy Economy Research Institute	R&D	Krakow	Poland
Miligal s.r.o.	SME	Brno	Czech Republic
GIS-GEOINDUSTRY, s.r.o.	SME	Prague	Czech Republic
SC NHN Ecoinvest SRL	SME	Bucharest	Romania
Wroclaw University of Technology - Mechanical and Power Engineering Faculty	University	Wroclaw	Poland
Polish Academy of Sciences - Institute of Chemical Engineering	R&D	Gliwice	Poland
GEONZENIRING d.o.o.	SME	Ljubljana	Slovenia
Sofia University, Dept. of Geology	University	Sofia	Bulgaria
Institute of Geology and Geography	R&D	Vilnius	Lithuania
Middle East Technical University, Dept. of Petroleum and Natural Gas Engineering	University	Ankara	Turkey
Latvian Environment, Geology and Meteorology Agency	Governmental	Riga	Latvia
National Research and Development Institute for Energy ICEMENERG	R&D	Bucharest	Romania

- **13 institutions from 8 New Member States and Candidate Countries**
- **help to extend CO2NET EAST activities to countries not represented in the Consortium (Slovenia, Bulgaria, Lithuania, Latvia, Turkey)**
- **bring additional expertise (CO2 capture etc.)**





## WP3 – Dissemination & Awareness

- presentations of latest CCS R&D achievements at suitable local events (professional meetings and workshops with focus on CO<sub>2</sub> emissions, climate change, environmental geology, etc.) and to national decision makers (Ministries of Environment, big national CO<sub>2</sub> emission producers, national hydrocarbon companies, etc.)
- consultations with regulators
- publications in national technical journals and media
- translation of the CO<sub>2</sub>NET public brochure to national languages and its publication & dissemination
- national websites on CCS (in national languages)



## CO2NET EAST national websites



<http://www.geology.cz/co2net-east>



[http://www.pbg.com.pl/CO2\\_net\\_east.htm](http://www.pbg.com.pl/CO2_net_east.htm)



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



<http://www.gi.ee/co2net-east>



[www.elgi.hu/co2net\\_east/index.htm](http://www.elgi.hu/co2net_east/index.htm)



<http://www.geology.sk/co2neteast/co2net-east.htm>



<http://www.co2net.ro>



<http://www.gi.ee/co2net-east/r>



<http://nis-su.uni-sofia.bg/co2net-east>

# CO2NET EAST national websites

www.geology.cz

**CO<sub>2</sub>netromania**

**PORTAL DE INFORMARE ASUPRA TEHNOLOGIILOR DE CAPTARE ȘI STOCARE A CO<sub>2</sub>**

Bine ați venit la portalul național românesc de informare asupra tehnologiilor de captare și stocare a CO<sub>2</sub>. Acest portal este operat de GeoEcoMar în cadrul proiectului CO2NET EAST . . .

**Captarea și stocarea CO<sub>2</sub>** (CO<sub>2</sub> capture and storage - CCS) reprezintă una dintre cele mai promițătoare opțiuni de reducere a încălzirii globale și a modificărilor climatice asociate. Puteți găsi mai multe informații asupra tehnologiilor CCS [aici](#).

CO<sub>2</sub>NET EAST este o acțiune de coordonare co-finanțată de Comunitatea Europeană în cadrul celui de al 6-lea Program Cadru de activități de cercetare, dezvoltare tehnologică și demonstrații. Principalul obiectiv al proiectului este extinderea activităților de cercetare asupra etelode captare și stocare a CO<sub>2</sub> în noile st

**News**  
 Premiul Nobel pentru pace 2007 decernat pentru acțiuni legate de stoparea încălzirii globale  
 Noutăți de la Carbon Sequestration Leadership Forum  
 Platforma tehnologică de Centrale pe bază de combustibili fosili dar cu

Sponsorii principali:  
 Shell, STATOIL, Schlumberger HYDRO

Sponsorii:  
 bp, ALSTOM, VATTENFALL, TOTAL

Strânky  
 Přílohy  
 Poznámky

Centralele electrice și de termoficare și/sau de producere a H<sub>2</sub> pot utiliza combustibilii fosili și biomasă. Recupărarea secundară cu CO<sub>2</sub> a fost aplicată în SUA timp de câțiva ani, dar nu în scopul stocării CO<sub>2</sub>, ci pentru a crește producția de petrol. În Canada, injecția de gaz acid (un produs rezidual obținut din rafinarea

Diagrama prezintă un proces de producere a energiei și stocare de CO<sub>2</sub>. Arată un flux de combustibil (fosil și biomasă) către o centrală electrică și de termoficare, care produce electricitate și căldură. Căldura este utilizată pentru producerea de combustibil H<sub>2</sub>. CO<sub>2</sub> este captat și stocat în rocă acoperis (Gresie) prin monitorizarea suprafeței și transportului de fluid prin geofizică de sondă.

Česká geologická služba



# CO2NET EAST national websites

www.geology.cz

Adresa <http://www.gi.ee/co2net-east/r/>

**CO2NET EAST**

Home Projekt Novinky **Kalendář** Odkazy Ke stažení Diskusní fórum Partners only Slovníček pojmů Hledat Napište nám

**3. výroční evropská konference o zachytávání a ukládání CO2**  
Pořádá firma Platts; 26.-27. února, Brusel, Belgie

**2. workshop CO2NET EAST o zachytávání a ukládání CO2**  
'Zachytávání a ukládání CO2 - odpověď na změnu klimatu' - workshop pro zájemce z nových členských a kandidátských zemí EU; 3.-4. března 2009, Bratislava, Slovensko

**CO2 GeoNet Open Forum**  
Otevřený seminář Evropské sítě excelence pro geologické ukládání CO2; 18.-20. března 2009, Benátky, Itálie

**EGU 2009**  
Valné shromáždění Evropské geovědní unie; programová část 'Energie, zdroje a životní prostředí' obsahuje několik sekcí zaměřených na CCS, jako např. 'Dlouhodobé ukládání CO2 v geologických systémech', 'Geofyzikální metody aplikované na geologické ukládání CO2' nebo 'První evropské pevninské úložiště CO2 v Ketzinu'; 19.-24. dubna 2009, Vídeň, Rakousko.

**15. evropské sympóziu o intenzifikaci těžby ropy**  
Pořádá EAGE; program obsahuje 3 sekce zaměřené na CO2-EOR; 27.-29. dubna 2009, Paříž, Francie

**5. kongres Balkánské geofyzikální společnosti - 'Geofyzika na křižovatce'**  
Mezinárodní konference a výstava; zahrnuje speciální sekci 'Změna klimatu a její zmírnění - CCS'; 10.-13. května 2009, Bělehrad, Srbsko

**4. mezinárodní konference o čistých uhelných technologiích pro naši budoucnost**  
18.-20. května 2009, Drážďany, Německo

**Zachytávání a ukládání CO2: Od snu k realitě**  
XII. konference cyklu Cathala-Letort, pořádaná Société Française de Génie des Procédés; 25.-26. května 2009, Lyon, Francie

**Hlubinné slané akvifery pro geologické ukládání CO2 a energii**  
Mezinárodní konference pořádaná Institute Francais du Petrol; 27.-29. května 2009, Rueil-Malmaison, Francie

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# CO2NET EAST national websites

www.geology.cz

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**Links**

This page maps information sources on the Internet linked to CO2 capture and its storage in suitable geological structures, links to related projects and other relevant websites.

**European Union**

[European Commission - Energy Research](#)  
EC information pages on energy related research; section Sustainable Energy Systems contains subsection CO2 Capture and Storage.

[European Commission - Directorate-General for Energy and Transport](#)  
DG TREN pages, section Energy contain a lot of information in the subsections Coal / Oil / Gas / Electricity / Nuclear energy / New and renewable energy sources / Energy Efficiency. In subsection Coal you can find information on ?Clean Coal technologies?.

[European Commission - Directorate-General for Environment - Climate Change](#)  
DG Environment pages contain a lot of information on climate change and important links, i.a. to the European Emission Trading pages, etc.

[European Climate Change Programme II](#)  
Document library of ECCP II Working Groups, incl. WG3 - CO2 Capture and Geological Storage?.

[6th EC Framework Programme \(2002-2006\)](#)  
Pages of the 6th Framework Programme of the EC for research, technological development and demonstration activities (FP6).

[7th EC Framework Programme \(2007-2013\)](#)  
Pages of the newly launched 7th Framework Programme of the EC for research, technological development and demonstration activities (FP7).

[European Technology Platform on Zero Emission Fossil Fuel Power Plants](#)  
Website of ZEP ETP, which represents a common vehicle of the EC, industry, research institutions and NGOs for defining and deployment of the European R&D strategy in the field of zero-emission power generation, incl. CO2 capture and storage.

[European Commission - website on CO2 capture and storage](#)  
EC website dedicated to CCS with sections "What is CCS ?" and "CCS in Europe"

**Global programmes and initiatives**

[Intergovernmental Panel on Climate Change \(IPCC\)](#)  
Intergovernmental Panel on Climate Change (IPCC) has been established by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) to assess scientific, technical and socio- economic information relevant for the understanding of climate change, its potential impacts and options for adaptation and mitigation.

**News**

News from CSLF

[Drilling programme for CO2SINK project completed](#)

[European Technology Platform on Zero Emission Fossil Fuel Power Plants promotes the pilot CCS installations](#)

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**Website hosted by:**  
ENORG

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Česká geologická služba



# CO2NET public brochures



EUROPEJSKA SIEĆ DWUTLENKU WĘGLA  
Wład do bezpiecznego, pewnego, zrównoważonego, przyjaznego klimatowi wytworzenia energii dla Europy

## GEOLOGICZNY SPOSÓB NA ZMIANĘ KLIMATU

Ropa, gaz i węgiel są wydobywane z głębi Ziemi aby wytworzyć energię. Przy spalaniu tych paliw kopalnych, celem uwolnienia zgromadzonej w nich energii, wytwarzany jest niepożądany dwutlenek węgla, wpływający na klimat globalny. Motywem jest wychwytywanie tego dwutlenku węgla, zatłaczanie do skorupy ziemskiej i składowanie w niej. Takie działanie zmniejszy istotnie emisje gazów cieplarnianych i pomoże w ograniczeniu zmiany klimatu, co stanowi także kluczowy element w przejściu do zrównoważonego wytworzenia energii.

**Po co wychwytywać i składować CO<sub>2</sub>?**  
Dowody na wpływ działalności człowieka na klimat globalny są coraz mocniejsze. Ogólnosiłowa emisja dwutlenku węgla (CO<sub>2</sub>) do atmosfery, pochodząca z rosnącego stosowania paliw kopalnych, odgrywa kluczową rolę. Wskazując naukowców przynajmniej ze ogólnosiłową emisją CO<sub>2</sub>, muszą zostać ograniczona o przynajmniej 50% w celu ustabilizowania koncentracji CO<sub>2</sub> i ślad ograniczenia zmiany klimatu. Jako pierwszy krok przyjęto protokół Kyoto 1997, celem zmniejszenia emisji do roku 2012 poniżej poziomu z roku 1990. Wymagane redukcje mogą być zrealizowane przy pomocy trzech środków:

- Poprawy efektywności energetycznej i zmniejszenia zapotrzebowania na energię
  - Wykorzystania odnawialnych źródeł energii (takich jak energia wiatru i energia słoneczna)
  - Wychwytywania i składowania aktualnych emisji CO<sub>2</sub>
- Staje się jasne że połączony efekt poprawy efektywności energetycznej i odnawialnych źródeł energii nie pozwala jeszcze na osiągnięcie wymaganych redukcji emisji. Trzeci środek, wychwytywanie i składowanie CO<sub>2</sub> (CCS) może być również wykorzystany aby pomóc ograniczyć globalną zmianę klimatu. Zatłaczanie CO<sub>2</sub> z powrotem do górotworu nie jest nowym zjawiskiem. W wielu krajach występuje naturalne składowanie CO<sub>2</sub> w formacjach geologicznych od milionów lat. Świat uzależniony jest od paliw kopalnych a zmiany w naszym systemie energetycznym nie mogą zająć z dnia na dzień, lecz zajmą lata. CCS wspierze stopniowe przejście od wytworzenia energii opartej na paliwach kopalnych do

roznorodnego systemu wytworzenia, który zminimalizuje wpływ na klimat globalny. Nasz obecny system energetyczny pozostanie w większości taki sam w okresie przejściowym, ale potrzebna będzie nowa infrastruktura: na przykład elektrownie i wielkie zakłady przemysłowe będą wyposażone w urządzenia do wychwytywania i wrociagi do miejsc składowania.

**Co to jest wychwytywanie i składowanie CO<sub>2</sub> (CCS)?**  
Wszystkie paliwa kopalne zawierają węgiel. Gdy spalamy paliwo, węgiel reaguje z tlenem w powietrzu tworząc CO<sub>2</sub>. Uświadczenie węgla przed, albo po procesie spalania, na przykład w elektrowniach, zapobiega się emisji CO<sub>2</sub> do atmosfery. Wynikiem jest dostawa gazu CO<sub>2</sub>, który może być następnie transportowany do odpowiedniego, podziemnego zbiornika składowania. Zbiornik może być „pustym” (wyeksploatowanym) złożem ropy lub gazu, warstwą węgla albo głębokim poziomem wodonośnym.



Instalacja do wychwytywania CO<sub>2</sub> (za zgodą ABB Lummus Crest)



EUROPEAN CARBON DIOXIDE NETWORK  
EUROOPA SÜSINIKIDIOKSIIDIVÕRGUSTIK  
Euroopa turvalise, kindla, säästliku, kliimasõbraliku energiaravutamise toetus

## MAASSE-TAGASI-LAHENDUS MUUTUSTE PIDURDAMISEKS

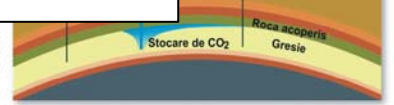
de mtonne a CO<sub>2</sub> Gt = (miliarde de tone)

Capacitatea de stocare în Gt CO <sub>2</sub>
400 – 10.000
930
30
25 Gt pe an

gazelor naturale, ce constă în principal din CO<sub>2</sub> și H<sub>2</sub>S) în zăcămintele de petrol/gaze și în acvifere saline adânci se practică de mai mult ani. Acviferele saline adânci sunt formațiuni geologice alcătuite în special din gresii care conțin apă sărată. Aceste formațiuni oferă un potențial enorm de stocare: ele sunt prezente în cele mai multe țări, de la nordul în sud. În România sunt prezente în zăcămintele de petrol sau gaze. Proiectul norvegian Sleipner este primul proiect comercial de injecție a CO<sub>2</sub> în cadrul cărui se introduce anual circa un milion de tone de CO<sub>2</sub> într-un acvifer situat sub Marea Nordului - demonstrază că CO<sub>2</sub> poate fi stocat eficient și pe termen lung în condiții mari.



Monitorizarea de suprafață a CO<sub>2</sub>  
Monitorizarea transportului de fluid prin fizica de sonda



Proiectul areu control de producere a energiei electrice și termice în care CO<sub>2</sub> se capturează și se stochează subteran (prin amalinizarea proiectului CCSSINX, GFZ, Potsdam, 2004)

Maasse-tagasi lahendus on võimalik ainult siis, kui kasutatakse looduslikke maasõelavaid. Nende fossiilkütuste põletamisel looduslikud maasõelavad loovad võimalikult kiiresti ja odavalt. Selline lahendus vähendab tunduvalt kasvuhoonegaaside taset ja on määrava tähtsusega õnnelikuks säästlikule energiaravutamisele.

**KINNI PÜÜDA JA KUIDAS JA KUS ON VÕIMALIK CO<sub>2</sub> KINNI PÜÜDA?**

**Mis on CO<sub>2</sub> kinni püüdmine ja ladustamine (CCS)?**  
Kõik fossiilkütused sisaldavad süsinikku. Kütuse põletamisel reageerib süsinik õhuhapnikuga ja tekib CO<sub>2</sub>. CO<sub>2</sub> heitmist atmosfääri saab vältida, kui süsinik enne või pärast põletamist, nt elektrijaamas, kõrvaldada. Tekkivat CO<sub>2</sub> saab juhtida sobivasse maasõelusse paigutusse. Põhilaks sobib "täht" (ammendatud) nafta- või gaasivälja, kivisõelastund või põhjaveekihi.

Ligikaudu 80% CO<sub>2</sub> -heitest toimub püsibjektide: suurtest elektrijaamadest, nafta- ja gaasiväljadest, nafta- ja gaasiväljadest ja tööstusettevõtetest. Enamasti on neist eraldatute suitsugaaside CO<sub>2</sub> -sisaldus väike (5-15%). Üks võimalustest süsinikdioksiidide heitmeid vähendamiseks on lahutada CO<sub>2</sub> muudest suitsugaasidest, tekitades voo, mis sisaldab



CO<sub>2</sub> püüdejaam (ABB Lummus Crest)

Kui te soovite teada, kuidas CO<sub>2</sub> kinni püüda, on teil võimalik saada teavet Euroopa Komisjoni kaudu. Kui soovite teada, kuidas CO<sub>2</sub> kinni püüda, on teil võimalik saada teavet Euroopa Komisjoni kaudu. Kui soovite teada, kuidas CO<sub>2</sub> kinni püüda, on teil võimalik saada teavet Euroopa Komisjoni kaudu.



CO<sub>2</sub> püüdejaam (ABB Lummus Crest)

CO<sub>2</sub> capture project.org: CCP je mezinárodní projekt financovaný osmi společnostmi ze skupiny velkých světových energetických firem.  
Euronet.org: Carbon Sequestration Ship Forum je mezinárodní iniciativa proti klimatu na vládní úrovni.  
ccc.ch: Mezinárodní panel o změně klimatu k tomu vydal zvláštní zprávu o zachytávání a uložení CO<sub>2</sub>.  
slimnet.org/CTAP: CAN, Climate Action Network je mezinárodní organizací se zaměřením na prosazení, uspořádání o CCS speciálníhop.

Projekt dále podporují jeho sponzoři - Shell International Renewables, Statoil.  
Český překlad: Vít Hladík, Vladimír Kolečka, Marie Zahradníková.  
Odpovědný redaktor: Petr Madřar. Grafická úprava a sazba: Helena Neubertová  
Vydala Česká geologická služba, Klárov 3, Praha 1





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**Peasponsorid:**



**Sponsorid:**



**Cap rock – Kattekivim**

Väga väikese läbilaskvusega kivim, mis toimib settekivimite järjestuses vedelikku või gaasi ülespoole siirdumist tõkestava kattena.

**Capture efficiency - Kinnipüüdmise kasutegur**

Gaasivoost eraldatud CO<sub>2</sub> osakaal.

**Carbonate - Karbonaat**

Looduslikud mineraalid ja kivimid (nt. kaltsiit, dolomiit, sideriit, lubjakivi), mis koosnevad CO<sub>3</sub><sup>2-</sup> aniooniga seotud mitmesugustest katioonidest.

**Carbonate neutralization - Karbonaatne neutraliseerimine**

Meetod süsiniku ladustamiseks hüdrofääris, mis põhineb CO<sub>2</sub> reageerimisel karbonaatsete kivimitega (nagu lubjakivi) vesinikkarbonaadi anioonide ja lahustuvate katioonide tekitamiseks.

**Casing - Mantel**

Toru, mis paigaldatakse puurauku pärast puurimist augu kindlustamiseks.

**CBM (Coal bed methane) - KKM (Kivisöekihhi metaan)**

**CCS - CKL**

CO<sub>2</sub> kinnipüüdmine ja ladustamine.

**CDM (Clean development mechanism) - PAT (Puhta arengu tee)**

Kyoto protokollis mehhanism lisavälise maade abistamiseks protokollis sihtide toetamisel ja lisas 1 märgitud maade aitamiseks nende kohustuste täitmisel.

*Any gas mixture that turns to an acid when dissolved in water (normally refers to H<sub>2</sub>S + CO<sub>2</sub> from sour gas).*

**Adsorption - Adsorpce**

Zachycení molekul na povrchu pevné látky nebo kapaliny

*The uptake of molecules on the surface of a solid or a liquid.*



## WP3 – National activities – Years 1&2

- informal CCS stakeholder groups
- formal CO2 Club and CCS workshop in Romania
- 26 presentations of CCS concept and on national activities and CCS potential
- 55 meetings with stakeholders, resulting into several national R&D projects or proposals and-or industry-funded studies
- 21 publications in technical journals
- CCS on TV (10 programmes), radio (6 broadcasts) and in newspapers
- seminars with students, distribution of the CO2NET Educational CD-ROM





## WP4 – Link & Liaison

- CO2NET – the mother networking platform
- ZEP Technology Platform – dissemination of information & providing feedback
- CSLF – dissemination of information
- ENeRG – using the newsletter and website
- EC-funded R&D projects



# ZEP Technology Platform

- active engagement in Task Forces
- dissemination of information in New Member States and Candidate Countries
- feedback & information to ETP ZEP from New Member States and Candidate Countries
- cooperation in finding suitable candidates for Government Group (Czech Republic, Estonia and Romania already represented)



# Liaison with ENeRG



www.geology.cz

Issue N° 14 The Newsletter of the ENeRG Network December 2006

## GEO ENeRG

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 6<sup>th</sup> 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 5<sup>th</sup> 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.

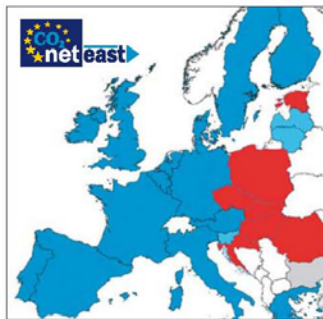
CO2NET EAST was started on 1 October 2006 for a period of 3 years. The project consortium is composed of 7 R&D institutions representing 5 new EU Member States and 2 Associated Candidate Countries + 1 strong industrial partner (State) responsible for mainly organisational tasks. The 7 Central & Eastern 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)
- Dornysz Súr State Geological Institute (Slovakia)
- Institute of Geology at Tallinn University of Technology (Estonia)
- FBG - Geophysical Exploration Company (Poland)
- National Institute for Marine Geology and Geodesy (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.

Vít Hladík



Geographic impact of CO2NET EAST

### CO2NET EAST workshop

Introduction to Carbon Capture and Storage Principles

27–28 February 2007, Zagreb, Croatia  
<http://www.co2neteast.rgn.hr>

### Geothermal Fields of Greece

Greece is one of the most favored countries of Europe regarding geothermal energy. The deep tectonic structures and the young to recent volcanism have created a large number of shallow geothermal fields both of low and high enthalpy.

According to national legislation, geothermal fields are divided to high enthalpy when temperature exceeds 90°C and to low enthalpy when the temperature ranges from 25° up to 90°C. Below 25°C they are considered groundwater and ground

suitable for Ground Source Heat Pumps (GSHP).

Fields are characterized as "proven" when their features are known with a level of confidence greater than 90 % and "possible" when this level is between 70 and 90 %. The rest of the fields are considered as "unexplored" areas or "unknown". The procedures for the licensing of fields are different for the three groups and for GSHP.

Twenty-three "proven" and "possible" fields are known (see Fig. 1), two of which are of high enthalpy. The high enthalpy fields are located in the South Aegean Volcanic Arc, and are related to Quaternary volcanism in the islands of Milos and Nisyros. The exploitable potential of the existing wells exceeds 25 MWe of installed electric capacity and the possible potential exceeds 250 MWe. The temperatures reach 400°C. At present they are not in use. One more prospective area is close to Argentos, Lesvos Island, where deep drilling is under preparation by the Public Power Corporation (PPC).

There are twenty-one "proven" and "possible" low enthalpy fields located all over the country. The geotectonic environments are: Tertiary volcanic areas, deep water circulation along structures in grabens, and areas with diapiric evaporites. Their potential exceeds 200 000 T.O.E. (tons of oil equivalent) per year. A small percentage of those (~ 20 % of the potential) are exploited for various uses, such as balneology (50 % of them) in more than 50 spas, heating in greenhouses, some fisheries, space heating, vegetables drying, and special aquacultures such as Spirulina algae.

The "unexplored" or "unknown" fields are potential prospects in the islands of Milos and Nisyros, where hot springs are known and amount to more than fifty all over the country.

One sector with fast development is the GSHP. During the years 2006 and 2007 some tens of units have been installed mainly in houses and the number is increasing rapidly.

George Hatziyanni



Fig. 1: "Proven" and "possible" geothermal fields in Greece

### Carbon Sequestration Leadership Forum

The International Carbon Sequestration Leadership Forum (CSLF) is a voluntary climate initiative of developed and developing nations. It focuses on development of improved cost-effective technologies for the separation and capture of carbon dioxide for its transport and long-term safe storage. The purpose of the CSLF is to make these technologies broadly available internationally; and to identify and address wider issues relating to carbon capture and storage.

The CSLF charter was signed on June 25, 2003 in Washington, DC, USA. Current members are: Australia, Brazil, Canada, China, Colombia, Denmark, the European Commission, France, Germany, Greece, India, Italy, Japan, Mexico, the Netherlands, Norway, Russia, Saudi Arabia, South Africa, South Korea, the United Kingdom and the United States. At present, the membership accounts for 75 percent of all manmade carbon dioxide emissions. Membership is open to

national governmental entities that are significant producers or users of fossil fuel and that have a commitment to invest resources in research, development and demonstration activities in carbon dioxide capture and storage technologies.

CSLF members engage in cooperative technology development aimed at enabling the early reduction and steady elimination of more than 60 percent of the world's CO<sub>2</sub> – those of electric generation and other heavy industrial activity. Pending business includes the first direct involvement of the developing nations, like China and India, in matters relating to the potential curtailment of industrial carbon dioxide. CSLF marshals intellectual, technical and financial resources from all parts of the world to support the long-term goal of the United Nations Framework Convention on Climate Change – the stabilization of atmospheric CO<sub>2</sub> concentrations in

this century. Members are dedicated to collaboration and information sharing in developing, proving safe, demonstrating and fostering the worldwide deployment of multiple technologies for the capture and long-term geological storage of carbon dioxide at low costs. As well as establishing a companion foundation of legislative, regulatory, administrative, and institutional practices that will ensure safe, verifiable storage for as long as millennia.

Collaborative projects may be undertaken by the CSLF. This includes projects involving information exchange and networking, planning and road-mapping, facilitation of collaboration, research and development, demonstrations, public perception and outreach, economic and market studies, institutional, regulatory, legal constraints and issues and support to policy formulation.

The latest Annual Meeting of the CSLF took place in Paris on 26–28th March 2007.

In addition to the normal governmental meetings involving the 22 member countries, some 200 delegates attended a special open workshop on overcoming the barriers to the deployment of carbon capture and storage. The workshop was opened by a keynote presentation on the European Zero Emission Fossil Fuel Power Plants (ZEP) Technology Platform, emphasising the importance of this initiative and its impact on the EU Energy Package published in January 2007.

Vít Hladík & Niels Peter Christensen (with the aid of [www.cslforum.org](http://www.cslforum.org))

This article is a Link & Liaison activity of the CO2NET EAST project.



Česká geologická služba





## ACHIEVEMENTS YEARS 1&2

- national websites running & up-to-date
- stakeholder groups established and growing
- awareness of CCS rising
- regulators well informed & requiring consultations
- national & industry projects running or under preparation in most countries



## GOALS YEAR 3

- to organise CCS workshop in Bratislava
- to prepare common publication – Slovak Geological Magazine
- to keep websites up-to-date, providing latest information
- enlarging stakeholder groups
- cooperating closely with national regulators (e.g. on implementation of the EC Directive on CO<sub>2</sub> storage)
- promoting CCS as an important R&D topic on national level



# CO2NET EAST ENGLISH PROJECT WEBSITE

[www.energnet.com/co2neteast](http://www.energnet.com/co2neteast)

The screenshot shows the website's main page with a navigation menu on the left, a central news section, and a right sidebar with logos and contact information.

**Navigation Menu:**

- Home
- Project
- News
- Calendar
- Links
- Download
- Search
- Contact Us

**News Section:**

**News**

[A session on Geologic Carbon Sequestration](#)

A session on Geologic Carbon Sequestration took place at the [American Geophysical Union](#) meeting in San Francisco on December 15 -19, 2008. Over 60 oral and 30 poster presentations were attended by over 100 people throughout the day. The abstracts could be loaded [here](#).

[European Council and European Parliament approved support for CCS demonstration plants](#)

On 12 December 2008, the European Council adopted a [compromise on the 'climate & energy package](#). Shortly after that, on 17 December, the package was approved by the European Parliament. This decision included, i.a., adoption of the Directive on the [geological storage of carbon dioxide](#) and a commitment to support the 10-12 European large-scale demonstration power plants equipped with CO2 capture and storage technology and operating by 2015, as proposed in the [EU Demonstration Programme for CCS](#). The funding will be provided in form of 300 million Emission Trading allowances awarded to the demonstration projects. The value of these allowances will depend on the price of CO2 at the carbon market but can be estimated at 6 – 9 bill. €. Last but not least, the MEPs also adopted a revision of the [EU's Emission Trading System](#) that should lead to a reduction in greenhouse gas emissions of 21 % compared to reported 2005 levels and introduces partial auctioning of the allowances from 2013. [European Parliament press release](#).

[ZEP Unveils Proposal for EU CCS Demonstration Programme](#)

At its 3rd General Assembly held in Brussels on 10 November 2008, the European Technology Platform for Zero Emission Fossil Fuel Power Plants (ZEP) unveiled a ground-breaking report for the rapid deployment of an EU-wide CO2 Capture and Storage (CCS) Demonstration Programme – integrating all aspects of CO2 capture, transport and storage – which would speed up the deployment of CCS in the EU by 10 years and contribute to the commercial availability of CCS by 2020. [Press release](#)

[Speech by EU Energy Commissioner A. Piebalgs](#)

**Right Sidebar:**

News

A session on Geologic Carbon Sequestration

European Council and European Parliament approved support for CCS demonstration plants

ZEP Unveils Proposal for EU CCS Demonstration Programme

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