



## A leap forward for the CO<sub>2</sub>GeoNet Association

Through the last seven months of the CGS Europe project, the CO<sub>2</sub>GeoNet Association underwent two phases of expansion where new partners from the CGS Europe project joined, so that the collaborative links established through the CGS Europe project can continue under the Association. GFZ and CIUDEN also joined CO<sub>2</sub>GeoNet bringing access to their pilots at Ketzin and Hontomin. This expansion is another step forward for the Network of Excellence, broadening the geographical coverage to pan-European and drawing together more key researchers on CO<sub>2</sub> geological storage. CO<sub>2</sub>GeoNet now comprises 24 key research institutes from 16 countries.

The strength of CO<sub>2</sub>GeoNet is greatly increased by this expansion, and its four main domains of activity: research, training, scientific advice, information and communication will benefit. As an example, the brochure 'What does CO<sub>2</sub> geological storage really mean?' has been translated into all the languages of the CGS Europe project (brochure now available in 26 languages through [www.co2geonet.com](http://www.co2geonet.com)). In line with its strategy, CO<sub>2</sub>GeoNet, as an independent scientific body, will continue to interact with stakeholders to enable the efficient and safe geological storage of CO<sub>2</sub> as a key technology in mitigating climate change.

*Isabelle Czernichowski-Lauriol,  
BRGM, France  
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CO<sub>2</sub>GeoNet recently expanded: new member countries (in yellow) have joined the founding member countries (in orange)

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### Seeking sponsors for the next CO<sub>2</sub>GeoNet school on CO<sub>2</sub> geological storage

Following three successful courses on CO<sub>2</sub> geological storage (CGS) over the last three years (see [www.cgseurope.net](http://www.cgseurope.net) -publications-public project deliverables D5.12, D5.13), CO<sub>2</sub>GeoNet is aiming to run the popular CO<sub>2</sub>GeoNet school in 2014.



The purpose of the CO<sub>2</sub>GeoNet school is to share the knowledge that already exists in Europe on geological storage of CO<sub>2</sub>. The school will last for one full week and will target young scientists and postgraduate students. Through lectures and practical exercises, the 20 – 25 students will develop understanding of climate change, CO<sub>2</sub> geological storage and monitoring and regulatory requirements.

CO<sub>2</sub>GeoNet is seeking sponsors to support costs for teaching and facilities. We hope that you will be able to help with a sponsorship. Please contact Niels Poulsen at [nep@geus.dk](mailto:nep@geus.dk).

*Niels E. Poulsen, GEUS, Denmark*

# Completion of the CGS Europe project: Summary of major achievements



CGS Europe, a three-year Coordination Action on CO<sub>2</sub> Geological Storage funded by the EC 7th Framework Programme, ended on 31 October 2013. CGS Europe pooled together the expertise of 34 key research institutes across 28 countries (24 European Member States and 4 Associated Countries). Building upon the experience of CO<sub>2</sub>GeoNet, the objective of CGS Europe was to develop a credible, independent and representative pan-European scientific body of expertise on CO<sub>2</sub> geological storage that would: (i) create a durable network of research capacity on CO<sub>2</sub> storage in Europe, (ii) liaise and coordinate its activities with other stakeholders, (iii) help reduce the gap between countries with a significant track record in CO<sub>2</sub> storage research and those with less experience and knowledge, (iv) facilitate the large-scale demonstration and industrial deployment of CCS, (v) support the implementation of the EU Directive and other regulatory regimes.

## Reports and publications

In order to enable stakeholders to easily find pertinent information, comprehensive key reports summarizing knowledge and the state of play on CO<sub>2</sub> geological storage have been produced. Brochures and papers for various types of audience have also been published, in as many EU national languages as possible. Please consult the website ([www.cgseurope.net](http://www.cgseurope.net)) for more details and access to documents.



The report gives a brief overview of the CO<sub>2</sub> storage options, potential and capacities in 28 European countries ([www.cgseurope.net](http://www.cgseurope.net))

## Organisation of events

Many events targeting a wide range of stakeholders have been organised across Europe for sharing knowledge on CO<sub>2</sub> storage, and raising awareness on CCS. Events were organised with IEAGHG, the Romanian CO<sub>2</sub> Club, the Evangelical Academy of Berlin, the Antwerp Port Authority, the Ministry of Energy and Natural Resources of Turkey, the European Science Foundation. Independent CO<sub>2</sub>GeoNet events included the annual CO<sub>2</sub>GeoNet Open Forum in Venice, the Spring School, and workshops on the latest developments by national research programmes, international cooperation, and lessons learned from pilot and demonstration projects.

## Cooperation with European, international, and national bodies

In Europe, a positive relationship with the European Commission (both DG Climate Action and DG Research and Innovation) was maintained throughout the project. Collaboration with the ZEP Technology Platform led to the preparation of the CGS Europe report on opportunities for CO<sub>2</sub> storage pilots in Europe, which will be released soon. Interaction with EERA CCS Joint Programme was achieved to ensure a joined-up approach to future research on CO<sub>2</sub> storage. CGS Europe / CO<sub>2</sub>GeoNet has been invited to the Advisory Forum of the CCS Demo Project Network and responded to consultations and invitations from the European Commission and Parliament.

At international level, CO<sub>2</sub>GeoNet, as a legal association representing the European scientific body on CO<sub>2</sub> storage, applied for Category A Liaison organisation in the ISO CCS Technical Committee, became a member of the Global CCS Institute, and was accepted as an Observer Organisation (Research NGO) at UNFCCC and therefore participated in the COP-19 Conference in Warsaw in November 2013. CGS Europe is a CSLF-recognised project. Collaboration with the IEAGHG continued throughout the CGS Europe project.

At national level, CGS Europe partners have held numerous consultations/in-house presentations to support their national authorities/stakeholders in implementing CO<sub>2</sub> storage-related legislation, planning and decision-making. In addition they have been able to quickly gather information from each country and make comparisons and summaries at a European level.

## Media outreach

Several workshops on CO<sub>2</sub> storage have been organised for science journalists in order to inform and enable a dialogue with:

- European Union of Science Journalists' Associations (EUSJA)
- French Associations of environment journalists (AJE) and of information press' scientific journalists (AJSPI)
- Union of Italian scientific journalists (UGIS)

These events, as well as press releases on the occasion of the Open Forum and release of reports, resulted in numerous media outputs (journal and online media articles, TV and radio broadcasts) around Europe.

## Expansion of the membership of the CO<sub>2</sub>GeoNet Association

This was a key goal of the project to ensure the continuity of the pan-European networking activities after the end of the CGS Europe project. Founded as an FP6 project (2004-2009), the CO<sub>2</sub>GeoNet Network of Excellence became an association under French law in 2008, with 13 founding members over 7 European countries. In 2013, 11 new members joined the Network of Excellence, among which 9 were partners of CGS Europe. Therefore CO<sub>2</sub>GeoNet has now 24 members over 16 European countries. A further expansion phase is planned for 2014.

## Activities are now continued in the framework of the enlarged CO<sub>2</sub>GeoNet Association

In conclusion, CGS Europe has had a powerful leverage effect in allowing the development of a credible, independent and pan-European scientific body on CO<sub>2</sub> storage. Continuation of activities will now take place in the framework of the enlarged and more powerful CO<sub>2</sub>GeoNet Association, which will continue to interact with stakeholders and respond to future research, training, scientific advice and information needs in the area of CO<sub>2</sub> geological storage as a key technology for combating climate change, in accordance with the CO<sub>2</sub>GeoNet Strategy and Values.

*Isabelle Czernichowski-Lauriol,  
CGS Europe Coordinator and  
CO<sub>2</sub>GeoNet President, BRGM, France*

## News and events

### CGS Europe workshop 16-17 September 2013

The sixth CGS Europe Knowledge Sharing Workshop 'Other promising options for CO<sub>2</sub> storage' took place in Slovakia, 16-17 September 2013. The workshop was organised by Ludovit Kucharic (SGUDS) and Alla Shogenova (TTUGI) and hosted by SGUDS, Bratislava.

The two-day workshop was attended by 42 participants from 21 CGS Europe countries. Presentations were given by project partners and guest speakers. Workshop participants also visited a nearby underground natural

gas storage (UGS) site; Gajary – Badenian, managed by the NAFTA company. The workshop comprised four sessions including Enhanced Hydrocarbon Recovery – CCS, CO<sub>2</sub> Storage in Shales and Hydrates, Enhanced Geothermal and Hydrocarbon Recovery – CCS and CO<sub>2</sub> Mineral Carbonation.

The workshop conclusions included recognition of increased opportunities for climate change mitigation through CO<sub>2</sub> storage when anthropogenic CO<sub>2</sub> is used as a working

fluid (shale gas, conventional enhanced oil and gas recovery, CO<sub>2</sub>-nitrogen coalbed methane recovery, geothermal energy recovery), the potential for hydrate storage of CO<sub>2</sub>, compatibility of the CCS cycle with renewables (Life Cycle Analysis) and the potential for CO<sub>2</sub> mineral carbonisation.

*Alla Shogenova, Institute of Geology at Tallinn University of Technology, Estonia*



*The sixth CGS Europe Knowledge Sharing Workshop participants during visit of UGS site Gajary – Badenian in Slovakia*

### Venice Open Forum 2014 (20-21 May 2014)

The CO<sub>2</sub>GeoNet Venice Open Forum has become a popular project tradition and the 9th gathering is scheduled for 20-21<sup>st</sup> May 2014. Every year we select a central theme dealing with the latest developments on CO<sub>2</sub> storage, allowing a large variety of stakeholders to express their viewpoints. After last years' theme on the value of pilot scale projects, the next forum will be focused on the future of CCS in Europe with the title "Horizon CO<sub>2</sub> storage": Many critical decisions are expect-

ed in 2014/2015 which will be introduced by speakers not only from the research community, but also from industry, regulators, EU representatives and NGOs. We hope you will be able to join us in Venice to enjoy these presentations and to take part in lively debates on CO<sub>2</sub> storage in Europe. More information on the program and registration will follow on our website ([www.co2geonet.com](http://www.co2geonet.com)).

*Rob Arts, TNO, The Netherlands*



### Response to EU consultation

CO<sub>2</sub>GeoNet and CGS Europe responded to strategic documents on the future for CCS in Europe including the 'Consultative Communication on the Future of Carbon Capture and Storage in Europe' in July and the series of events organised by Chris Davies MEP which resulted in a motion for a European Parliament Resolution 'implementation report 2013: developing and applying carbon capture and storage technology in Europe'.

CO<sub>2</sub>GeoNet presented our positive view on the safety of underground storage of CO<sub>2</sub> at the Chris Davies seminar on CCS in Europe in June 2013 and attended the roundtable event where CO<sub>2</sub>GeoNet and CGS Europe emphasised the importance of further research into geological storage and the role of pilot projects and demonstration projects in driving large scale implementation of CCS. Feeding the opinion of the CO<sub>2</sub>GeoNet and CGS Europe members into these documents and consultations is important as these consultations provide steer on future research into geological storage of CO<sub>2</sub> in Europe.

*Ceri J. Vincent, BGS, UK  
Kris Piessens, RBINS, Belgium*



*Photo taken from San Servolo Island, the venue of the Venice Open Forum*

# CO<sub>2</sub>GeoNet is expanding

## Presentation of new member institutes (1<sup>st</sup> round of applications)

*The other five new members will be presented in the next issue*

### Royal Belgian Institute of Natural Sciences (RBINS)



The RBINS is a federal research institute in Belgium under the Science Policy Office. The Geological Survey of Belgium (GSB) was founded in 1896 and joined the RBINS in 2002 as one of its departments. The GSB is a resource and research centre with a wide area of expertise, ranging from data management to mineralogy and geo-energy. RBINS-GSB is the Belgian focal point for CO<sub>2</sub> storage, and has coordinated the national PSS-CCS projects, mapping the national potential for CCS. Areas of CCS research include reservoir evaluation, uncertainties and techno-economic modelling, and monitoring of natural analogues.

### University of Zagreb – Faculty of Mining, Geology and Petroleum Engineering (UNIZG-RGNF)



The Faculty conducts research in a range of sectors from soil and rock mechanics to applied geology, geophysical prospecting, drilling engineering, reservoir development and protection of environment. UNIZG-RGNF is the country representative in ENERG (European Network for Research in Geo-Energy) and the leading CO<sub>2</sub> storage research body in Croatia. UNIZG-RGNF participated in four EU FP projects (EU GeoCapacity, CO<sub>2</sub>NetEAST, ECCO and CGS Europe) and mapped the storage potential of Croatia, Bosnia and Herzegovina and disseminated the CCS-related research results. In addition, two PhD Theses were also completed – one by Domagoj Vulin testing the influence of thermodynamic and petrophysical parameters to storage potential assessment, and another by Iva Kolenković who conducted innovative parameter-sensitive regional mapping of deep saline aquifers.

### Spanish Geological and Mining Institute (IGME)



IGME is a Spanish Public Research Organisation devoted to the generation and dissemination of a knowledge infrastructure regarding Earth sciences. IGME is the national geological survey but also a research centre, developing its activities in many fields including geological and thematic cartography, hydrogeology, mineral resources, geophysics, geological risks and mining heritage. IGME has assessed the Spanish CO<sub>2</sub> storage capacity through projects such as GeoCapacity and COMET. IGME is also active in the fields of 3D modelling and storage simulation through several national research projects. IGME is performing a detailed screening of the Spanish territory, including the marine platform, carrying out geophysical data acquisition to support definition of the most promising subsurface structures for storage.

### Geoinženiring d.o.o. (GEO-INZ)



Geoinženiring (GEO-INZ), a Slovenian SME company, is a geological engineering institute engaged primarily in research on soil and rock mechanics, engineering geology and engineering geophysics. GEO-INZ was formally established in its current form in 1998, following on from the national geological institute (established 1946). Areas of expertise range from large infrastructural projects to geo-energy, water and mineral resources and natural hazards. GEO-INZ is a leading institution on geological storage of CO<sub>2</sub> in Slovenia and undertakes knowledge transfer activities. GEO-INZ has assessed national CO<sub>2</sub> storage capacity (EU GeoCapacity, CO<sub>2</sub>StoP) and has previously been involved in international CCS projects on storage site screening, site characterization, monitoring and verification and utilisation of the deep subsurface.

### Middle East Technical University (METU)



The Middle East Technical University (METU) Petroleum Research Centre (PAL) was established in 1991. As a university research centre, METU PAL has a close relationship with the METU Petroleum and Natural Gas Engineering Department, therefore the main areas of expertise are reservoir drilling and production and natural gas engineering. Besides being Turkey's oldest established and accredited fuel quality laboratory, METU PAL has broad expertise on laboratory management and know-how on fuel analyses. Routine fuel quality control analyses are performed in the laboratories of METU PAL for gasoline, diesel, biodiesel, fuel oil, LPG and natural gas. The analytical equipment as well as core tomography and core displacement test systems are used for academic and contracted research by METU PAL.

### German Research Centre for Geosciences (GFZ)



The Deutsches GeoForschungsZentrum (GFZ) is the national research centre for earth sciences in Germany. Its long-term aim is to understand the highly complex, non-linear system of the Earth and its interactive natural subsystems to evaluate the influence of human activity on the "System Earth". GFZ launched the Centre for Geological Storage (CGS) in January, 2012, to study the potential and conditions of long-term and safe storage of carbon dioxide in the underground. The role of GFZ in the CGS Europe project, was to i) operate and coordinate the test-site for CO<sub>2</sub> storage at Ketzin, Brandenburg (Germany), ii) develop and test new technologies for monitoring the injected CO<sub>2</sub> and its behaviour in deep porous rocks, and iii) study fluid-fluid-rock interactions and their impacts on chemical and physical properties of reservoir and cap rocks.



"CO<sub>2</sub>GeoNet Highlights" is the online newsletter issued by The European Network of Excellence on the Geological Storage of CO<sub>2</sub> Association

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#### Founding members:

**GEUS**, Denmark - Geological Survey of Denmark and Greenland; **BRGM**, France - Bureau de Recherches Géologiques et Minières; **IFPEN**, France - IFP Energies Nouvelles; **BGR**, Germany - Bundesanstalt für Geowissenschaften und Rohstoffe; **OGS**, Italy - National Institute of Oceanography and Experimental Geophysics; **URS**, Italy - Università di Roma "La Sapienza"; **TNO**, The Netherlands - Netherlands Organisation for Applied Scientific Research; **IRIS**, Norway - International Research Institute of Stavanger; **NIVA**, Norway - Norwegian Institute for Water Research; **SPR**, Norway - SINTEF Petroleum Research; **BGS**, UK - British Geological Survey; **HWU**, UK - Heriot-Watt University; **IMPERIAL**, UK - Department of Earth Science and Engineering, Imperial College London.

#### New members:

**GBA**, Austria - Geologische Bundesanstalt; **RBINS-GSB**, Belgium - Royal Belgian Institute of Natural Sciences; **UNIZG-RGNF**, Croatia - University of Zagreb - Faculty of Mining, Geology and Petroleum Engineering; **CGS**, Czech Republic - Czech Geological Survey; **GFZ**, Germany - Helmholtz Centre Potsdam, German Research Centre for Geosciences /Deutsches GeoForschungsZentrum; **MFGI**, Hungary - Magyar Földtani és Geofizikai Intézet; **GeoEcoMar**, Romania - National Institute of Marine Geology and Geoecology; **GEO-INZ**, Slovenia - Geoinženiring d.o.o.; **CIUDEN**, Spain - Fundación Ciudad de la Energía; **S-IGME**, Spain - Instituto Geológico y Minero de España; **METU-PAL**, Turkey - Middle East Technical University Petroleum Research Center.

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