



## Political decisions on CCS in Europe – Horizon CO<sub>2</sub> storage

CO<sub>2</sub>GeoNet participated in the CCS hearing at the European Parliament and the round-table discussion (June 2013) organised by Chris Davies, Member of the European Parliament to contribute to the request for a parliamentary resolution on Carbon dioxide Capture and Storage (CCS) in Europe. This resolution, 2013/2079(INI), was accepted on 14 January 2014. The resolution encourages CCS as a promising technology for reducing emissions from industrial sources and fossil-fuel power plants to allow the EU to meet its 2050 low-carbon emission targets, discusses potential financial incentives for CCS and clearly states the view that CCS should be regarded as complementary to other low carbon technologies. The large potential geological capacity for CO<sub>2</sub> storage in Europe, the importance of geological characterisation and the need for the development of pilot and large scale commercial-scale storage are also described. Further development of the Spanish pilot project operated by CIUDEN, a member of CO<sub>2</sub>GeoNet, is specifically mentioned. This parliamentary

resolution is a positive step for moving CCS forward in Europe.

On 22 January 2014, at the EU2030 Framework for Climate and Energy conference in Brussels, the Commission set out proposed targets to reduce EU domestic greenhouse gas emissions by 40% below the 1990 level by 2030 and asked the Council and European Parliament to endorse its approach and the proposed emission reduction and renewable energy targets. In March 2014, the European Council meeting confirmed a decision on the 2030 Framework would be made by the end of October 2014 at the latest. The Green paper on a 2030 framework for climate and energy policies COM(2013)169 and the DG Energy consultative communication on the Future of CCS in Europe COM(2013)180 fed into the 2030 Framework for climate and energy policies. CO<sub>2</sub>GeoNet provided input to this consultative communication to emphasise the importance of pilot and demonstration projects and the key role in clear stakeholder communication to the future of geological storage of CO<sub>2</sub> in Europe.

**9<sup>th</sup> CO<sub>2</sub>GeoNet Open Forum and workshop**  
on the future of CO<sub>2</sub> storage in Europe:  
**May 20-22 2014** in Venice:  
The key CO<sub>2</sub>GeoNet event for discussing  
the latest CO<sub>2</sub> storage research.  
Please, visit [www.co2geonet.com](http://www.co2geonet.com)

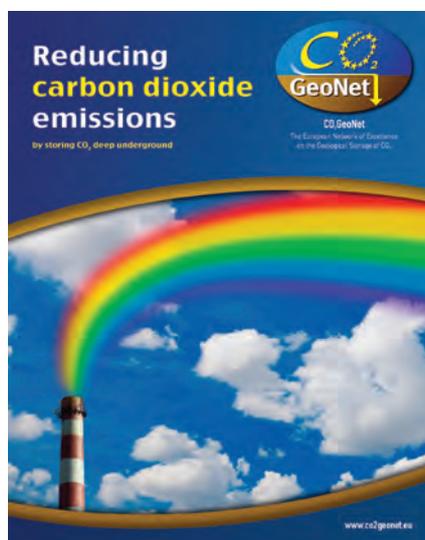


These decisions supporting greenhouse gas emission reductions at European Level and ongoing work in the Commission (e.g. the review on implementation of the Storage Directive being undertaken by DG CLIMA) demonstrate political will to reduce greenhouse gas emissions through energy efficiency, increased renewables and CCS in Europe. The ongoing dialogue and results will also feed into the CO<sub>2</sub>GeoNet Open Forum, where the future of CO<sub>2</sub> storage research in Europe will be discussed.

*Ceri J. Vincent, BGS, UK*

## New eBook - Reducing carbon dioxide emissions

A new eBook describing the CO<sub>2</sub>GeoNet view on geological storage of carbon dioxide published by Adjacent Digital Politics Ltd. is available through our website (see link at the end of this article). The eBook starts with a brief introduction to CCS then takes the reader through the major questions for geological storage of CO<sub>2</sub>: Why do we need to store CO<sub>2</sub>, is geological storage viable, is storage safe, can storage be implemented quickly enough? After these questions have been answered, a brief description of the role of CO<sub>2</sub>GeoNet is given. The eBook finishes with a perspective on decarbonisation of the EU Energy system from the European Commissioner for Energy, Günther H. Oettinger. For more information please visit [www.co2geonet.com/ebook](http://www.co2geonet.com/ebook)



*Ceri J. Vincent, BGS, UK*

*Front page of the new eBook*

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## CO<sub>2</sub>GeoNet, the scientific voice of Europe in international bodies

CO<sub>2</sub>GeoNet has become increasingly involved in international initiatives aiming to develop CCS and fight against climate change. Since the founding FP6 contract (2004-2009), CO<sub>2</sub>GeoNet has been officially recognised by **CSLF**, the Carbon Sequestration Leadership Forum and has established strong cooperation with **IEAGHG**, the IEA Greenhouse Gas R&D Programme. In 2013, CO<sub>2</sub>GeoNet provided documents for the Ministerial Meeting Book, which was presented and distributed at the 5th CSLF Ministerial Conference held in November 2013 in Washington, DC, USA. CO<sub>2</sub>GeoNet also prepared a report for the IEAGHG titled "Methodologies and technologies for mitigation of undesired CO<sub>2</sub> migration in the subsurface" and is involved in the organisation of the IEAGHG summer schools.

In 2013 CO<sub>2</sub>GeoNet became a member of the **GCCSI**, the Global CCS Institute and in early 2014 CO<sub>2</sub>GeoNet became a Category A Liaison organisation in the **ISO TC265** technical committee which will prepare international standards for CCS. CO<sub>2</sub>GeoNet was also accepted as an observer organisation of **UNFCCC**, the United Nations Framework Convention on Climate change, enabling its attendance at the **COP-19** conference in Warsaw in November 2013 with invited participation in three side events. CO<sub>2</sub>GeoNet is therefore able to express at a global level the points of view of the European research community on CO<sub>2</sub> geological storage and to efficiently collaborate with international bodies for the development of CCS technology in the race against climate change. In par-

ticular CO<sub>2</sub>GeoNet makes itself available to the European Commission and European stakeholders for presenting the scientific voice of Europe on geological storage of CO<sub>2</sub>.

*Isabelle Czernichowski-Lauriol,  
President of CO<sub>2</sub>GeoNet, BRGM,  
France*



*Official opening of the 2013 UNFCCC meeting  
(source: <http://ly/qL43P>)*

## Knowledge dissemination and awareness raising workshops



*Participants following 'Environmental and Climate Technologies' conference in Riga (October, 2013)*

One of the key actions of CO<sub>2</sub>GeoNet is to undertake information and communication activities as stated in the Association Statutes. Through the CGS Europe project and member funding, CO<sub>2</sub>GeoNet participated in and co-organised many activities with the aim of disseminating knowledge on current research on geo-

logical storage of CO<sub>2</sub> and improving stakeholder awareness of the potential for CCS to reduce greenhouse gas emissions. The audience for these activities included the general public, scientific experts, media representatives, governmental bodies, policy makers and industrial stakeholders.

Through the CGS Europe project (1 November 2010 to 31 October 2013), knowledge dissemination and awareness-raising activities undertaken by members of CO<sub>2</sub>GeoNet included more than 120 activities with international audiences and over 200 national activities in the 17 CO<sub>2</sub>GeoNet member countries. Activities with international audiences included more than 30 workshops/targeted meetings, over 30 conference presentations, more than 15 popular media articles and 10 press releases. National activities included 10 ministry/policy-maker consultations, 40 articles in popular media, attendance at 45 workshop/seminar events, 9 radio/TV interviews, 15 student lectures and 30 conference presentations.

Workshops where CO<sub>2</sub>GeoNet members presented their research results and CCS-related knowledge included three workshops on 'CO<sub>2</sub> Capture and Storage - response to climate change' (Vilnius, Lithuania, April 2011, Ankara, Turkey, June 2012 and Sofia, Bulgaria, October 2013), the 'Environmental and Climate Technologies' conference (Riga, Latvia, October 2013), a workshop on 'EOR: The catalyst for carbon capture clusters, in ports and other industrial regions' (Antwerp, Belgium, June 2013), the workshop on 'CO<sub>2</sub> Capture and Storage in the Baltic Sea Countries - Status and future cooperation opportunities' (Espoo, Finland, May 2013) and the World Bank workshop on 'CCS: Perspectives for the Balkan Region' (Dubrovnik, Croatia, May 2011).

*Ceri J. Vincent, BGS, UK*

# An overview of the opportunities for pilot projects across Europe

In the field of the geological storage of carbon dioxide (CO<sub>2</sub>), a 'pilot' project is one that has a research objective and where less than 100,000 tonnes of CO<sub>2</sub> are injected into the subsurface, typically over a timescale of a few years. Although CO<sub>2</sub> Geological Storage (CGS) is well advanced from a technological point of view, research based on real field sites is still greatly needed in order to maximise efficiency of storage technologies, to optimise tools for monitoring and verification, and to be able to adapt to the specificity of local geological conditions. Pilot scale projects should be open research platforms to allow field experiments that will supply highly relevant information to inform future design of larger-scale projects. This information will play a key role in ensuring safe operation of storage sites and strengthen confidence in the storage process.

In this context, the CGS Europe key report 'Opportunities for CO<sub>2</sub> Storage Pilot Projects across Europe' provides an overview of the many potential pilot projects across Europe, giving a wide range of options in terms of geographical distribution, varied geological settings and intended funding schemes. Detailed descriptions of each project are given based on responses to a questionnaire from CGS Europe project partners, most of whom are CO<sub>2</sub>GeoNet Members. The stage of development of these projects ranges from theoretical (where possibilities do exist but need to be further investigated) to injecting where a fully-fledged pilot project is underway. It would be interesting to maintain this diversity when deploying real projects and in this case it can be concluded that CO<sub>2</sub>GeoNet is in a strong position to provide support in the coordination of pilot projects, in the creation of links between them, in



Light equipment drilling at Hontomin Pilot site (Spain)

integrating research and results and in transferring newly acquired knowledge to the industrial sectors and the society as a whole, helping to build public awareness of CCS technologies.

*Roberto Martinez, IGME, Spain*

COUNTRY	PILOT NAME	LOCATION AND TYPE	DEVELOPMENT STAGE	DEPTH (m)	LITHOLOGY	FORECASTED BUDGET (M€)
Bulgaria	Pavlikeni	Onshore aquifer	Theoretical	800 - 1400	Carbonates	
Czech Republic	SE Moravia	EOR/depl. onshore oil field	Under investigation	1600	Sandstones	20 - 40
Denmark	Skagerrak	Onshore aquifer	Under investigation	1200 - 1500	Sandstones	
France	Paris Basin	Onshore aquifer	Theoretical	2500 - 3000	Sandstones	55
Hungary	Alfold	Onshore aquifer	Under investigation	>1500	Sandstones	>20
Italy	Sulcis	Onshore coal + offshore aquifer	Under investigation	900 - 1000	Coal/sandstone/limestone	30
The Netherlands	Q01	Offshore aquifer	Under investigation	1300 - 1600	Sandstones	50
The Netherlands	K12-B	Offshore gas field	Injecting	>3000	Sandstones	30 - 100
The Netherlands	Rotterdam	Onshore gas field	Under investigation	1200 - 1600	Sandstones	40
Norway	Longyearbyen	Onshore aquifer	Under investigation	670 - 970	Sandstones	
Norway	Svelvik	Onshore field lab, leakage	Ready	20 - 100	Unconsolidated sands	
Poland	Dziwie	Onshore aquifer	Ready (standby)	1250	Sandstones	19
Portugal	Lusitania	Onshore aquifer	Theoretical	1600	Sandstones	4 - 5
Romania	Turceni	Onshore EOR	Under investigation	2200	Sandstones	20 - 40
Romania	Rovinari	Onshore aquifer	Theoretical	1400	Sandstones	20 - 40
Romania	Craiova	Onshore depl. oil field	Theoretical	1500	Sandstones	20 - 40
Romania	Galati	Onshore depl. oil field	Theoretical	2000	Sandstones	20 - 40
Slovakia	Làb, Vienna Basin	Depl. onshore oil & gas field	Under investigation	1350 - 1450	Limestone/sandstone	8
Slovakia	Ptruksa	Depl. onshore gas field	Theoretical	1450 - 1850	Sandstones	9
Slovakia	Stretava	Depl. onshore gas field	Theoretical	1100 - 1750	Sandstones	8
Slovakia	Marcelová	Onshore aquifer	Theoretical	1038 - 1761	Carbonates/sandstones	25
Spain	Hontomin	Onshore aquifer	Commissioning	1600	Limestone	30
Baltic Region	Bastor	Offshore aquifer	Under investigation	>800	Sandstones	
Turkey	Bati-Raman	Onshore EOR pilot	Injecting	1311	Limestone	Confidential
United Kingdom	UK on	Onshore aquifer	Theoretical	800 - 1200	Sandstones	>1
United Kingdom	QICS	Sea loch, leakage pilot	Injecting	12	Unconsolidated sediment	2

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

## Presentation of new member institutes (2<sup>nd</sup> and 3<sup>rd</sup> round of applications)

### Geological and Geophysical Institute of Hungary (MFGI)



MFGI was founded in 2012 by merging the MAFI and ELGI geoscience institutes. Both founding institutes have more than a hundred-year long history of earth science research. MFGI is continuing to assess the CO<sub>2</sub> geological storage potential of Hungary. MFGI has been involved in several EU projects related to CO<sub>2</sub> storage assessment and is responsible for detailed investigation of potential storage sites in accordance with EU and national regulations. MFGI is enthusiastic to join forces with other research bodies for complex and high-level research.

### CIUDEN



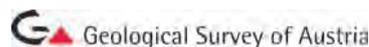
CIUDEN is a Public Research Foundation which has research and development of CCS as its core objective. CIUDEN has several innovative facilities, including three focussed on CO<sub>2</sub> storage: The Technology Development Plant Hontomín, a large scale pilot in the commissioning phase with CO<sub>2</sub> storage in a carbonate reservoir; the PISCO2 facility where the potential impacts of CO<sub>2</sub> leakage are studied; and the CCS-Lab where samples from the field sites are examined. CIUDEN expertise covers CO<sub>2</sub> storage site characterisation (including lab-scale and field-scale), storage site monitoring, including geophysics, geochemistry, hydrogeology and bio-monitoring and public perception and knowledge sharing on CO<sub>2</sub> storage.

### National Institute of Marine Geology and Geoecology (GeoEcoMar)



GeoEcoMar, established in 1993, represents the focal point of national excellence in research and consultancy on marine, coastal, river and lacustrine geology, geophysics and CO<sub>2</sub> storage. Research relating to CO<sub>2</sub> geological storage began with affiliation with ENeRG in 2001 and continued with participation in national and international projects related to CCS (CASTOR, EU GeoCapacity, CO<sub>2</sub>NET EAST, FENCO-ERA, CGS Europe, CO<sub>2</sub>Stop), as well as affiliation with GCCSI in 2010. GeoEcoMar coordinated the storage part of the Feasibility Study for the Romanian GETICA CCS demonstration project, which was partly funded by GCCSI. GeoEcoMar is also a founder member of the Romanian CO<sub>2</sub>Club (est. 2007).

### GBA



The Geological Survey of Austria (GBA), founded in 1849, represents one of the most traditional state surveys in Europe. Currently GBA has 120 employees including 90 scientists from various geoscientific disciplines. GBA's mission is to collect and interpret geoscientific data in Austria, to provide sound information about natural resources and hazards to the public and to advise the government of Austria. In the field of CCS, GBA is still a newcomer, as this topic has not yet received major national interest. However, as GBA has decades of experience in geothermal research, GBA aims to combine aspects of CCS and geothermal energy use.

### Institute of Geology at Tallinn University of Technology (TTUGI)



The Institute of Geology (formerly an institute of the Estonian Academy of Sciences) is an independent research, development and teaching institution of Tallinn University of Technology. TTUGI is a pioneer in CO<sub>2</sub> storage research and education in Estonia, providing an academic CO<sub>2</sub> storage course to international students. TTUGI has participated in EU FP and EC projects (EU GeoCapacity, CO<sub>2</sub>NET EAST, CGS Europe and CO<sub>2</sub>Stop), and is a regular consultant for a major national energy company, Eesti Energia. Expertise includes EU CCS Legislation, CO<sub>2</sub> storage capacity and 3D geological, geochemical, petrophysical and geophysical modelling in the Baltic Sea Region, as presented in TTUGI publications and the PhD study of Kazbulat Shogenov.

### Czech Geological Survey (CGS)



The Czech Geological Survey (CGS) is the leading geological research institution in the Czech Republic. It is a state research institute supervised by the Ministry of Environment. CO<sub>2</sub> geological storage has been one of the CGS priority research themes since 2004. CGS participated in a number of European R&D projects, including EU GeoCapacity (FP6) and CGS Europe (FP7). In 2006-2010, CGS coordinated CO<sub>2</sub>NET EAST, a FP6 project focused on CCS knowledge transfer and awareness raising in new EU Member States and Candidate Countries.



"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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Online platform: [www.co2geonet.com](http://www.co2geonet.com)

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Editorship: Information and Communication Task Force

#### 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; **TTUGI**, Estonia - Institute of Geology at Tallinn University of Technology; **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.