

GEO ENeRGY

ENOS Project in Force at the CO₂GeoNet Venice Open Forum

The annual 12th CO₂GeoNet Open Forum on San Servolo Island in Venice (Fig. 1) has become a lighthouse event in the CO₂ storage agenda. The 2017 event 'Driving CCS towards implementation' took place on 8-9 of May, followed by several workshops on 10-11 May.

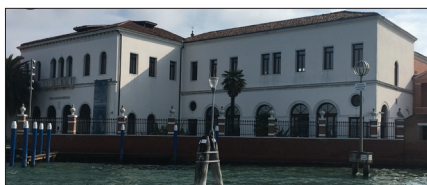


Fig. 1 San-Servolo Island, Venice, Italy

Partners from ENOS (Enabling Onshore CO₂ Storage in Europe), a four-year Horizon 2020-funded project, participated in force. The Open Forum proved a great occasion to meet with other research bodies and CCS stakeholders. Of the almost 100 attendees at the Open Forum, 40 were from ENOS partner institutes (meaning that 21 of the 29 partners were represented), including 24 participants from 10 ENeRG members.

9th May - Lessons Learned for Future Applications (session 4)

In line with the ENOS objective to enhance the development of CO₂ geological storage onshore, five field sites (Fig. 2) are included in the project to develop, test and demonstrate key storage technologies in the field and in various geological settings. Three of these sites were presented as oral presentations at the Open Forum (Fig. 3):

Hontomín technology development plant - from characterization to injection: 10 000 tonnes of CO₂ will be injected into a limestone rock layer at a depth of 1500 m at this storage pilot in Spain to study key parameters, demonstrate that the storage operations have no negative impact on the environment, and test innovative injection strategies.

The Sulcis Fault Lab - preparation for drilling phase: Located in Sardinia, Italy, CO₂ will be injected along a fault plane to test, in real life conditions, geochemical and geophysical monitoring tools, and to engage dialogue with local citizens. It is currently in the drilling preparation phase.



Assessing monitoring technologies at the UK GeoEnergy Test Bed: This field laboratory near Nottingham, UK, is an initiative of the University of Nottingham and the British Geological Survey (BGS). Tests in a shallow aquifer will help improve techniques to detect CO₂ in the subsurface so that, in the unlikely case that CO₂ leakage were to occur, smaller amounts of CO₂ could be identified more quickly. Such in-situ experiments will also help provide ground truthing for leakage simulations.

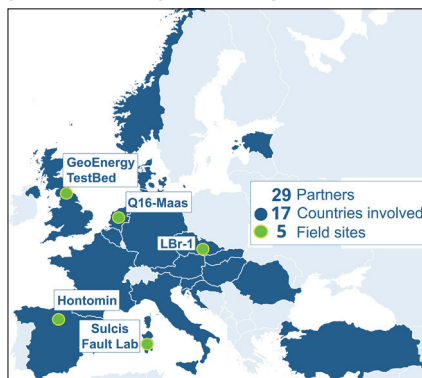


Fig. 2 Five field sites and 29 partners from 17 countries involved in the ENOS project, including 11 ENeRG members

10th May - International collaboration workshop 'Experience sharing focus groups: framing the topics' organised by BRGM (ENOS coordinator).

Knowledge sharing is an important activity in ENOS. One of the platforms for knowledge sharing will be Experience sharing Focus groups, where specific topics will be discussed in

webinars and workshops, open not only to ENOS partners but also to external stakeholders. Partners from the US participated in the workshop and are ready to collaborate in these focus groups. The first webinar, scheduled for September 2017, will deal with data management and archiving. Among the other topics discussed were public engagement, site characterisation and site monitoring.

11th May - Workshop 'Research priorities and future pilots' organised by ENOS partners BGS and University of Zagreb.

Over 30 experts in CO₂ storage participated in this workshop that aimed to identify the required characteristics and research questions that could be answered by undertaking pilot injection and storage tests in a number of European onshore geological settings. Discussion focused on three key topics: 1) site design and operational flexibility, 2) optimising strategic reserves and 3) assuring site conformance. Three pilot concepts were developed by the group: 1) an enhanced hydrocarbon pilot, which would seek to develop practical options for maximising storage during and following EHR, 2) a storage pilot integrated with other subsurface geoenery opportunities (such as geothermal energy) and 3) a flexible storage pilot concept to test innovative injection and pore-space optimisation technologies.

The presentations of the Open Forum, short videos and a key messages report are available on the CO₂GeoNet conference website:

www.conference2017.co2geonet.com

More on ENOS at:

www.enos-project.eu



Fig. 3 Panel discussion at San-Servolo Island, convened by V. Hladik (CGS) and N. Poulsen (GEUS), following presentations of Ketzin pilot site and three ENOS test sites, made by CO₂GeoNet members

Rowena Stead

BRGM



ENOS

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ESTMAP Results Available Online

The Interreg Central Europe Project GeoPLASMA-CE

Shallow geothermal energy use for heating, cooling and seasonal heat storage based on borehole heat exchangers and groundwater heat pumps may play a future key role in the European Union to establish a shift towards low emission, endogenous energy supply.

According to the EGEN market report, published in 2016, ground source heat pump systems have a share of 67% of the total installed geothermal capacities in Europe. The market situation still varies significantly between the Member States, showing well developed markets in Germany and Austria, developing markets in Poland and underdeveloped markets in Czech Republic, Slovakia and Slovenia. The above mentioned market situations are affected by different challenges.

Well developed markets face increasing conflicts of use, especially due to a high density of partly comparative shallow geothermal utilizations especially in urban areas. On the other hand, the current energy economic situation, especially low electricity prices, puts pressure on low scale utilizations as there is a strong competition between air based and ground source heat pumps. However, countries with well-developed markets, especially Germany, already obtain well proven tools for dissemination of potentials and risks of conflicts as well as sophisticated legal procedures associated to the use of shallow geothermal energy. In contrast, countries with developing or undeveloped markets still face the challenge of low visibility of shallow geothermal methods and lack effective procedures for planning and managing.

For that reason, the geological surveys of Austria, Czech Republic, Germany (Saxony), Poland, Slovakia and Slovenia launched the Interreg Central Europe project GeoPLASMA-CE in cooperation with the University of Krakow, the German Geothermal Association, the SME companies GiGa information systems and geoENERGIE Konzept in July 2016. In order to allow an effective transfer of the project results in the policy circle, the city administration of Ljubljana also joined the project consortium. Additionally, more than 15 national as well as international organizations observe GeoPLASMA-CE.

During the project, which runs between July 2016 and June 2019, GeoPLASMA-CE aims to foster the share of shallow geothermal use

based on borehole heat exchangers and groundwater heat pump systems in the Central Europe region. The project supports a transfer of knowledge between leading and follow-up countries and the establishment of an international network of experts. Tailored strategies and outputs will be prepared for assessment, planning, management and geoscientific monitoring of shallow geothermal use in 6 pilot areas, 3 of them trans-nationally in the above mentioned Member States (Fig. 4).

The project investigates the requirements for successful management of shallow geothermal use, in both urban as well as non-urban regions, as they are affected by different challenges. Harmonized guidelines on assessment, planning and management of geothermal resources will be important project outputs. Geoscientific maps based on 3D models will be prepared for the pilot areas, which will later be disseminated on tailored web based information and decision support systems.

In addition, the GeoPLASMA-CE web portal will also provide an expert platform aiming to connect expert knowledge in Central Europe. In that context, emphasis is also given on the exchange of know-how and the establishment of an international network on Thermal Response Test Measurements. Based on the produced geoscientific outputs, strategies and action plans will be developed for a sustainable implementation of shallow

geothermal techniques in the six pilot areas. The lessons learned in the project will finally be compiled to an international strategy for fostering the use of shallow geothermal methods in Central Europe.

National as well as international stakeholders and the interested public have already been included in the project via two surveys and two knowledge exchange workshops. User requirements for web tools and thematic contents of resource and conflict mapping were investigated in the surveys.

The knowledge exchange workshops covered geothermal mapping strategies and Thermal Response Tests. More events are scheduled in 2017, treating energy planning strategies and legal frameworks of shallow geothermal use in Central Europe. For more information on the project and the upcoming events in 2017 please visit the project website www.geoplasma-ce.eu.

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Fig. 4 Overview of the GeoPLASMA-CE pilot area

The M4ShaleGas Project: Measuring, Monitoring, Mitigating & Managing the Environmental Impact of Shale Gas

The European Commission's Energy Roadmap 2050 identifies gas as a critical fuel for the transformation of the energy system to a system with lower CO₂ emissions and more renewables energies. It can be argued that in Europe, natural gas replacing coal and oil will contribute to emissions reduction in the short and medium term, and that natural gas will have a permanent role in the future energy mix alongside CCS.

Shale Gas has proved to be a game changer in the US energy market, and it is thought that the rapid increase in production will make the nation self-sufficient in gas. Consequently, dependency on imported fossil fuels will be drastically reduced. Shale gas source rocks are widely distributed around the world, and many nations including European Member States have now started to investigate their shale gas potential.

There are, however, several concerns related to shale gas exploration and production, many associated with the hydraulic fracturing. Potential risks include the long term footprint of chemical additives to the fracturing fluid, in particular regarding pollution of groundwater. There is also a debate on the greenhouse gas emissions of shale gas (CO₂ and methane) and its energy efficiency compared to other energy sources. Furthermore, concerns are raised about land and surface impacts, noise, and seismic events. Assessing and minimizing the environmental impacts and footprint of (potential) shale gas exploration and exploitation in Europe requires a comprehensive scientific knowledge base on possible impacts and best practice operations, specifically addressing situations in different European Member States.

The M4ShaleGas project provides such a scientific knowledge base, studying the most important risks and impacts of shale gas operations (Fig. 5) dealing with subsurface impacts, surface impacts, air emissions, and public perceptions.

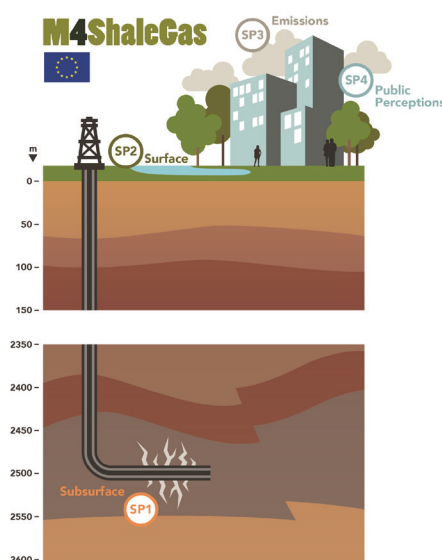


Fig. 5 Schematic diagram showing the different sub-programs (SP) of the M4ShaleGas project studying subsurface impacts (SP1), surface impacts (SP2), air emissions (SP3) and public perceptions (SP4)

It integrates the research of 18 research institutes from 10 European Member States (Fig. 6) covering many different topographical, geological and geopolitical regions in Europe. It addresses the issues raised in the Horizon 2020 call LCE 16 – 2014 on “Understanding, preventing and mitigating the potential environmental risks and impacts of shale gas exploration and exploitation”, and runs from June 2015 to November 2017 (30 months). All results are publicly available through the project's website www.m4shalegas.eu. The project is coordinated by TNO.

Jan ter Heege

TNO



M4ShaleGas has received funding by the European Union's Horizon 2020 research and innovation programme under grant agreement number 640715

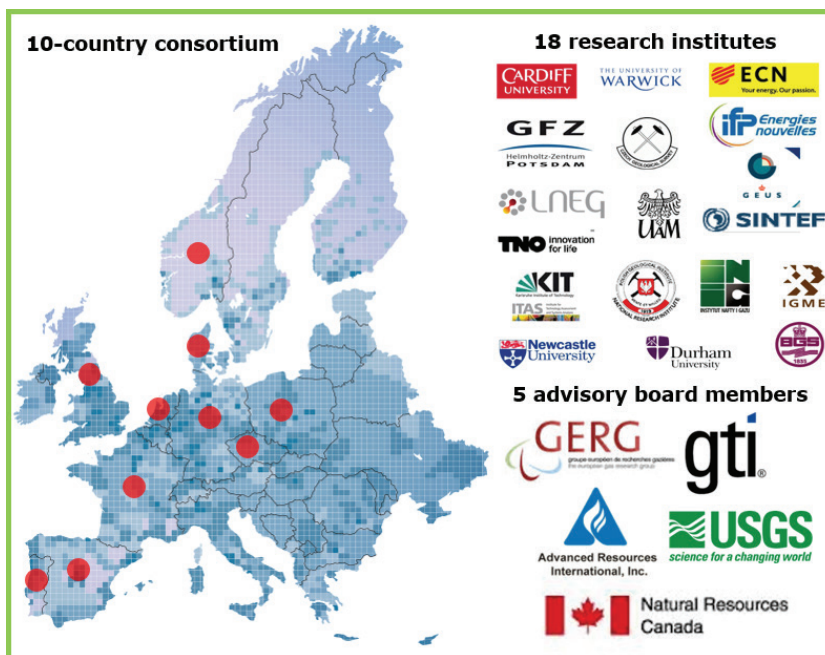


Fig. 6 M4ShaleGas consortium partners consisting of 18 research institutes from 10 European Member States and advisory board consisting of institutes from Europe, the United States and Canada

ENeRG – European Network for Research in Geo-Energy

ENeRG – European Network for Research in Geo-Energy is an informal contact network open to all European organisations with a primary mission and objective to conduct basic and applied research and technological activities related to the exploration and production of energy sources derived from the Earth's crust.

ENeRG president for 2016-2017 is Dr. Isabelle Czernichowski-Lauriol from BRGM, France. Contact: i.czernichowski@brgm.fr

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ENeRG website: <http://www.energnet.eu> is maintained by the Czech Geological Survey (CGS), Czech Republic.

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ENeRG Newsletter – GEO EneRGY

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4th Sustainable Earth Sciences Conference

3-7 September 2017, Malmö, Sweden

ENeRG is co-organising again the Sustainable Earth Sciences (SES) conference promoted by EAGE, the European Association of Geoscientists and Engineers. The 4th SES Conference will take place on 3-7 September 2017 in Malmö, Sweden, building on the success of the previous editions in Valencia, Spain (2011), Pau, France (2013) and Celle, Germany (2015). The SES 2017 conference will be co-located with two other EAGE conferences, the 23rd European Meeting of Environmental and Engineering Geophysics and the 2nd European Airborne Electromagnetics Conference. Registration to one conference will give participants the opportunity to participate in the two other conferences and engage in the exciting developments in the field of Deep and Near Surface Geoscience.

SES conference themes

The SES 2017 conference will bring together multi-disciplinary scientists working on different aspects of Sustainable Earth Sciences:

- Geothermal energy
- CO₂ storage
- Energy storage



- Hydrocarbon energy - environmental footprint
- Geological storage of hazardous waste
- Monitoring technology
- Modelling methods
- Environmental, economic and societal impacts
- Cross-technology topics

Registration

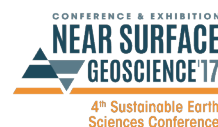
The call for abstracts is closed. The deadline for early registration is **15 July 2017**. Registration will close on 21 August 2017.

Short courses & Field trips

Two workshops and one short course are scheduled on Sunday 3 September and two field trips on Thursday 7 September. The conference itself will be from Monday 4 September to Wednesday 6 September.

Contact

For more information or enquiries please visit the event website: www.eage.org/event/ses-2017 or contact the EAGE Europe Office via nearsurface@eage.org.



ESTMAP Results Available Online

ESTMAP (Energy Storage Mapping and Planning), a European Horizon 2020 project, was finalised at the end of last year. Most ENeRG partners participated in its realisation, contributing especially to the creation of the first European database of energy storage sites and future potential. The database includes comprehensive and publicly available information about subsurface structures and rock formations suitable for storage of various energy carriers.

Main ESTMAP results are now available online on the project web at www.estmap.eu/deliverables.html.

The contents of the European energy storage database can be accessed and evaluated using an online and interactive ESRI GIS platform.

Project results prove the importance of large-scale energy storage in planning of future energy systems in the new, carbon-constrained world.

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