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## **Deliverable D4.6**

### **OUTCOMES OF THE INTERNAL KNOWLEDGE SHARING WORKSHOP 5**

#### **International cooperation and key results from European projects**

##### **San Servolo Island, Venice, Italy, 11 April 2013**

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# 1. Workshop report

## 5th CGS Europe Knowledge Sharing Workshop International cooperation and key results from European projects San Servolo Island, Venice, Italy, 11 April 2013

The fifth CGS Europe Knowledge Sharing Workshop “International cooperation and key results from European projects” took place at San Servolo Island, Venice, Italy, 11 April 2013. The workshop was organised by Alla Shogenova (TTU GI, WP 4.2 leader) with the help CO2GeoNet management board and sessions' chairs Roberto Martinez (S-IGME), Kazbulat Shogenov (TTUGI), Heike Rütters (BGR) and Adam Wojcicki, (PGI-NRI). The programme of the event is given in annex to this report.

93 participants attended the workshop from 25 CGS Europe countries, Australia, Iceland and USA (Table 1).

Country	N	Country	N
Australia	1	Italy	12
Austria	2	Lithuania	2
Belgium	3	The Netherlands	2
Bulgaria	1	Norway	7
Croatia	3	Poland	3
Czech Republic	1	Portugal	1
Denmark	1	Romania	2
Estonia	2	Serbia	2
Finland	1	Slovenia	1
France	10	Spain	3
Germany	5	Sweden	3
Greece	2	Turkey	3
Hungary	1	UK	14
Iceland	1	USA	3

Table 1: Number of participant per country

Most of the workshop presentations are available on the restricted part of the project website: <http://www.cgseurope.net/NewsData.aspx?IdNews=81&ViewType=Actual&IdType=478>

During the workshop at San Servolo Island, presentations in the two sessions were made by 5 invited speakers and 7 project participants (Annex 1) (Figs.1-7).

The first session „International cooperation outside Europe“ was concluded by a discussion on CCS research worldwide, stressing the role of international cooperation and knowledge transfer from developed to developing countries in implementation of CCS technology.

The workshop ended with discussions on filled and remaining gaps and key issues followed by overall conclusions of the workshop.

The conclusions reached by the workshop participants are summed up here below.

## 2. Conclusions

1. Presentation of the SIMSEQ project on “International Model Comparison Study for Geological CO<sub>2</sub> storage” with involvement of 15 modeling teams from 9 countries show the example of really high-level international worldwide cooperation on CGS, when different modeling process were applied to one storage site and results are compared to verify quality and reliability of CGS modeling.

2. Two cases of cooperation with developing countries (Kazakhstan and Morocco) show the urgent need to transfer knowledge from developed to developing countries, but results depend highly on national policy and political decisions. This can be highlighted by the example of China and Russia. After a first knowledge transfer project in a limited area (FP6 EU GeoCapacity), China is now one of the leaders in new full-scale CCS projects planning. On the contrary, in Russia, CCS technology is not yet wide-known and developed, because it is not included in the national research and policy agenda.

3. European research projects are working towards the wide implementation of CCS by filling identified gaps such as :

- uniformed CO<sub>2</sub> storage capacities assessment,
- guidelines for site characterisation,
- impact of heterogeneity ,
- single and coupled process understanding in the behavior of reservoir, cap rocks and well cements,
- upscaling approaches ,
- modeling methods,
- monitoring technique validation,
- multiphase tracer transport,
- effects of CO<sub>2</sub> leakage on ecosystem,
- demonstration of “near zero CO<sub>2</sub> emission” geothermal power plant.

4. Times are crucial now for the wide deployment of CCS: gaps remain, but research capacity and expertise is available to overcome them.

5. It is necessary to transfer already available knowledge to countries less advanced in CCS research and technology.

6. Opportunities for CO<sub>2</sub> utilization, such as use of CO<sub>2</sub> for enhanced geothermal energy recovery or for shale gas extraction, and combination with other technologies (like Bio CCS) or other types of storage (like basalts) must be studied and developed.

7. Possible economic advantages of using Enhanced Hydrocarbon Recovery and CCS should be shown to stakeholders and general public.



Figures 1-7. Presentations and discussion.

# ANNEX 1- Workshop program

5th CGS Europe knowledge-sharing workshop - 11 April 2013				
International cooperation and key results from European projects				
9:00	9:05	Introduction	Alla Shogenova	CGS Europe-TTUGI
Session 1. International cooperation outside Europe				
Chair: Roberto Martinez, CGS Europe-S-IGME				
9:05	9:30	International research networks of the IEA Greenhouse Gas R&D Programme (IEAGHG)	Millie Basava-Reddi	IEAGHG
9:30	9:55	Gaps closure and recommendations from the CSLF technology Road Map	Sergio Persoglia	CSLF - OGS
9:55	10:20	SIMSEQ - Progress of the international Model Comparison Study for Geologic CO <sub>2</sub> Storage	Sumit Mukhopadhyay	LBNL, USA
10:20	10:50	Coffee break		
Chair: Kazbulat Shogenov, CGS Europe-TTU GI, OGS				
10:50	11:10	Is CCS a feasible option in developing countries? Presenting CCS as a realistic choice for Kazakhstan	Kris Welkenhuysen	CGS Europe-RBINS-GSB
11:10	11:30	Potentiality of carbon dioxide geological storage in Morocco. Cooperation with Iberian countries	Roberto Martinez	CGS Europe-S-IGME
11:30	12:00	<b>Discussion on CCS research worldwide</b>	Moderator: Gary Kirby	CO <sub>2</sub> GeoNet-BGS
12:00	13:10	Lunch		
Session 2. Key results from European projects: remarkable contribution to implement CO <sub>2</sub> storage				
Chair: Adam Wojcicki, CGS Europe-PGI-NRI				
13:10	13:30	CO <sub>2</sub> STOP & European CO <sub>2</sub> Storage Atlas	Niels Poulsen	CO <sub>2</sub> GeoNet-GEUS
13:30	13:50	Progress of MUSTANG project on Quantification of Saline Aquifers; results on method development and field testing programs so far	Auli Niemi	Uppsala University
13:50	14:10	SiteChar: demonstrating safe and permanent storage before injection begins	Jonathan Pearce	CO <sub>2</sub> GeoNet-BGS
14:10	14:30	Hydrogeological modeling of CO <sub>2</sub> storage at the basin scale: preliminary results of <b>ULTimateCO<sub>2</sub> project</b>	Nicolas Maurand	CO <sub>2</sub> GeoNet-IFPEN
14:30	15:00	Coffee break		
Chair: Heike Rütters, CO <sub>2</sub> GeoNet-BGR				
15:00	15:20	CO <sub>2</sub> FIELDLAB - CO <sub>2</sub> Field Laboratory for Monitoring & Safety Assessment	Menno Dillen	CO <sub>2</sub> GeoNet-SINTEF
15:20	15:40	What is the likely extent of ecosystem impacts should a CO <sub>2</sub> storage site leak? Findings from the RISCS project	David Jones	CO <sub>2</sub> GeoNet-BGS
15:40	16:00	CarbFix - mineral storage of CO <sub>2</sub> in basalt	Bergur Sigfússon	Reykjavik Energy
16:00	16:20	Research on site closure assessment - results from the CO <sub>2</sub> CARE project	Axel Liebscher	GFZ Potsdam
16:20	16:50	<b>Discussion on filled gaps and key issues</b> <b>Conclusions</b>	Moderator: Alla Shogenova	CGS Europe-TTUGI

