CO2 Capture and Storage, a viable and flexible technology vital for completing the climate change mitigation portfolio – The perspective from the CO2GeoNet European Network of Excellence on CO2 geological storage

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Abstract

CO_2GeoNet, the European Network of Excellence on CO_2 geological storage, was created in 2004 as an EU PF6 project and became an association in 2008. The Association strives to enable efficient and safe CO_2 storage in deep geological formations to combat climate change and ocean acidification. With a current membership of 26 research institutes spanning 19 European countries, activities include research, scientific advice, training, information & communication. CO_2GeoNet, as a pan-European scientific body, has a valuable and independent role to play in enabling the deployment of the CO_2 capture and storage (CCS) technology, when and where it is needed in Europe and in other parts of the World. CO_2GeoNet is highly active on the international scene, through a cooperation agreement with IEAGHG and the Global CCS Institute, as a CSLF recognized network and a Liaison organization in the ISO CCS Technical Committee, and as a UNFCCC accredited Research NGO (RINGO).

The COP21 Climate Conference in Paris in December 2015 was an important milestone and CO_2GeoNet was deeply involved, both before and after this conference, in bringing the science behind CO_2 storage and the rationale for CCS to a wide range of stakeholders including the general public:

- In May 2015 in Venice, the 10th CO_2GeoNet Open Forum themed "*CO_2 storage – the cornerstone of our low carbon future*" offered the opportunity to discuss the current state of play of CCS in terms of research achievements, policy, public outreach and business development.

- In July 2015 in Paris at the international Scientific Conference "Our Common Future under Climate Change", CO_2GeoNet co-organized a session entitled "*Negative emissions for climate change stabilization & the role of CO_2 geological storage*".
- In December 2015 in Paris-Le Bourget at the COP21 Conference, CO_2GeoNet organized side-events and booths on CCS in both the UNFCCC negotiation blue zone and the public zone of the Climate Generations Area.
- In March 2016 in Orléans, CO_2GeoNet is co-organising a conference entitled "*Coupling CO_2 storage and Renewable Energy as part of integrated territorial energy and climate plans*". The focus is on coupling CO_2 storage with bioenergy and geothermal energy, and considering its application to regional contexts and small emitters.
- In May 2016 in Venice, the 11th CO_2GeoNet Open Forum will focus on the future of CCS in light of the momentum created by the Paris global climate agreement reached at the COP21 Conference. Topics to be addressed will include the role of CCS in national roadmaps (INDCs) and regional implementation plans towards a low carbon future, CO_2 storage and/or utilisation, as well as synergistic use of pore space in the subsurface.

The main outcomes of these events will be presented, focusing on key messages such as:

- CCS is a viable technology to reduce emissions resulting from fossil fuel combustion and industrial processes and even an opportunity for negative emissions through integration with renewable energy from biomass (BECCS). This makes CCS a very flexible technology to mitigate climate change.
- The longer the deployment of key mitigation technologies is delayed, the more expensive and the more challenging it will be to keep global temperature change below 2°C. CCS provides a timely, highly scalable and cost effective pathway to pursuing this much needed step-change action.
- The Paris climate agreement, including the highly challenging objective to try to limit global warming to 1.5°C, requires stronger efforts in CCS technology development, transfer and capacity-building. Developed countries have the responsibility to provide support to developing countries for enabling the use of CCS.
- CO_2 can be stored safely and efficiently in deep geological formations. Currently, through 22 large-scale projects in operation worldwide, over 20 Mt of CO_2 are captured from power and gas production and injected into saline aquifers and hydrocarbon reservoirs each year, with 50 Mt already securely stored.
- More demonstration and pilot projects in a wide range of geological settings, with both knowledge-sharing and public outreach activities, are needed in Europe and worldwide to rapidly advance CCS technology.
- The importance of further research activities is emphasized for decreasing costs and increasing the reliability and efficiency of methods and tools for the characterization, operation, monitoring, and closure of storage sites, as well as for creating synergies with other uses of the subsurface and avoiding conflicts of use.
- In addition to large storage sites offshore, smaller and distributed storage sites onshore closer to emitters offer more flexibility to territories for managing their CO_2 emissions locally while contributing to local economic development, with possible combination of CCS with other local activities such as renewable biomass and geothermal energy, CO_2 use, or capture of atmospheric CO_2.
- Assurance of storage capacity is a crucial boundary condition for the sustainable commercialization of CCS technology. Sufficient storage potential is available, but needs to

be certified in terms of sustainable injection rates of CO_2, such that storage space is available when needed. This certification can be executed in a staged manner over future decades. It is imperative to start new storage operations now in ‘sweet spots’ where there is enough storage capacity for at least the next decade.

- CCS is not a way to continue using fossil fuels. CCS is a ready-to-go climate change mitigation technology that countries or operators who still wish to make the choice to use fossil fuels, even partially, should have the duty to implement. No more fossil energy without CCS! Returning the carbon back into the underground where it was extracted is a virtuous loop for protecting the environment and the climate.