



Response to European Commission consultation document

1st July 2013

Expert recommendations from the European scientific community on CO₂ geological storage in response to the “Communication from the Commission to the European Parliament, the Council, The European Economic and Social Committee and the Committee of the Regions on the Future of Carbon Capture and Storage in Europe”

The **CO₂GeoNet Association**, the European Network of Excellence on CO₂ geological storage, in close connection with the **CGS Europe** FP7 project, here expresses the views of a pan-European consortium involving 34 research institutes from 24 EU Member States and 4 Associated Countries. As such representing the European scientific community on CO₂ Geological Storage (CGS), CO₂GeoNet & CGS Europe wish to share their expert input for the debate on the future of CCS in Europe.

In response to the questions set out in the consultative “Communication from the Commission to the European Parliament, the Council, The European Economic and Social Committee and the Committee of the Regions on the Future of Carbon Capture and Storage in Europe” issued on the 27th March 2013, we have largely focussed this brief set of recommendations on those directly relevant to the expertise of CO₂GeoNet and CGS Europe, i.e. scientific research into geological storage of CO₂.

In view of the complexity of the underlying motivation, we would welcome the opportunity to have an additional oral discussion to further explain and explore the views that can only be briefly presented here.

Our key messages are:

- The possible role of CCS in a clean energy mix is not well understood by the public and other stakeholders, policy and communication should address this issue.
- Policies including consideration of public consultation are more likely to be supported, therefore public engagement is key to the success of CCS
- We see CCS as synergistic with renewables as part of the clean energy mix, offering a bridging technology for fossil fuels and opportunities to counteract the often intermittent nature of renewable energy sources
- Combining CCS with biomass can result in negative emissions and is currently the only technology able to do so at large scale
- For some industrial processes where CO₂ is generated as a by-product, CCS offers the only opportunity to reduce GHG emissions
- Funding options for pilot and demonstration projects, inclusive of a research component and public sharing of results, are key for the quick advancement of CCS towards full implementation and for the future construction of an European-scale system
- Pilots and demonstrations are complementary and have important roles to play in driving research forward and demonstrating the safety of geological storage of CO₂

- 1) *Should Member States that currently have a high share of coal and gas in their energy mix as well as in industrial processes, and that have not yet done so, be required to:*
 - a. *develop a clear roadmap on how to restructure their electricity generation sector towards non-carbon emitting fuels (nuclear or renewables) by 2050,*
 - b. *develop a national strategy to prepare for the deployment of CCS technology.*

In the light of the overwhelming scientific evidence with regard to climate change, CO₂GeoNet and CGS Europe believe that the Member States should be required to swiftly advance using either one of these options or a combination of both in order to make a diversified, stable and cost-effective system that reduces greenhouse gas emissions.

- 2) *How should the ETS be re-structured, so that it could also provide meaningful incentives for CCS deployment? Should this be complemented by using instruments based on auctioning revenues, similar to NER300?*

CO₂GeoNet and CGS Europe wish to take this opportunity to support resolution of funding issues for demonstrations/pilots and full scale CCS because of the opportunities for advancing scientific research in the field of CO₂ storage offered by pilots and demonstration projects. Public funding incentives to pilots and demonstrations should be conditioned to the collaboration with independent research institutes and these data and experiences that are relevant for public concern should be communicated openly in order to engage with stakeholders. This kind of collaboration with open access to pilot/demonstration results will accelerate demonstration and implementation of CCS where upcoming projects can learn from these flagship projects. We urge the Commission to analyse decisions also in the light of their impact on scientific development.

We would also support a package that rewards negative emissions via the capture and storage of biogenic CO₂ under the EU ETS and includes the concept of negative emissions such as biomass with CCS.

The implementation timescale of the funding scheme(s) and interaction between funding mechanisms is also of great importance and we request these factors are taken into consideration. With respect to other countries in the rest of the world, who are going ahead with the demonstration programmes, European funding mechanisms have proven too complicated and unreliable (for example, the funds available for NER300 were reduced by the fall in unit price of allowances).

- 3) *Should the Commission propose other means of support or consider other policy measures to pave the road towards early deployment, by:*
 - a. *support through auctioning recycling or other funding approaches*
 - b. *an Emission Performance Standard*
 - c. *a CCS certificate system*
 - d. *another type of policy measure*

We support policies which bring about further scientific research and communication of CCS to the public including;

- Policy support for CO₂ storage pilots as they offer an excellent opportunity to increase scientific knowledge on CCS through field experience. Pilots offer opportunities to ensure continuous research on storage using real data. Pilots also increase confidence in CCS as a technology and build experience for dealing with new situations
- Policies which support release of geological data to support public understanding of the subsurface (e.g. in the UK offshore borehole geology is released via the DECC website after a certain number of years). Policies which support open communication of demonstration and pilot research results would also be constructive in informing scientific and public debate

- More alignment between European and national authorities and time efficient funding mechanisms would be useful (for example, the UK demonstration projects were deemed non eligible for NER300 funding in round 1 due to the timescale of the UK competition). Complicated funding mechanisms have hindered the demonstration process
- Support CCS for all industrial sources; current research has focussed on power stations, however CCS is a key technology in CO₂-intensive industries such as cement and steel production and hydrocarbon refineries. In industries where fossil fuels are irreplaceable as a fuel or feedstock, or where CO₂ production is chemically inevitable, CCS is the only solution for reducing emissions
- Clear definition of what constitutes 'CCS ready' for large industrial sources (power, steel cement etc) and policy to support new plants being 'CCS ready' would be welcome. Aspects of the capture, transport and storage options for a proposed plant should be included in the pre-feasibility study

6) *What are the main obstacles to ensuring sufficient demonstration of CCS in the EU?*

More field experience is needed, especially as each storage site is unique due to local geology. We need to promote research across a wide range of experimental sites to increase our understanding of storage in different geological settings and conditions. Confidence in storage capacity and safety will encourage CCS and support policies and funding mechanisms which could encourage further company investment in CCS.

Storage pilots should be seen as complementary to CCS demonstration as they offer opportunities to research novel technologies or geological conditions which are not yet proven for large scale deployment. It should by no means be taken that pilots could somehow substitute the core necessity to swiftly move to the full demonstration projects at appropriate locations however.

Additionally, CCS needs to be placed in context as one of the necessary measures to reduce emissions. Promotion of an integrated public dialogue on CCS and the other technologies of the mitigation portfolio would be a positive step in public engagement, in particular putting an emphasis on synergy rather than competition with other technologies in the important exercise of decarbonisation.

CCS faces financial challenges; currently a level playing field does not exist between CCS and renewable technologies as unlike CCS, renewables benefit from feed-in tariffs. The gap between funding for and cost of CCS demo projects was highlighted during the NER300 call. This is the main reason for the failure of many NER300 projects.

7) *How can public acceptance for CCS be increased?*

Based on our experience working in this field for many years and based on frequent questions that we receive from stakeholders and the public we would like to make the following recommendations:

CCS has been a top-down decision to date. Allow input from the public to decisions about clean energy. Decisions taken including consideration of public consultation are more likely to be supported.

It is still unclear to much of the public what the role of CCS can be in the energy system. While other technologies (e.g. renewables) appear aligned to a new energy concept, CCS has a blurred image. Will it lock us in to technologies that we want to overcome? Is it a bridging technology? For industries where CO₂ production cannot be avoided (e.g. steel, chemicals, cement), is it the only solution? All these questions require answering for stakeholders and the public to understand policies and support them.

As such, communication from the commission and member states national governments with clear and concise explanation is needed, accompanied by comprehensive reference documents, on:

- why CCS is important,

- why it should be part of the energy portfolio,
- why it is worthwhile to spend a considerable amount of money on it,
- relative merits of CCS and other options in that member state
- CO₂ storage is safe when sites are carefully chosen, operated and monitored as demonstrated by current demonstration and pilot projects

Make a clear decision:

- If there are no alternatives and CCS has to be implemented then it should be made mandatory. This will allow investment planning and provide a common ground for all stakeholders to work in a precise direction for implementing it.
- If it is one option among others, then full explanations of the relative advantage of each option should be provided

Governmental support is key to public acceptance. Commitment to the implementation of the technology can be demonstrated in several ways such as:

- Funding support, ensuring the development of pilots and industrial scale demonstrations
- Communication material explaining why CCS is needed to complement the development of renewables and that it will create and preserve jobs in many industrial sectors
- Introducing a progressive mandatory scheme for CCS for high emitting industries linking again job creation/preservation to the development of CCS

Storage pilots are an excellent opportunity to demonstrate to the public the feasibility and safety of storage and to set up dialogue with the civil society. Therefore, CO₂ storage pilots with public participation are crucial. Pilots offer opportunities for public engagement and demonstration of CCS including monitoring methods which have been developed to detect early any leakage or irregularities and possible mitigation and remediation techniques identified for each site.

Finally we strongly recommend the use of consistent and correct terminology. CCS captures and stores carbon dioxide, not carbon or other carbon compounds. CO₂ or Carbon Dioxide is often shortened to “Carbon”, which refers to other substances. Lack of clarity in communication can lead to misunderstandings as discussed in the ECO₂ project report “The language of CCS” (<http://www.eco2-project.eu/info-material.html>). It is important to use the terminology of Carbon Dioxide, as it is the case in several official documents such as the EU Directive for the Geological Storage of Carbon Dioxide, the IPCC special report on CCS, the CCS ISO norm in preparation, etc.

8) *Other issues*

CO₂GeoNet and CGS Europe wish to take this opportunity to emphasise that CCS has strong synergies with renewables:

- Combined CCS & renewable energy schemes are emerging, e.g. with biomass leading to negative emissions (Bio-CCS) or with geothermal energy, combining heat production and CO₂ storage.
- CCS can allow us to utilise fossil fuels to supplement intermittent clean energy sources including renewables.
- CCS could open the door to the storage of excess electricity generated from renewables. New research suggests that intermittent renewable sources (e.g. wind power) may be used to generate hydrogen through electrolysis which can then be converted to methane or liquid hydrocarbons (using CO₂ or CO). Those synthetic hydrocarbons which can be stored and supplied on-demand, will then substitute equal amounts of primary fossil resources, reducing CO₂ emissions at the energy system level. CO₂ storage sites will be key for ensuring the provision of a reliable stream of CO₂ when needed.

New research is being undertaken to investigate new schemes combining CO₂ storage with other energy uses of the subsurface, such as geothermal energy or underground coal gasification offering options for CO₂ capture, utilisation and storage (CCUS).

About CO₂GeoNet

CO₂GeoNet is the European scientific body on CO₂ geological storage. Founded by 13 public research institutes from 7 European countries, it brings together over 300 researchers with the multidisciplinary expertise needed to address all aspects of CO₂ storage. With activities encompassing joint research, training, scientific advice, information and communication, CO₂GeoNet has a valuable and independent role to play in enabling the efficient and safe geological storage of CO₂. CO₂GeoNet was created in 2004 as a Network of Excellence supported by the EC FP6 programme for 5 years. In 2008, CO₂GeoNet became a non-profit association under French law. As of 2013, the membership of CO₂GeoNet is expanding thanks to the support of the FP7 CGS Europe project. More about CO₂GeoNet at www.co2geonet.eu

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- GEUS (Denmark)
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About CGS Europe

CGS Europe is a networking project (2010-2013) that pools together the expertise of 34 key research institutes in the topic of CO₂ geological storage across 28 countries (24 European member states and 4 associated countries). Funded by the EC FP7 programme, it builds upon the networking and integration experience of CO₂GeoNet with the ultimate goal of providing an independent, scientific, pan-European platform and reference source where national, European and international experts, institutes and regulators can access the most up-to-date results of CO₂ storage-related studies, share experiences and good practices, discuss the implementation of regulations, identify research needs to face upcoming challenges, and build new projects.

After the end of the project in October 2013, all activities will be performed in the framework of the CO₂GeoNet Association, enlarged with new members from CGS Europe for a pan-European coverage.

More about CGS Europe at www.cgseurope.net

CGS Europe partners:

- CO₂GeoNet
- GBA (Austria)
- RBINS-GSB (Belgium)
- SU (Bulgaria)
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