

23 April 2016

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**To SET-Plan Secretariat**

(sent by email to [SET-PLAN-SECRETARIAT@ec.europa.eu](mailto:SET-PLAN-SECRETARIAT@ec.europa.eu))

**Subject: ENeRG input on SET plan Action 9 - CCS and CCU Issues Paper**

Dear Madam, Sir,

The ENeRG research network for the advanced and smart use of the subsurface for energy issues, covering 23 European countries, welcomes the Issues Paper entitled 'Renewing efforts to demonstrate carbon capture and storage (CCS) in the EU and developing sustainable solutions for carbon capture and use (CCU)'.

Indeed CCS is a key climate change mitigation technology and the Use of CO<sub>2</sub> can be a catalyzer for CCS (not only for capture and transport but also for storage) while modestly contributing to the decarbonisation of the energy and industry system.

ENeRG recommendations on key objectives and targets in CCS and CCU are listed below:

*By 2020:*

- *At least one commercial-scale CCS demonstration project operating; ENeRG recommends specifying 'in the power sector' (the third bullet point specifies 'preferably with an industrial source' and the Sleipner and Snohvit projects in Norway are already operating at commercial scale).*
- *Completed feasibility studies on applying CCS to a set of clusters of major industrial CO<sub>2</sub> sources (at least 3 clusters in different regions of the EU); ENeRG recommends including also CO<sub>2</sub> sources from the power sector in the clusters, together with the industrial sources.*
- *At least one additional CCS demonstration project, preferably with an industrial source from which CO<sub>2</sub> can be easily captured, having taken positive FID, which could be possibly funded from the part of the Innovation Fund available before 2021 (50 million allowances from Market Stability Reserve plus leftover money from NER300); ENeRG approves.*
- *At least 1 Project of Common European Interest identified for CO<sub>2</sub> transport infrastructure, preferably related to storage in the North Sea; ENeRG approves and also recommends considering the Baltic Sea: 'preferably related to storage in the North Sea or Baltic Sea'.*

- *An up-to-date atlas of the geological storage capacity that has been identified by various national authorities in Europe. This will provide additional certainty that the required CO<sub>2</sub> storage capacity will be available when needed;*

**The JRC is preparing the publication of the first European atlas on CO<sub>2</sub> storage, based on the results of the CO2Stop and EU Geocapacity projects, coordinated by one ENeRG member and in which many ENeRG members contributed. However, the capacity assessment at this stage is theoretical. It is based on volumetric calculation using storage efficiency factor, and on available public subsurface data meaning that the interpretations still have large uncertainty even at a regional scale. ENeRG recommends moving from theoretical to greater certainty by acquiring new subsurface data (through agreements with private bodies and through new wells with adequate coring, sampling and injection tests to evaluate injectivity and permeability with CO<sub>2</sub> of the investigated formations) and carrying out dynamic modelling of CO<sub>2</sub> injection at storage site level.**

**ENeRG also recommends MS to perform local investigations in regions with greater potential and low conflicts of interest in order to appraise at least three storage sites at pre-competitive characterization level for facilitating subsequent application for a storage permit and the kick-start of CCS in their country through ‘sweet spots’. MS with no storage capacity should consider transboundary projects.**

- *At least 3 pilots on promising new capture technologies, and at least one to test the potential of Bio-CCS;*  
**ENeRG approves.**
- *At least 3 new CO<sub>2</sub> storage pilots in preparation or operating in different settings;*  
**ENeRG recommends to specify ‘in deep saline aquifers’ for the 3 pilots, and when possible to investigate synergies with renewables (geothermal energy & heat extraction; Bio-CCS and carbon negative solutions; etc.)**
- *Completed feasibility studies for the use of captured CO<sub>2</sub> for fuels and value added chemicals;*  
**No comment on such topic.**
- *At least 4 pilots on promising new technologies for the production of value added chemicals from captured CO<sub>2</sub>;*  
**ENeRG thinks that this is not clear compared to the above objective on feasibility studies. May be the two should be merged but with a mention/list of specific prospective technologies therein (e.g. synthetic methane production using captured CO<sub>2</sub> as a carbon source and Power-to-Hydrogen technology).**
- *Setup of 1 Project of Common European Interest for demonstration of different aspects of industrial CCU, possibly in the form of Industrial Symbiosis.*  
**ENeRG thinks that it is not really clear how does this Project relate to the above feasibility studies. It looks like the subject is much the same but then the Project should start AFTER the feasibility studies, based on their results, therefore rather at the beginning of the 2030 group.**

*On the road to 2030:*

- *MS to deliver on their 2030 nationally determined contributions to the COP21 agreement, and in particular decide on the need for CCS to achieve these targets and make them compatible with the 2050 long-term emission targets;*  
**ENeRG recommends asking MS to mention CCS from the first revision of their INDCs (due in 2020), with an explanation on whether they need it or not. This is really important as CCS is a key technology in the mitigation portfolio. It should even be mentioned already in the above part ‘By 2020’.**
- *MS having prepared plans for retrofitting until 2040 at least 90% of their fossil fuel power plants capacity which they expect to be still operational beyond this date.*  
**ENeRG supports this. Before 2030 each concerned MS should have plans ready for retrofitting (which includes capture, transport and storage plans), in order to have 10 years for implementing the plans and be ready to capture and store CO<sub>2</sub> from 2040 at the latest.**

- *MS having prepared, if appropriate in regional cooperation with other MS, feasibility studies for applying CCS in all major clusters of energy and carbon intensive industries in the EU by 2035, cooperating across border for transport and storing CO<sub>2</sub>.*  
**ENeRG approves, pending that the deadline is advanced to 2025, not 2035, therefore leaving 10 years for preparing implementation from 2035.**
- *Further develop the potential of the industrial use of captured CO<sub>2</sub>, in particular through a Project of Common European Interest.*  
**ENeRG recommends further developing the potential of CCUS, in particular through a Project of Common European Interest covering the full capture-transport-storage-use chain and the integration of CCUS in the European energy system.**

**ENeRG specifically recommends appraising a set of onshore storage sites in Europe** to the level of confidence that CO<sub>2</sub> injection can be performed at sustainable rates for at least the next decade, with a 'certified' minimum storage capacity. This will facilitate the kick-start of new storage operations in 'sweet spots' and the further deployment of CCS in a staged manner over future decades. This action has to be started as soon as possible as it takes time to characterize sites up to the level required by the EU Directive on the geological storage of CO<sub>2</sub>. In addition all stakeholders, including the local authorities and citizens need to be involved in the process for co-constructing solutions to mitigate climate change.

ENeRG believes that 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<sub>2</sub> 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<sub>2</sub> use, or capture of atmospheric CO<sub>2</sub>.

**ENeRG stresses that Education and Training is a key standing issue in the way to reaching the proposed targets/priorities** listed in the Issues Paper. Additional targets should be included in both the roads to 2020 and 2030, based on the SET Plan Roadmap on Education and Training and further considerations. This is extremely important for building capacity for CCS development and deployment, but also for enabling regional stakeholders and European citizens to be well informed about the mitigation potential of the CCUS technology and making them ready to participate to the co-construction of decarbonisation plans for their territories. This active involvement of stakeholders is needed for designing the best set of mitigation solutions and preventing 'public acceptance' issues as far as possible.

In addition ENeRG stresses that **Europe should include one additional target towards developing countries**, related to support on CCUS technology development and transfer, and capacity-building. This is in line with the requirements of the Paris climate agreement.

**All the targets described in the Issues Paper need to be addressed jointly and collectively by Industry, EU, Member States, Regions, Research Institutes and Universities.** In particular **Regions** need now to be involved and to include R&I actions on CCUS in their territorial climate and energy plans, with the possibility to engage also European Regional Development Funds, including through European Territorial Cooperation (INTERREG). **The best placed actors** for providing the subsurface knowledge in an impartial and coordinated way throughout Europe are the CO<sub>2</sub>GeoNet association (dedicated to CO<sub>2</sub> storage), the EERA CCS Joint Programme (covers the full CCS chain), the ENeRG network (dedicated to geo-energy), and the Eurogeosurveys association (dedicated to the broad and unbiased knowledge of the subsurface and various potential therein).

**CO<sub>2</sub>GeoNet**, the European Network of Excellence on CO<sub>2</sub> geological storage, was created in 2004 as an EU PF6 project, became an association in 2008, and has currently a membership of 26 research institutes spanning 19 European countries. CO<sub>2</sub>GeoNet is now recognized as a pan-European and independent scientific body. CO<sub>2</sub>GeoNet is also highly active on the international scene as a UNFCCC accredited Research NGO (RINGO), a CSLF recognized network and a Liaison organization in the ISO CCS Technical Committee, and through a cooperation agreement with IEAGHG and the Global CCS Institute. CO<sub>2</sub>GeoNet's activities include research, scientific advice, training, information & communication; all these activities are key for enabling the development and deployment of the CCS technology, in cooperation with all stakeholders including the citizens. The development of CO<sub>2</sub>GeoNet since 2004, including the initiation of the successful FP7 CGS Europe coordination action and the H2020 ENOS R&I project, is a **superb example** of pooling of efforts in Europe, on which further EU efforts should build on for demonstrating and deploying CCUS.

The **EERA CCS-JP** was officially launched at the SET-Plan Conference in Brussels in November 2010. The CCS JP is coordinating both national and European R&I programmes on CO<sub>2</sub> capture, transport and storage to maximise synergies, facilitate knowledge sharing and deliver economies of scale to accelerate the development of CCS. It involves 31 members and eight associated members from more than 12 countries who have committed more than 270 person years/year to carry out joint R&D activities. EERA CCS JP is an **excellent example** of pooling research efforts in Europe, on which further EU efforts should build on for demonstrating and deploying CCUS.

**ENeRG**, the European Network for Research in Geo-energy created in 1993, is also an **excellent example** of long-lasting cooperation among research institutes at pan-European level to ensure integrated and sustainable energy uses of the underground. ENeRG can help addressing several core priorities of the Energy Union through the further development of **geothermal energy (Core priority 1: Number 1 in renewable energy)**, the development of **energy storage in the subsurface which offers massive storage capacities both for thermal energy and electricity (Core priority 2: The future smart energy system)**, CO<sub>2</sub> geological storage (*Additional priority 1: Driving ambition in CCUS deployment*), **the geological disposal of radioactive waste (Additional priority 2: Increase safety in the use of nuclear energy)**. EU efforts should build on the ENeRG network to ensure the development of efficient and smart geo-energy technologies for the benefit of the European integrated energy system, **avoiding competitions in the use of the subsurface and encouraging synergies when possible**.

**Eurogeosurveys (EGS)**, The Geological Surveys of Europe, is a not-for-profit organisation representing 37 National Geological Surveys and some regional Surveys in Europe, an overall workforce of several thousand experts. EuroGeoSurveys members, the National Geological Surveys, are public sector institutions carrying out operations and research in the field of geosciences. These organisations have a long tradition, in many cases more than 100 years, in collecting data, preparing information and conducting research focused on their national subsurface. EuroGeoSurveys provides the European Institutions with expert, neutral, balanced and practical pan-European advice and information as an aid to problem-solving, policy, regulatory and programme formulation in a broad range of subsurface areas. These include Geo-Energy uses and the various aspects of Geological storage of CO<sub>2</sub> such as assessment of storage potential and environmental impacts. EuroGeoSurveys is therefore also an **excellent body** on which further EU efforts should build on for demonstrating and deploying CCUS.

Yours sincerely,



Dr. Isabelle Czernichowski-Lauriol

ENeRG President