IEAGHG Information Paper; 2014-IP2: Carbon capture technology could be vital for climate targets

A new study has just been published by the Stanford Energy Modelling Forum[1] known as EMF27. The EMF27 project is a global model comparison exercise that includes a worldwide consortium of research institutes and is led by the Stanford Energy Modeling Forum, the Potsdam Institute for Climate Impacts Research, IIASA, and other institutes. More than twenty individual studies from the three-year project are being published online as they become available in a special issue of Climatic Change. These papers touch on issues as diverse as climate policy, land use and agriculture, and non-CO_2 greenhouse gases, among others.

The study, has been published in a special issue of the journal Climatic Change[2], provides an overview of the results of EMF27, a major research project combining 18 different global energy-economy models from research teams around the world. The study examined the role of technology in future climate mitigation, asking which technologies will be needed and when in order to reach different climate targets.

In 2010, coal, oil, and gas supplied more than 80% of the world's total primary energy supply—and the demand for energy is projected to increase by 2 to 3 times by 2100. The EMF27 study shows that without policies to cut greenhouse gas emissions, fossil fuels will remain the major energy source in 2100, with resulting increases in greenhouse gas emissions.

The study aims to answer two questions:

- Where should policymakers focus their carbon mitigation efforts?
- Which technologies hold the most promise?

In a summary article published on the IIASA web site[3], the lead author of the study (Volker Krey of IIASA) has made a number of key comments

"Some technologies are more valuable than others, particularly CCS and bioenergy compared to wind, solar, and nuclear energy, because the combination of the two can lead to negative emissions,". "That would allow us to compensate for short term delays in mitigation by later taking carbon out of the atmosphere."

He goes on to say that;

CCS is a yet-unproven technology that would remove carbon from fossil fuel or bioenergy combustion and store it underground. In combination with bioenergy, this results in carbon dioxide removal from the atmosphere (owing to the previous carbon uptake of plants through photosynthesis) and is frequently referred to as "negative emissions". The big questions are whether and when it will become available, and how quickly it could be deployed.

The future availability of bioenergy and CCS technologies would also take some pressure off other sectors, in terms of required mitigation effort, "Unless stringent mitigation action in transport and other end-use sectors is implemented almost immediately, the only way to still achieve the 2 degree target will be to rely on carbon dioxide removal technologies such as bioenergy with CCS."

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[1] For further details on the EMF see http://emf.stanford.edu/

[2] http://www.springer.com/earth+sciences+and+geography/atmospheric+sciences/journal/10584

[3] http://www.iiasa.ac.at/web/home/about/news/20131211-EMFCarbon.en.html

From a CCS perspective the initial comments are promising i.e. that CCS and in particular bio-CCS is seen as a key mitigation technology which should be high on the policy maker's agenda. Our own recent study on BioCCS, which is due to be published soon, has looked at ways to develop recommendations on a consistent system to account for "negative emissions". IEAGHG feels that accounting for "negative emissions" in a transparent and sustainable way is crucial to have Bio CCS included in the trading schemes like the EU ETS. IEAGHG views that issue as a key barrier to the deployment of BioCCS.

A more disappointing quote refers to "CCS as a yet-unproven technology". Of course the CCS community would say it is not unproven but has been demonstrated around the world at various commercial sites. BioCCS in particular is being demonstrated at the Archer Daniel Midland site in the USA. Clearly the message on CCS deployment needs to be more strongly made.

With regard to his other point "The big questions are whether and when it will become available and how quickly it could be deployed". We would argue the technology is available and demonstrated now. How quickly it can be deployed depends on their being a business case for BioCCS, getting clear accounting rules for "negative emissions" is one step towards potential deployment. However despite strong scientific support for BioCCS there is no apparent political will to address the issues preventing deployment.

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