CO2Chem Network

Comments on Issue Paper No.9

Renewing efforts to demonstrate carbon capture and storage (CCS) in the EU and developing sustainable solutions for carbon capture and use (CCU)

The document is welcomed and makes good points in relation to the EU's commitments to climate change mitigation, COP21 and the drive to a 2 degree scenario. It is true that implementation of CCS is required by 2030 at the latest, however this is dependent on sufficiently robust technologies being developed. Current methodology does not provide an environmentally or financially viable solution.

Recommendation 1: There is immediate investment in research into new materials and processes for carbon capture that reduce capital expenditure costs and operational costs by at least 50% and ideally by 70%.

When considering any process, CCS and CCU, the emissions and cost of the process should be assessed and reported on a cradle to grave basis in line with ISO14044 Life Cycle Assessment. This necessarily includes emissions associated with the immediate supply chain and the ultimate use of any products created. Consequential LCA is needed to consider the full scope of the supply chain.

Recommendation 2: Transparent and evidence based LCA should be performed over all CCS and CCU processes to ensure comparability in technologies.

Care must be taken with Bio-CCS to ensure its environmental robustness and its impact on both water and land use. At the forefront of any considerations should be the balance within the Energy-Water-Food nexus to avoid undesirable negative impacts.

We support a reformed EU-ETS system to include CCU within its primary focus, including the transportation of CO2 from emitter to user without penalty. This could be part of or separate to any envisaged CCS pipeline.

While storage capacity in the EU is acknowledged, there must be guarantees in place to ensure the security of the storage site and mitigation plans in place to deal with CO_2 leakage.

When considering CCU, the net emission of GHGs over the whole process should be considered including the final destination of products. EOR is seen as an overall emitter as the oil produced will primarily be used for fuel. EOR is not the largest CCU technology: worldwide it (and CCS overall) is less thatn20 Mt/yr according to data from the Global CCS Institute. The largest volume of CO_2 use is in the conversion of CO_2 captured from ammonia production into urea, using that ammonia. In 2012 the amount of CO_2 consumed in urea production globally was 114 Mt/yr and expected to grow to 180 Mt/yr in 2016. Likewise, CO_2 use in methanol production by CCU was 8 Mt/yr and mineralisation 50 Mt/yr in 2012

(Armstrong and Styring, Frontiers in Energy Research, 2015). Therefore, CCU consumption of CO_2 is currently much higher than any use in EOR and is likely to accelerate. These chemicals represent only a small fraction of the potential petrochemicals replacement market.

We note the proposed scaling out of CCU technologies to commercial scale. While the ZEP report claims this to be unnecessary the Technical Workshop on CCU held in Brussels in April 2015 strongly recommended the establishment of a translational research centre. This has already been submitted as part of a package as an IPCEI.

Professor Peter Styring

Chair CO2Chem Network (www.co2chem.com)

29 April 2016