



## Summary CCUS session

Tuesday 18 – Wednesday 19 October 2016

### Conclusions, highlights and key messages

Under the umbrella of the 5<sup>th</sup> i-SUP2016 conference, VITO organised a 2-day workshop on the most relevant aspects of Carbon Capture, Utilization and Sequestration (CCUS). In an ambitious collaboration VITO invited its key partners to discuss the challenges and opportunities in CCUS development and deployment. In over 20 invited contributions the state-of-the-art technologies and socio-economic and policy aspects were presented. Over 70 attendants from involved industry sectors, policy levels and knowledge organisations joined the discussion and shared their viewpoints.

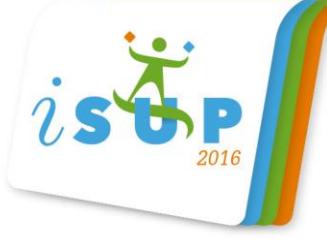
Starting from the future scenario's for the energy mix, that all take into account that for at least 3 more decades fossil fuels will be needed to meet the world's energy needs, emission of greenhouse gases will continue to happen. So, this justifies trying to close the carbon loop. With CO<sub>2</sub> as an interesting carbon source, several cases were presented during the event showing that utilization of CO<sub>2</sub> is evolving from an academic interest to an economically viable technology. Moreover, Carbon Capture and Utilization (CCU) is set to become a complementary tool in the Carbon Capture and Storage (CCS) landscape over the following decades. In the future it will not be a matter of CCS or CCU, but and CCS and CCU with integrated infrastructure.

Several contributions shared the latest results on innovative R&D concepts and a large number of technologies that are under development, ao several conversion technologies chemicals and fuel synthesis, technologies for negative emissions ao direct air capture based on structured (amine-based) sorbents, advanced combustion of biomass with inherent capture, carbonation for long term storage (sequestration), improved catalysis,....

The many challenges and barriers to the successful implementation of CCUS include unfavourable thermodynamics and kinetics of some of the reactions, the energy costs associated with capture and conversion, supply chain logistic and economics, public acceptance and socio-political issues. These challenges of CCUS are not insurmountable and need to be addressed actively.

Presenters pointed at the fact that CCUS will not only support slowdown of CO<sub>2</sub> emissions but also it will create valuable chemicals.

CCUS and new value chains that follow from it are to be developed in a global context. CO<sub>2</sub> utilization implies there is renewable energy available; it will give in return to this sector a solution for the peaks of excess energy that inevitable will occur in the terms of storing this excess in the form of chemical energy.



The upcoming approach of a circular economy offers opportunities in this respect. Since CCU fits a circular economy it must be looked at from a systems perspective: in order to judge whether a CCU process or product is economically sustainable, it is needed to make an evaluation and judgement on the system-level. A sustainable approach is the one that takes all energy and resource inputs into account.