



SUMMARY REPORT

INTEGRATING CO₂ IN THE VALUE CHAIN – THE ROLE OF CHEMISTRY

3 March 2015

European Economic and Social Committee

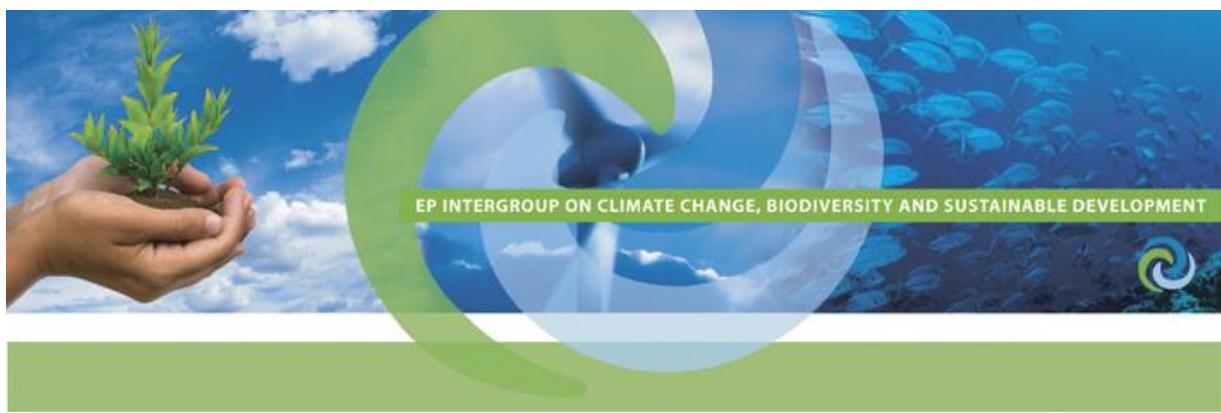
On Tuesday March 3rd, the European Parliament Intergroup on Climate Change, Biodiversity and Sustainable Development in collaboration with the European Association for Chemical and Molecular Sciences (EuCheMS), organised a debate on the role of chemistry in enhancing the renewable potential of CO₂ in order to deliver a more efficient value chain and a non-toxic environment.

Welcoming the participants, **Mindaugas Maciulevičius**, Member of the European Economic and Social Committee, Representative of the Chamber of Agriculture of the Republic of Lithuania, highlighted that green chemistry is one of the areas that can bring about technological innovation and help forward the transition towards a bioeconomy, particularly emphasising the impact it could have on empowering rural areas. Integration, coordination and collaboration between the EU, Member States and research institutions were pointed out as necessary components for solutions to fully reach the end users.

The meeting was chaired by **MEP Julie Girling**, who in her opening remarks highlighted that although research and innovation are widely discussed within the European Institutions, work still needs to be done in order to raise awareness and disseminate their contributions to a wider audience. With regards to the circular economy and improving waste management, CO₂ is at some extent the ultimate waste product and if positive usages exist they must be mobilised by the European institutions as soon as possible. Green chemistry is an area of research that has the potential to deliver truly sustainable solutions.

Professor David Cole-Hamilton, President of the European Association for Chemical and Molecular Sciences (EuCheMS) provided a short background on fossil fuel usage and its relationship with CO₂ level, which has been raised by burning fossil fuels by 20% in the past 40 years. The main priority is to make the problem a solution and transform CO₂ into a resource. Research is currently being conducted on finding a catalyst that can break down water into hydrogen and oxygen with the help of sunlight to produce fuels from CO₂. Several questions still remain but in the long-term using CO₂ as a feedstock can have a significant contribution to chemical production and possibly reducing the CO₂ footprint.

José Lorenzo Valles, Head of Unit "Advanced Manufacturing Systems and Biotechnologies", DG RTD, European Commission discussed the role of Horizon 2020, and in particular the important pillar of industrial competitiveness, which promotes more involvement of industry via the industrial deployment of key enabling technologies (KETs) and public-private



partnerships (PPPs). Part of the working programme for 2014-2015 is "Leadership in Enabling and Industrial Technologies" (LEIT), which supports the development of technologies underpinning innovation across a range of sectors. The major drive of LEIT is to enhance synergies between research and industry and to have a strong focus on leveraging private sector investment. Both institutionalised and contractual PPPs are present in Horizon 2020 and one contractual in particular, Sustainable Process Industry (SPIRE) which takes into account the resource efficiency in the whole production process, which would be in line with the circular economy. There is a huge potential for CO₂ to be used as a feedstock and to a large extent replace fossil fuels in our economy, however funding opportunities are needed beyond Horizon 2020.

Professor Dr. Walter Leitner and Professor Dr. Jürgen Klankermayer, Institute for Chemical Technology and Macromolecular Chemistry (ITMC), RWTH Aachen University, Winners of the 2015 European Sustainable Chemistry Award, explained that an interdisciplinary approach is needed to integrate product design with pathway and process design. The key to making the connection of the two ends of the chain is finding catalysis and catalytic processes that enable energy and resource efficient transformations. The fundamental idea is to examine what potential contribution CO₂ can have as a carbon feedstock. All carbon cannot be utilised but cases exist where products and plants are integrating CO₂ in the value chain. A German case was presented where polymer foams are produced from CO₂ and can be used in a variety of applications ranging from mattresses and car seats to insulation materials, which reduces the amount of petrol chemicals that go into production. Another case from Iceland was highlighted where a geothermal plant utilises CO₂ to produce renewable methanol. Using CO₂ as a feedstock has great potential, however it is important to understand that the right conversions must be found and it must be seen in a long-term perspective. It requires further progress in catalysis research, interdisciplinary solutions and interaction between academia and industry.

The discussion with the audience highlighted that the integration of CO₂ in the value chain is a viable solution and decentralisation of energy production is happening across Europe. However, many issues remain uncertain and more support is needed from the European institutions for further progress in this area. The issue of economics was mentioned as well as the affordability of promoting these products. Funding differs between Member States and suffering economies do not have the ability to put forward money in such developments. Carbon pricing was highlighted as an issue that must be settled within the EU. The role of the European Parliament and Commission is important as they can ensure that these issues remain high on the agenda. The commitment to Horizon 2020 funding was also highlighted calling on the Commission to abstain from removing money towards other priorities. To this, **José Lorenzo Valles** replied that the idea is not for investment to be lost but to ensure that the initiatives of the Juncker Investment Plan that promote research and innovation are executed.

Further questions concerned how CO₂ can better be recognised as a renewable feedstock and whether there are other alternatives to CO₂, which can be integrated into the value



chain. To this, **Professor Dr. Walter Leitner** replied mentioning that there are differences in what is recognised as renewable as regulations are feedstock driven. It was suggested to instead measure the production of the carbon footprint and what is relevant to existing technology. From a carbon reduction perspective, he underlined the importance for the overall life cycle to show carbon reduction and urged the European institutions to focus on reducing carbon as a primary objective through renewables or biomass. **Professor David Cole-Hamilton** briefly mentioned that an alternative to CO₂ integration could potentially be waste from biomass produced as a by-product from food, if implemented properly.

In the last round of comments the speakers made some final remarks. **Professor Dr. Walter Leitner** concluded by highlighting that there is a valley of death between research and application, and argued that this can be bridged by putting in place "research pipelines" that include consortia focusing on pre-competitive research, as well as public-private partnerships across low and high Technology Readiness Levels (TRL). **Professor David Cole-Hamilton** further emphasised that there is still a gap between the research and demonstration stage and ensuring that the funding is available. **José Lorenzo Valles** concluded by emphasising that more efforts are being made to support innovation within Horizon 2020. New instruments have been introduced for TRL to help bridging the gap between research and application.

MEP Julie Girling concluded by saying that it is hoped that more can be done in this area, particularly through the innovation programmes in Europe. It would be interesting to examine how much is actually being conducted and applied and how we can work towards improving this process.

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