SET Plan Action 9

Cefic - Draft Comments on the Issues Paper n°9

The SET Plan Issues Paper n°9 is essentially dedicated to Carbon Capture and Storage (CCS). Carbon Capture and Utilisation (CCU), mentioned at the end of the Issues Paper n°9, includes the chemical valorisation of CO_2 with technologies at various technology readiness levels (TRLs) and various applications. CCS technologies aim to remove and permanently store CO_2, while the impact of CO_2 conversion technologies cannot be reduced to the volume of CO_2 used. The utilisation of CO_2 to produce chemicals, materials, fuels and store renewable energy can contribute to the development of a low carbon economy, and can contribute to addressing major energy challenges.
Various aspects of the value of CO_2 conversion technologies have therefore to be considered.

CO_2: an alternative sustainable feedstock

CO_2 is an alternative carbon source available in abundance in Europe.

Innovative CO_2 conversion technologies can contribute to:

- Reduced use of fossil carbon sources;
- Reduced import dependency and improved security of supply of carbon feedstock;
- Reduced pressure on biomass, land use and other environmental stressors.

The utilisation of CO_2 as an alternative carbon source can contribute to manufacturing chemicals and materials with a lower CO_2 footprint. The CO_2 emission reduction results from CO_2 avoided due to the replacement of fossil feedstock by this alternative carbon source, in addition to the CO_2 used as raw material.

Chemical valorization of CO_2: a contribution to low carbon energy objectives

The chemical valorisation of CO_2 from various industrial sectors can contribute to meeting the ambitious EU Energy targets. CO_2 valorisation has the potential to contribute to increasing the share of energy produced from renewable resources via improved management of renewable electricity with:

- *Large scale renewable energy storage* via power-to-methane or power-to-liquid technologies that can rely on the existing infrastructures (e.g. gas network);

- Production of CO_2-based *advanced sustainable alternative fuels* (e.g. methane, methanol, dimethylether, diesel, gasoline) for transport with significant CO_2 emission reduction compared

to fossil based fuels, contributing to reducing pressure on biomass, land use and other environmental stressors.

These CO_2 conversion technologies using renewable electricity, could also contribute to increasing the share of renewable energy in the chemical sector for the production of platform chemicals such as methane and methanol.

The competitive access to renewable energy and the development of innovative processes to generate low carbon hydrogen at lower cost are key factors for the deployment of many of these CO_2 valorisation routes with potential high volume production. In comparison to the straight use of renewable H_2, the reduction of CO_2 by renewable H_2 requires an additional conversion step but the resulting energy carriers can offer a number of benefits such as:

- Utilisation of existing infrastructures to transport the energy vectors;
- Utilisation of existing engines, which would allow impact on the existing car fleet;
- Potential impact on the carbon footprint of the aviation and marine transport sectors.

A sustainability based approach needed

The impact of CO_2 conversion technologies cannot be reduced to the volume of CO_2 used, and a better integration of all aspects of sustainability (environment, economy, social) and integration of lifecycle concept is therefore required for the prioritisation of innovative technologies.

The various aspects of the chemical utilisation of CO_2, and their contribution to the energy challenges should be better considered in the Integrated SET Plan. Priorities and targets in action 9 should therefore be developed in coordination with the other actions from the SET Plan that CO_2 valorisation can contribute to, and relevant stakeholders should be invited to contribute to the definition of the related SET Plan actions*(in particular on energy storage and alternative fuels in actions 4 and 8 respectively).

Some technologies for the chemical valorization of CO_2 are already at TRL above 6. In order to ensure leadership of the European industry in clean technologies for the valorisation of CO_2, and their contribution to EU challenges, it is essential to:

- provide appropriate support (including through ETS Innovation Fund) to the development of the various CO_2 conversion technologies at all Technology Readiness Levels in Europe;
- ensure coherence and stability over time of the Resource and Energy policy framework to allow investment in related low carbon technologies in Europe.

**The chemical valorisation CO_2 was considered in various sections of the document "Towards an Integrated Roadmap: Research Innovation Challenges and Needs of the EU Energy System" published by the European Commission in December 2014, including:*

- *In the section dedicated to "Unlocking the potential of energy storage and conversion of electricity to other energy carriers" (Theme 7), with actions related to the conversion of electricity to "other energy carriers" were included such as the improvement of power-to-methane and power-to-methanol technologies, and rapid responsive chemical processes for valorisation of peak renewable electricity.*
- *In the section dedicated to "Developing sustainable biofuels, fuel cells and hydrogen and alternative fuels for the European transport fuel mix" (Theme 13) with actions on CO_2-based fuels in the section on Advanced Alternative Fuels.*