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The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement n. 838061

July 2021

CO2fokus newsletter



CO₂Fokus aims to develop cutting-edge technology to **convert industrial CO₂ into DME (Dimethyl Ether)**, a valuable gas extensively used in the chemical and energy sectors, providing an **alternative to fossil fuel-derived feedstock.**

CO2Fokus and Life Cycle Thinking

Life Cycle Thinking is an analytical approach that considers the entire life cycle of a product or process when assessing their environmental effects and impacts; from the production of raw materials to the end-of-life phase. It helps to better understand the production system along the entire value chain. In the CO2Fokus project, several activities are following this Life Cycle Thinking approach:

- **Life Cycle Assessment (LCA)**, LCA is the most widespread methodology based on life cycle thinking. LCA is internationally harmonized by the ISO 14040 and ISO 14044 standards. In the project LCA will be used to assess the environmental aspects and impacts of the

CO2Fokus solutions, by quantifying the relevant indicators along each phase of the process for Dimethyl Ether (DME) production.

- **Life Cycle Cost Analysis** (LCCA) examines and defines the costs for producing DME using the CO2Fokus CCU technology.
- **Social Life Cycle Assessment** (S-LCA) evaluates the social hotspots of the value chain, especially the activities taking place in specific locations and the potential risks and opportunities for the stakeholders in relation to social themes of interest.

The lead partners for these project tasks are the ECODESIGN company and LCE, who are actively engaging all the other project partners for primary data collection and research in scientific publications, in order to obtain useful data and information about project-related topics.

The work on the LCA and S-LCA are taking forward the most significant social topics according to the interest of the intended audience and businesses. A questionnaire will assess the risks for each topic that has been developed. All the consortium members will soon provide the answers to understand the social performance of the value chain, to monitor and hopefully improve the overall conditions of the stakeholders involved.

Societal readiness and CO2Fokus

The social acceptance of technology is usually assessed after its complete development or even long after its rollout on the market. In the CO2Fokus project social acceptance is seen as an integral component of technology development. This allows a timely understanding of public perceptions to adequately prepare and steer information and communication strategies. The societal readiness of the technology also supports the creation of a strong value chain.

In CO2Fokus, a comprehensive literature review has been completed on the public perception of CCU. Exchange with sister EU projects has been established, to share better practices in assessing societal readiness of similar CO2 conversion projects.

In CO2Fokus a customized survey is ready to be launched to gather responses, spontaneous thoughts, and concerns from a large sample of participants. Their answers will be analyzed and classified in clusters of themes, such as those related to health and safety, environmental impact and costs.

Communication activities

Dissemination, exploitation and communication activities are key actions for European-funded projects as they allow to:

- Communicate the findings of the project;

- Extend the network of potential stakeholders to ensure the technology transfer of the most promising results, to exchange information and to establish collaborations in the field of Carbon Capture and Storage (CCS) and Carbon Capture and Utilization (CCU);
- Initiate the first steps for market uptake.

Lead partners of such tasks are LCE and LGI.

Up to now, CO2Fokus has carried out several activities, which are going in such a direction.

One of the most noteworthy activities has been the International Workshop on CO₂ Capture and Utilization (IWCCU) held on 16-17 February 2021 at the University of Technology of Eindhoven, in the Netherlands. It has been organised thanks to collaboration among several projects, all dealing with CO₂ capture and utilization matters. The two day workshop included talks and discussions on the details of each of the projects. Highlights of the current work in CO2Fokus were presented by the project coordinator, Dr. Vesna Middelkoop, and two main contributors, Dr. Giuseppe Bonura and Dr. Susana Perez. The IWCCU workshop is expected to serve as a newly established platform for CO2Fokus' sister projects to share common topics of interest.



In addition, the CO2Fokus partners have been involved in exploitation of the project results. In May 2021, the consortium gathered at three different events, organized by LGI, with the contribution of the European Commission Booster, who has the role of supporting EU projects in their exploitation activities in order to increase the spread of project results.

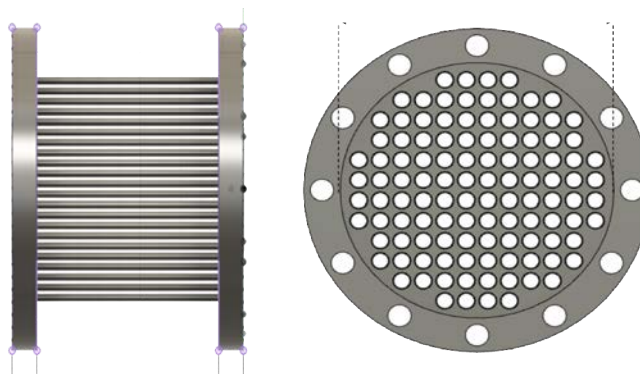
The three events have included a webinar, where the Value Proposition Design and Business Model Canvas methodologies have been presented and discussed to understand how they could be useful in the CO2Fokus exploitation phase, and two workshops, each one dedicated to one of the previously named methodologies.

The second workshop has been particularly relevant thanks to the participation of a potential investor, making the event a precious opportunity to exchange experiences and opinion with an

external stakeholder who could be directly interested on the project results.

Technical advancements

CO2Fokus partner Tecnia carried out the design of a millichannel reactor for Dimethyl Ether (DME) production from CO₂. For its design, specific characteristics were taken into consideration, such as the number of channels, internal diameter, total length and diameter of the reactor and weight of the catalyst to be used to fill it. Furthermore, the reactor has been evaluated at laboratory scale. In this way, it was possible to assess which were the best conditions, in terms of catalysts, temperature, pressure, and space velocity, to obtain the highest DME yield.



Furthermore, CO2Fokus' partner CNR-ITAE carried out two more activities:

- A test on 3D printed catalysts under CO₂-to-DME hydrogenation conditions;
- A performance comparison between conventional powdered catalysts and 3D printed catalysts after crushing and sieving, the first being provided by partner Hybrid Catalysis and the second by partner VITO.

In the testing phase, different formulations were used, in order to compare the behavior of each material. The obtained results led to some major conclusions, which will allow to model the following phases of the project in order to maximize the positive outcomes from a technical point of view.

Further test and activities are foreseen in the next months in order to ensure the solidity and reliability of results.

Co2fokus Partners



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