



SPIRE-10-2017

## **CO2EXIDE**

Full Title: CO<sub>2</sub>-based Electrosynthesis of ethylene oXIDE

Aim:

The CO<sub>2</sub>EXIDE project aims at the development of a technology for the conversion of bio-based carbon dioxide into industrially relevant chemicals. In line with the energy turnaround the underlying electrochemical process uses renewable energy from renewable sources. Operating at low temperatures and pressures, the reactions will forecast significant improvements in energy and resource efficiency combined with an enormous reduction of GHG emissions.

Concept:

The CO2EXIDE technology combines a modular nature for the feasibility of a decentralised application, high energy and material efficiency and the substitution of fossil-based production of ethylene oxide. Initially, the electrochemical step pursues the simultaneous conversion of CO<sub>2</sub> to ethylene at the cathode and water oxidation to hydrogen peroxide at the anode. A subsequent chemical conversion of both intermediates to ethylene oxide will deliver polyethylene and further derivatives, which are basic materials for many industrial processes such as the manufacture of plastic products. All improvements will be quantified using life cycle assessment. The CO2EXIDE approach will link the chemical and energy sector, climate protection to industrial processing: physicists, chemists, engineers, economists and communication experts from universities and research institutions, SMEs and industries, innovatively joining their key technologies to develop and exploit an unprecedented process based on CO<sub>2</sub>, renewable energy and water. The CO2EXIDE project thus tackles important societal challenges by fostering sustainable supply chains for the creation of factories of the future.

Start date:

01/01/2018

End date:

31/12/2020