

PYROCO2: Demonstrating sustainable value creation from industrial CO2 by its thermophilic microbial conversion into acetone

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The transition towards climate neutrality by 2050 necessitates the rapid adoption of innovative climate-positive solutions that can stimulate the European market. Among these solutions, carbon capture, utilization, and storage (CCUS) technologies hold significant potential to decarbonize the chemical industry while enabling the value generation from its own carbon emissions. To address this context, the PYROCO2 project aims to demonstrate the scalability and economic viability of carbon capture and utilization (CCU) by producing climate-positive acetone from industrial CO2 and renewable electricity-derived hydrogen. At the core of the technology is an energy-efficient thermophilic microbial bioprocess that is projected to reduce 17 million metric tons of CO2 equivalent by 2050. The acetone produced through the PYROCO2 process serves as an ideal platform for catalytic synthesis, enabling the production of various chemicals, synthetic fuels, and recyclable polymer materials from CO2. This portfolio of viable business cases and pre-developed processes will facilitate replication and commercialization. The PYROCO2 demonstrator plant, located in the Herøya Industrial Park in southern Norway, will have the capacity to annually produce a minimum of 4,000 tonnes of acetone using 9,100 tonnes of industrial CO2 and green hydrogen. This strategic placement provides access to industrial CO2 feedstock and competitively priced green energy, while fostering industrial symbiosis by connecting carbon-intensive industries with chemical production. The PYROCO2 project will act as a catalyst for the emergence of CCU Hubs throughout Europe. In addition to the large-scale demonstration and comprehensive financial, regulatory, and environmental assessments of the PYROCO2 technology, the project will explore public acceptance and market exploitation, encouraging the growth of the CCU market. By driving innovation and creating a supportive ecosystem, PYROCO2 aims to pave the way for a sustainable and climate-positive future.