

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

ADVANCING CARBON CAPTURE AND UTILIZATION FOR CLIMATE-POSITIVE ACETONE PRODUCTION IN EUROPE

The PYROCO₂ project, initiated in October 2021 with funding from the European Union's Horizon 2020 program, is a groundbreaking initiative aimed at revolutionizing carbon capture and utilization (CCU) in Europe. This project is specifically focused on converting industrial CO₂ emissions into climate-positive acetone, aligning with Europe's goal of achieving climate neutrality by 2050. By implementing an innovative, energy-efficient thermophilic microbial bioprocess, PYROCO₂ seeks to transform CO₂ and renewable hydrogen into acetone, a key commodity in the chemical industry. This process not only reduces emissions but also valorizes CO₂ into commercially viable products, thus contributing to the sustainability of Europe's chemical industry.

The core of the PYROCO₂ project is the development and construction of a large-scale demonstrator plant situated in Herøya Industrial Park, Norway. This location was chosen for its strategic importance, rich industrial ecosystem, and access to green energy sources. The project has made significant strides towards demonstrating the industrial feasibility of large-scale thermophilic microbial gas fermentation. In addition to creating acetone, the project aims to diversify its product range, integrating biotechnology with chemical catalysis to produce a variety of CO₂-based chemicals and materials.

PYROCO₂'s approach goes beyond mere technological innovation; it encompasses a comprehensive strategy for promoting sustainable practices within the European chemical industry. This includes fostering industrial symbiosis, engaging with various stakeholders, and establishing synergies with other European initiatives focused on the green transition. The project has been actively involved in developing strategies and tools to facilitate the emergence of local CCU hubs across Europe, thereby amplifying its impact.

With an ambitious goal to reduce around 17 million tonnes of CO₂ emissions by 2050, PYROCO₂ is not just a technological endeavor but a pivotal movement towards a more sustainable chemical production in Europe. The project serves as a model for greener industrial processes, demonstrating the practicality, flexibility, and economic viability of converting industrial CO₂ into valuable products. As the project progresses, it promises to significantly influence the way the chemical industry operates, steering it towards a more sustainable and environmentally conscious direction.

