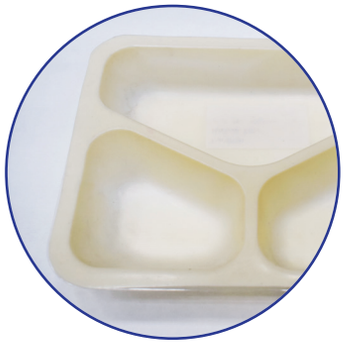
The HICCUPS Work Process

- Design, manufacture and operation of a gas upgrading process unit to capture and purify CO_2 from biogas at a wastewater treatment plant.
- Developing, upscaling and optimising the multiple steps involved in the full CO_2-to-monomer conversion process.
- Developing and upscaling of the process for the polymerisation step and the promotion of the large-scale production of the polymer PLGA.
- Testing of the CO_2-derived PLGA for various end-use applications
- Understand and evaluate the environmental and cost performance of the novel process route to the bio-based polymer PLGA, e.g., for packaging materials, by performing life cycle assessments, techno-economic assessments and establishing a monitoring system of the carbon removal potential.

Aims of the HICCUPS Project

- To develop an efficient process for the conversion of carbon dioxide emissions from water treatment sludge into polylactic-co-glycolic acid (PLGA).
- A key step in the HICCUPS project involves building a CO_2 capture and purification demonstration plant at a wastewater treatment plant.
- The aim is to scale up the laboratory technology to a demonstration / pilot scale of about 100 kg of PLGA.
- Final products, including PLGA-coated paper for food packaging and moulded plastics, will be produced for the consumer market.
- Testing of the recyclability and (marine) biodegradability of the PLGA materials.



Funded by the European Union

Circular Bio-based Europe Joint Undertaking

The HICCUPS Project ist funded by the European Union and Circular Bio-based Europe Joint Undertaking and its members under the grant agreement number 1011124555.

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HICCUPS

The HICCUPS Project – Highly Innovative Technology Demonstration for Bio-based CO_2 Capture and Utilisation for the Production of Bulk Plastics Applications

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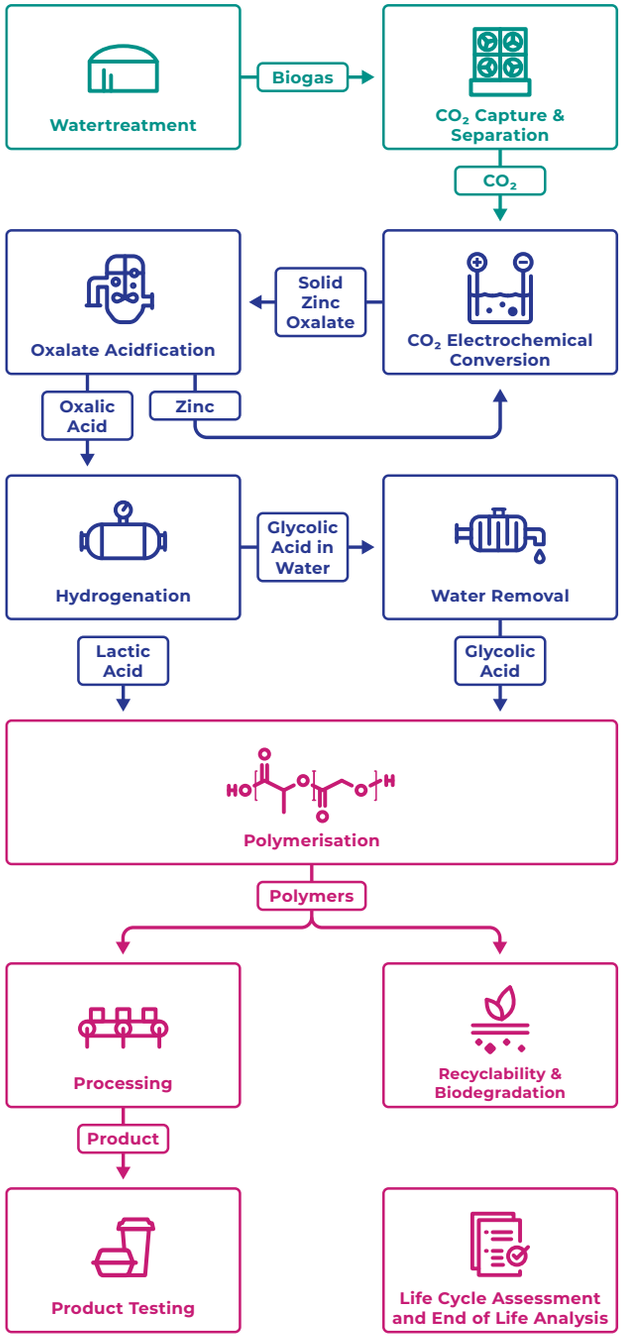
The HICCUPS Project

The HICCUPS project proposes a resource-efficient solution to electrochemically convert captured CO_2 emissions from wastewater treatment plants into monomers, which can be polymerised to produce the bio-based polymer polylactic-co-glycolic acid (PLGA) for the food packaging industry.

PLGA is a polymer with excellent water and gas barrier properties – which is very important for food, pharmaceutical and cosmetic packaging – it is fully biodegradable and made entirely from renewable resources, making it a promising candidate to replace fossil-based polyethylene (PE).
To demonstrate the potential of PLGA, packaging materials will be produced using PLGA film coated paper and moulded plastic, including coated paper for food packaging.

There is great interest in PLGA, but this interest will only continue if PLGA can be manufactured at a price low enough to make it attractive for mass production so that is can actually commercially compete with PE. This is one of the many challenges that the HICCUPS team will be working on.



HICCUPS is a highly innovative interdisciplinary project with the aim of producing bio-based polymers from CO_2 extracted from biogas produced at wastewater treatment plants.

The HICCUPS project is a novel and original undertaking that can only succeed in an interdisciplinary team. Therefore, the project brings together twelve industrial and academic partners from seven European countries with a diverse range of expertise covering the entire value chain – from the extraction and capture of biogenic CO_2 from sewage sludge to the use of polymers for end-use applications.

The overarching objectives of HICCUPS are in line with the urgent goals of our time: the reduction of CO_2 and other greenhouse gas emissions, the transition from fossil to renewable raw materials, and the promotion and development of the circular economy. While we need to reduce CO_2 everywhere to meet climate targets, the CO_2 also stands out as a promising alternative carbon source for fuels, chemicals and plastics.