Highly Innovative technology demonstration for bio-based CO_2 Capture and Utilization for production of bulk plastics applications

HICCUPS

Robert-Jan van Putten
Sr. Scientist
Parana Materials
robert-jan.vanputten@paranamaterials.com

Circular Bio-based Europe Joint Undertaking

The project is supported by the Circular Bio-based Europe Joint Undertaking and its members.

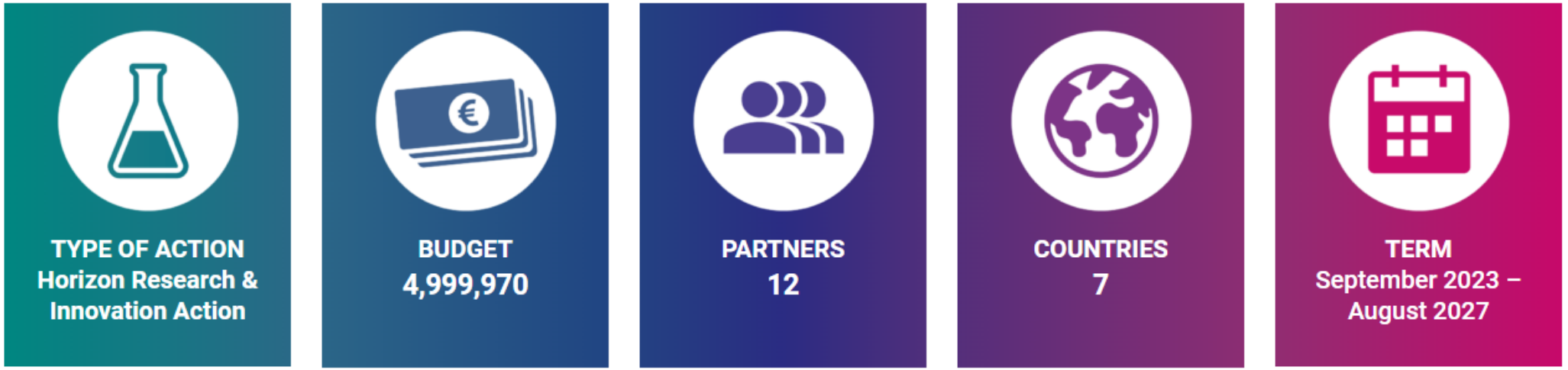
Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

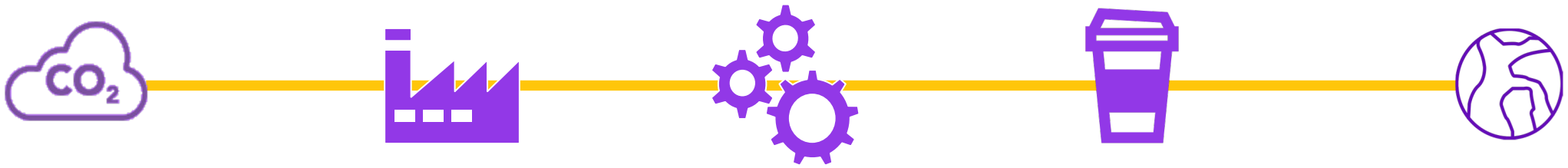
Bio-based Industries Consortium

HICCUPS Project

HICCUPS is a novel and resource-efficient solution to convert CO_2 emissions from wastewater treatment plants into bio-based polymers for the packaging industry.



HICCUPS Value chain



Feedstock
CO_2 provider

acciona

R&D and Scaling up

avantium
carbeau
aqualung
FUNDITEC
SINTEF

Downstream Processing

VTT
carbeau
avantium

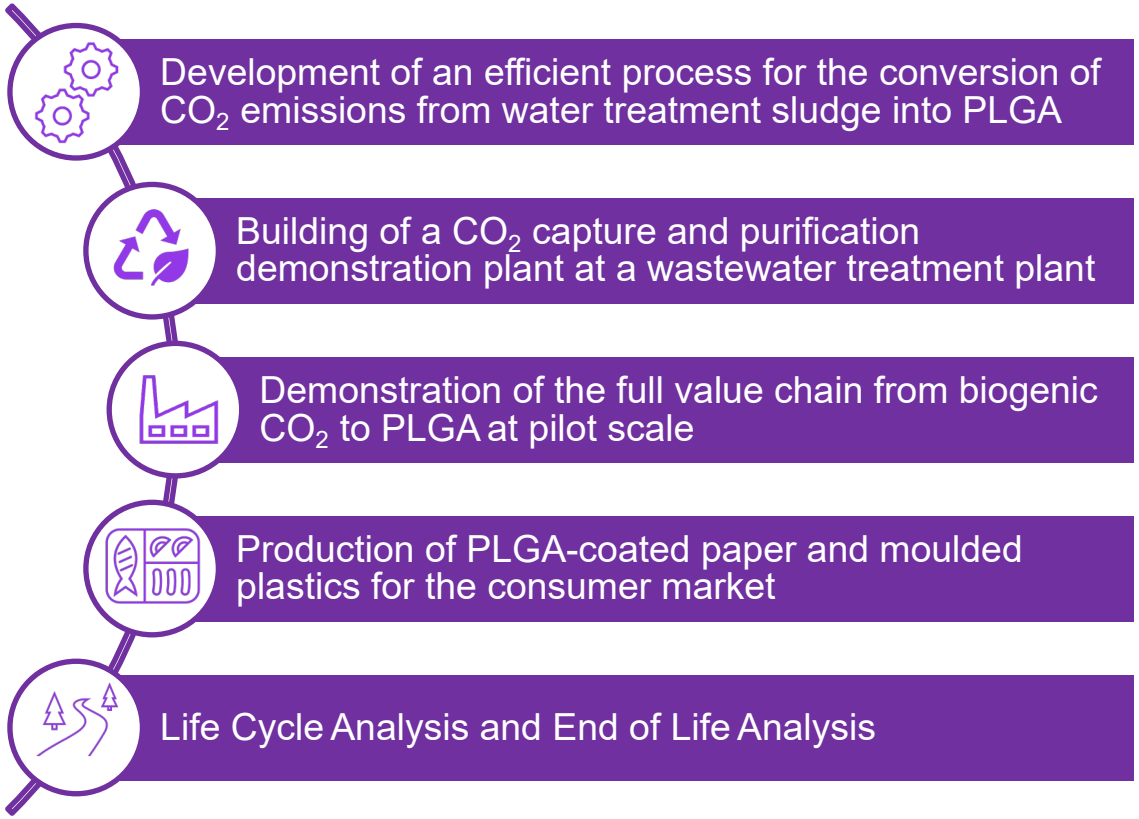
Application testing

walki
tecno tp packaging
University of Ferrara
INRAE

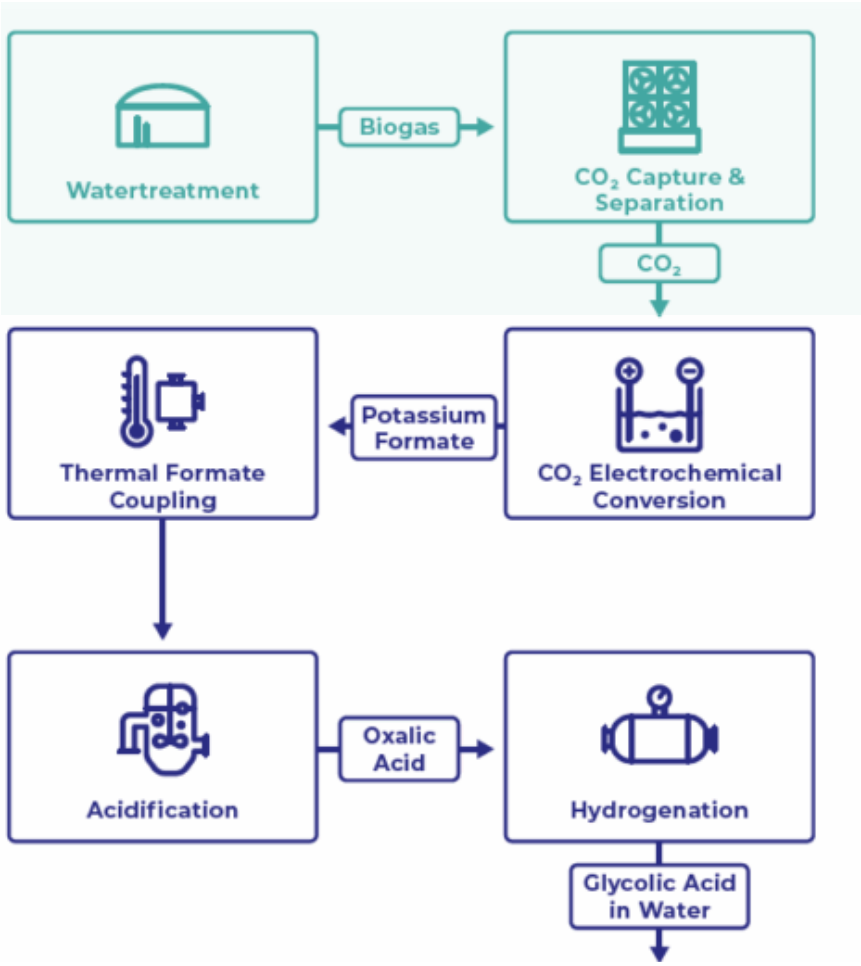
End-of-life Environmental impact

nova
UNIVERSITY OF AMSTERDAM

HICCUPS Objectives



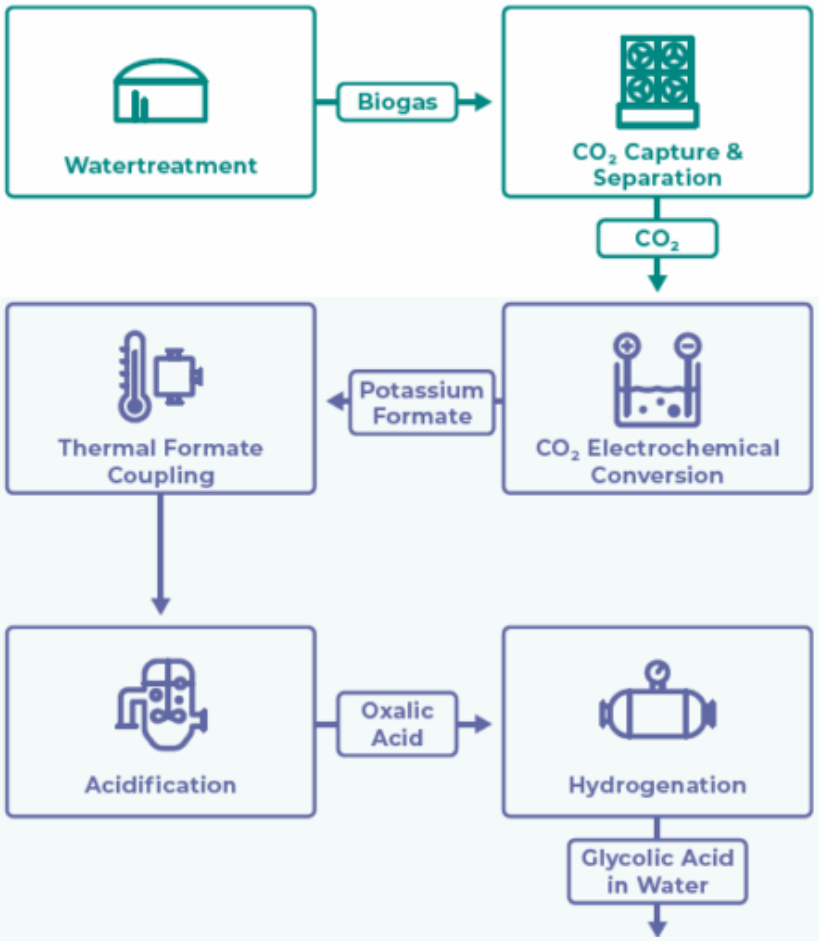
HICCUPS concept: CO_2 capture



- CO_2 capture and separation membrane-based technology development

acciona aqualung SINTEF FUNDITEC

HICCUPS concept: CO_2 conversion

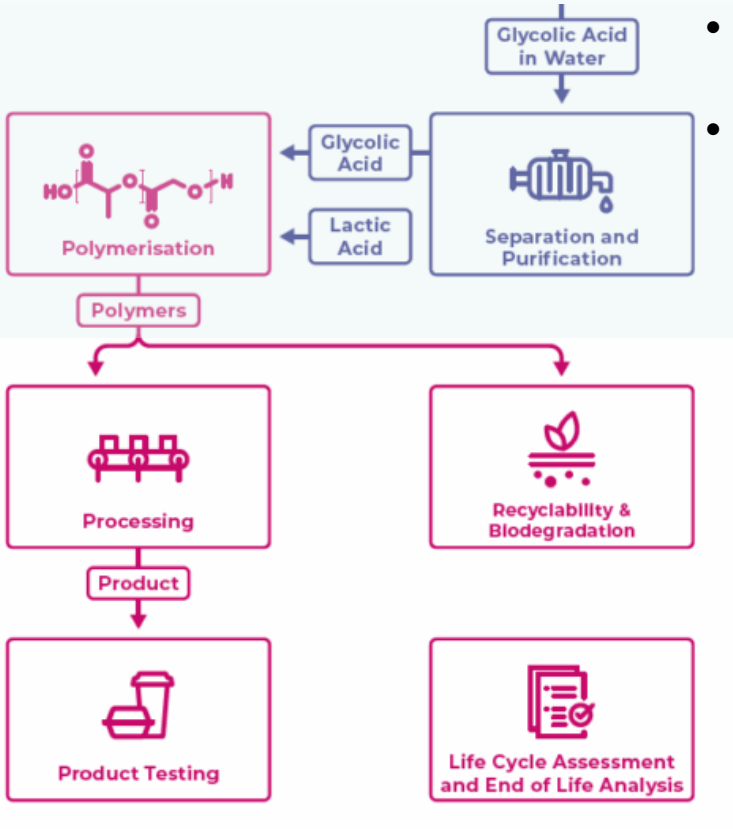


- Development of multistep CO_2 conversion to oxalic acid & hydrogenation reaction to glycolic acid
- Demonstration of glycolic acid production at 100 kg scale

avantium

carbeau

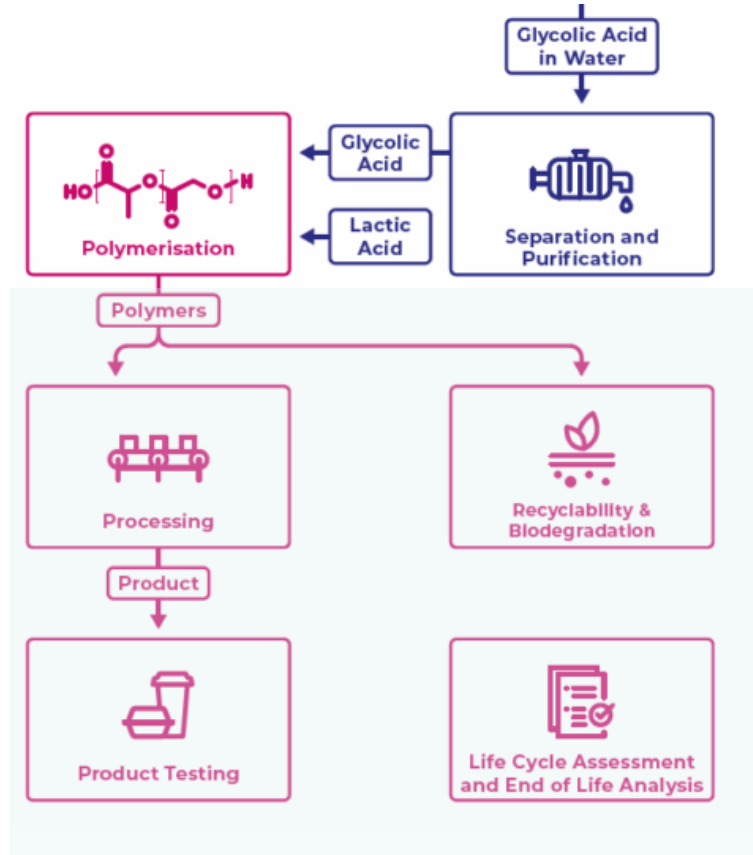
HICCUPS concept: PLGA synthesis



- Development of downstream process Glycolic Acid
  Development of polycondensation route for the PLGA synthesis
- Production of 100 kg of CO_2-based PLGA

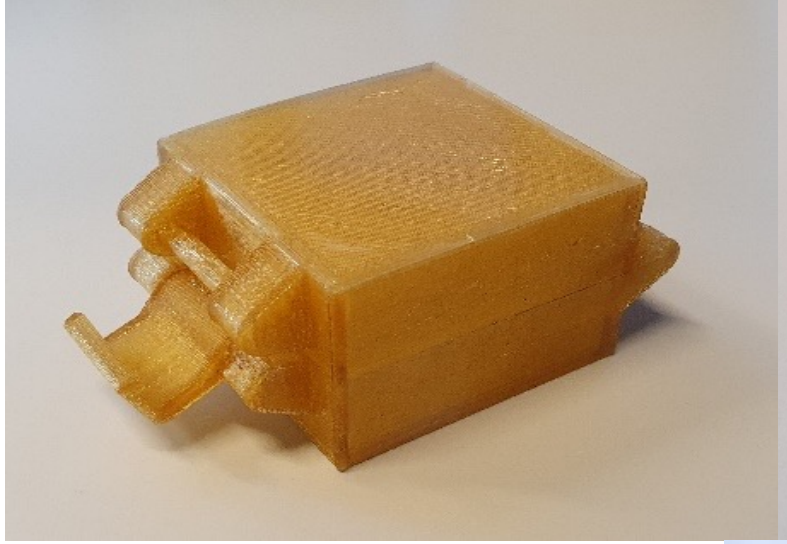
VTT avantium

HICCUPS concept: PLGA application development



- Study of PLGA properties
- Development of PLGA applications (dispersion coating, extrusion coating and thermoformable products)
- Assessment of PLGA biodegradability and recyclability
- Assessment of environmental impact of PLGA products

Parana Materials





- Spun out from Avantium
- What we do
  - Biobased polyesters
  - Focus on performance at a competitive price at scale
  - Use existing assets for scale-up and production
- Our lead materials
  - Glass and PC replacement: PEIT/PEIF/PISA
  - PC and ABS replacement: PICT/PICF
  - Hight Tg and degradable by design: PISOX
  - Soft material: PBAF analogs



Parana Materials

- We operate a polymerization pilot plant
  - Polyesters
  - For our own research
    - Process development
    - Sample prep
  - For external parties (tolling)



The HICCUPS Consortium

