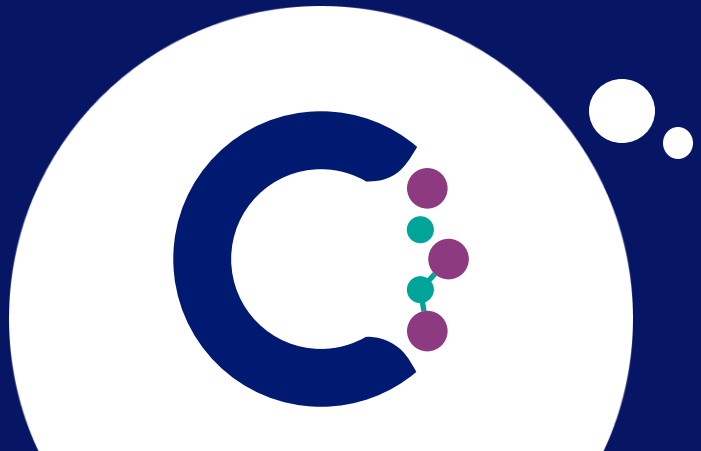
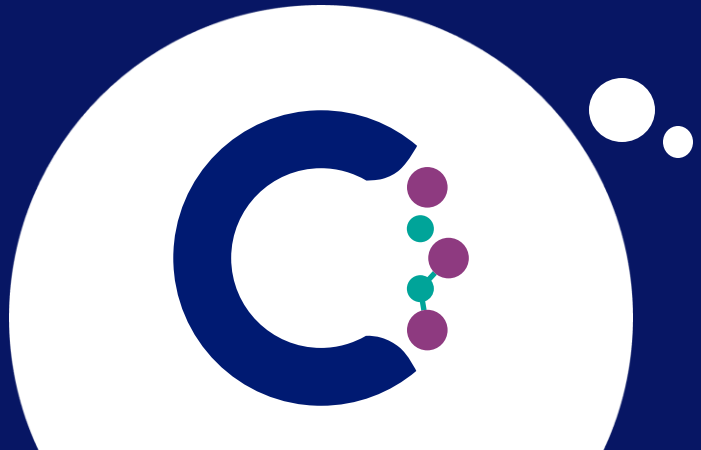
Biorecycling of Plastic and textiles

Carbios technology update



Who we are

Our history, key figures, sites



Some key figures

Carbios at a glance

120 +
employees

58
patent families

2
Commercial technologies

3
sites

Clermont-Ferrand
Headquarters
Laboratory
Pilot
Demonstration Plant

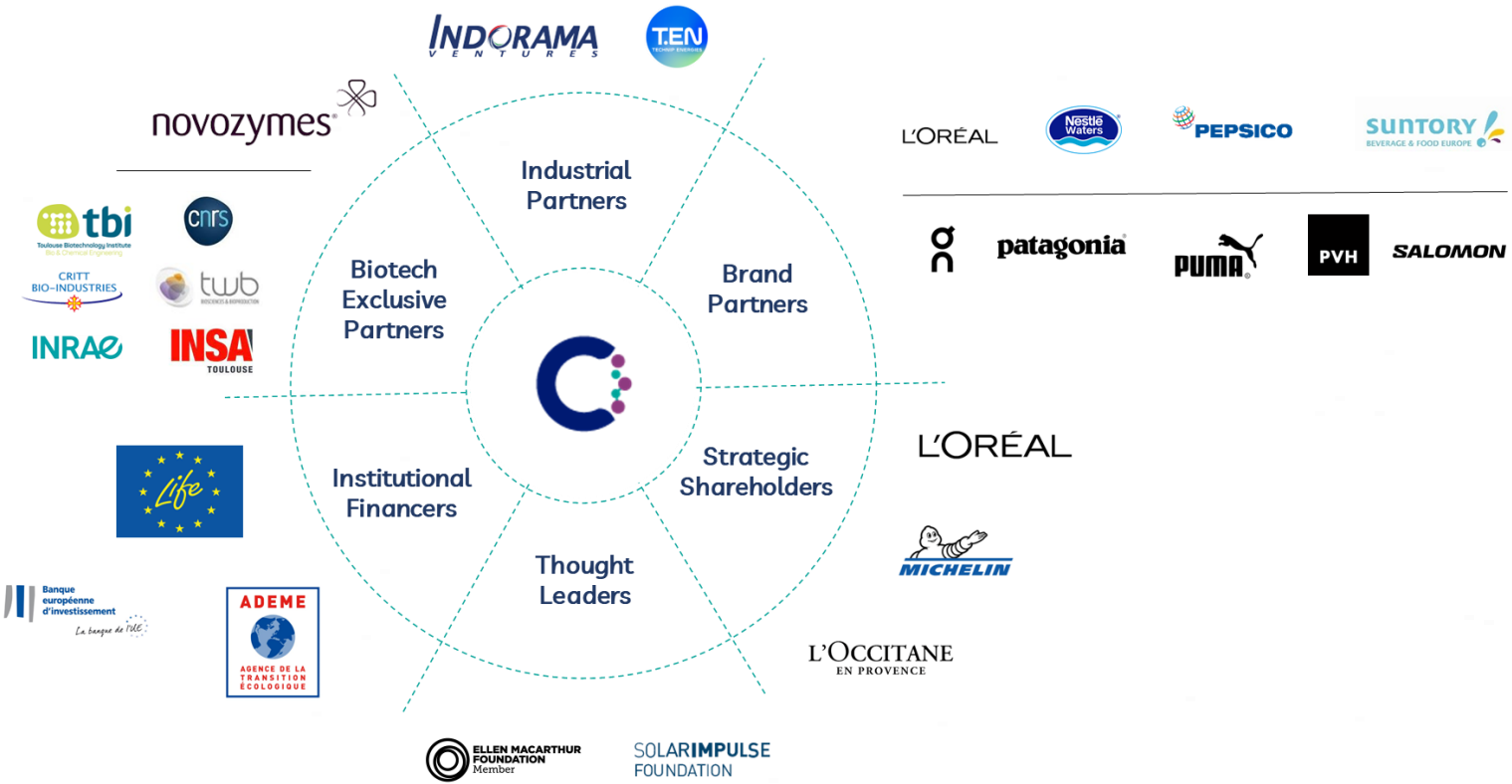
Toulouse
Research center

PopLaB

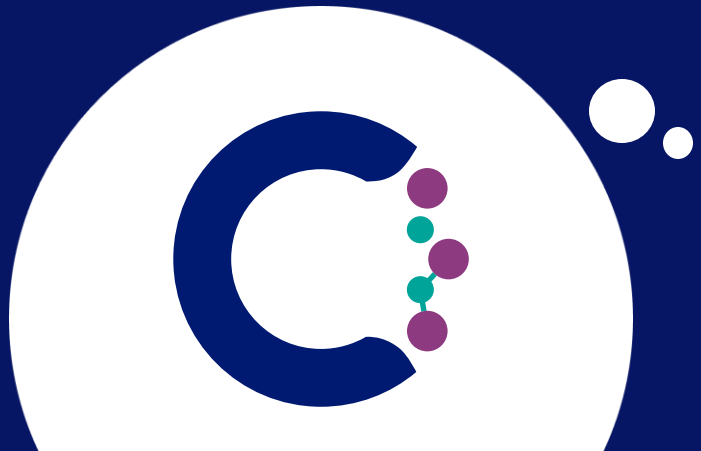
Longlaville
PET biorecycling plant

Our partners

A complete ecosystem to built and support a major player in the recycling of plastics & textile

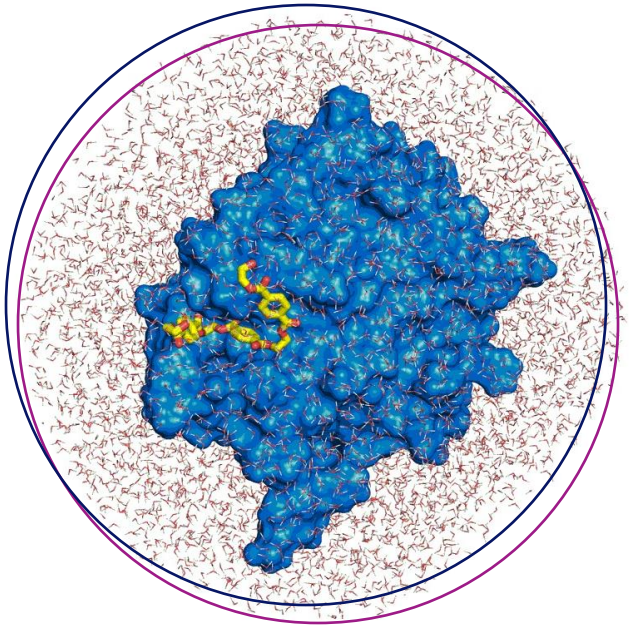


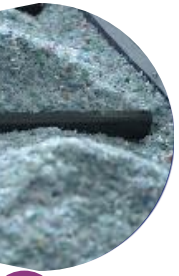
What we do



Our expertise

The successful marriage of two scientific areas: plastic engineering and enzymology



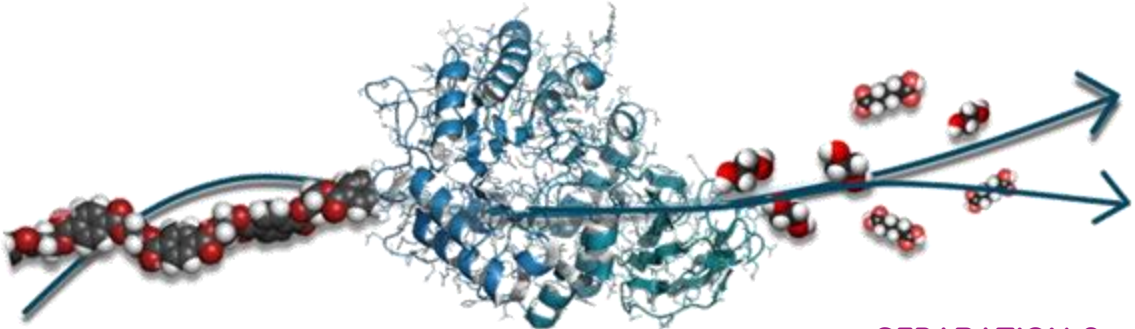


Our mission

To develop enzymatic solutions to deconstruct plastic and textile waste

A commercial solution with PET biorecycling

Enzymatic recycling



POLYMERS waste (plastic and fibers)

CARBIOS ENZYMES

SEPARATION & PURIFICATION

PTA

MEG

VIRGIN QUALITY MONOMERS

Used by >95% PET resin production facilities

Carbios PET bio-recycling starts with low value waste feedstock of packaging & textile being incinerated or landfilled

Our biological depolymerization technology breaks down the PET containing waste into its base chemical building blocks, or monomers: PTA and MEG, with same quality of the ones produced by petrochemical routes and used by over 95% of the PET producers.

The Carbios recycled monomers PTA and MEG, can be converted in the existing assets into virgin like quality r-PET, food contact resin.

Circular 100% R-PET Virgin like quality

Demonstration unit: Last step before industrializaton

Research Laboratory

Picolitre-Microlitre

2011 –

Toulouse

TBI, INSA, CRITT, CNRS

Development Laboratory

Réacteur: 250 ml to5 litres

2014

Toulouse Clermont-Ferrand

Pilot

Reactor: 1 M³

2019
Clermont-Ferrand

Demonstration

Process validation

Reactor: 20 M³

2021
Clermont-Ferrand

Fisrt Production Unit

Reactors: 1200 m³

Start up in 2025
Longlaville (54)
50.000Tons

Commercialization

Building capacity with licensees

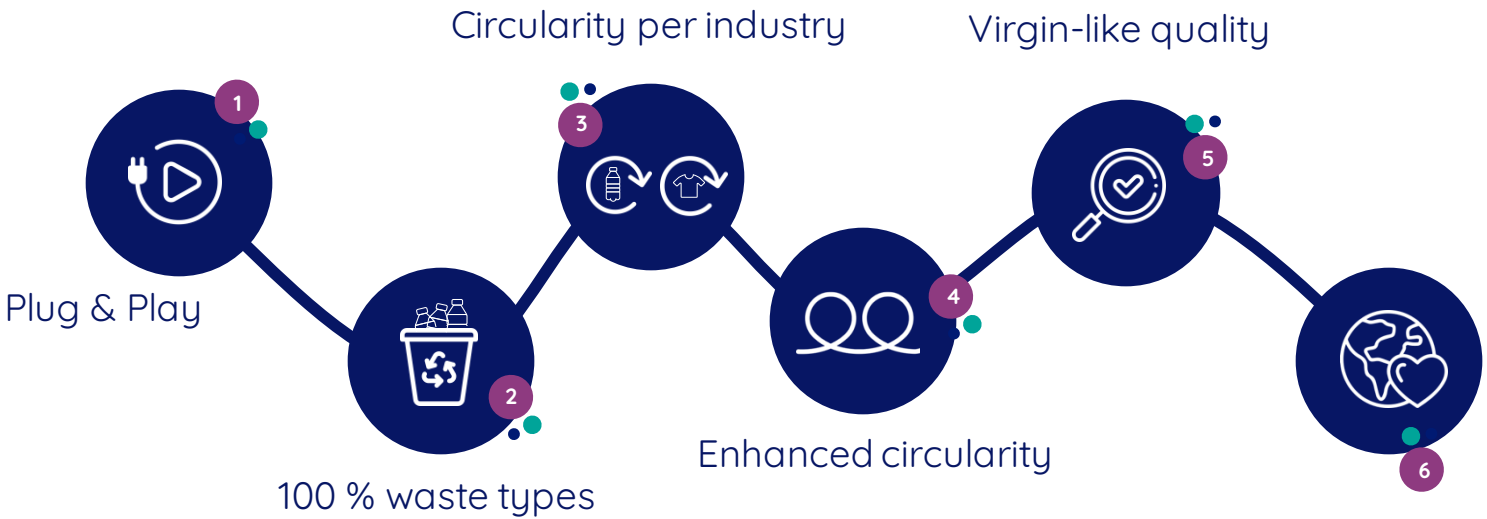
International deployment

License sales

2023

Carbios is best positioned

to conquer r-PET market leadership



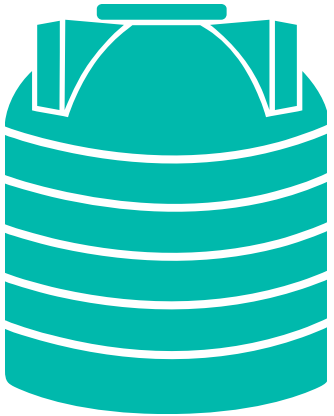
Biorecycling process labeled Solar Impulse Efficient Solution

Thermomechanical recycling & Carbios process complementary technologies

Same starting feedstock
Carbios: colored bottles, food trays, opaque bottles

Flakes,

Fines



Reactors: 4x 300 m^3
Batch using: 30T of waste
~ 1 millions bottles x4

Longlaville will start in 2025 using coloured flakes, mono- and multi- layers trays, fines (rejects from thermomechanical recyclers
In a second stage, it will be able to handle textile as well

2025: commissioning of world's 1st PET biorecycling plant

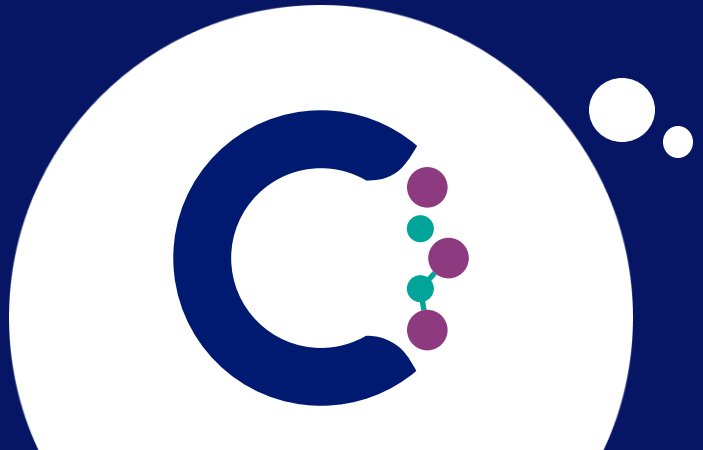
Longlaville

50,000 tons of waste/year
2 billion PET bottles a year

1 strategic partnership

150 direct and indirect jobs created

Appendix



Our history

Key dates

2011
Creation of Carbios by Truffle Capital

2012
Launch of THANAPLAST collaborative R&D project

2013
Initial public offering

2016
Creation of Carbiolice and granting of a licence

2019
Nestlé Waters, PepsiCo and Suntory Beverage & Food Europe join Packaging Consortium founded by Carbios and L'Oréal

Launch of CE-PET project funded by ADEME PIA

2020
Publication in scientific journal Nature

Creation of PoPLaB with INSA Toulouse

2021
Capital increase successfully completed

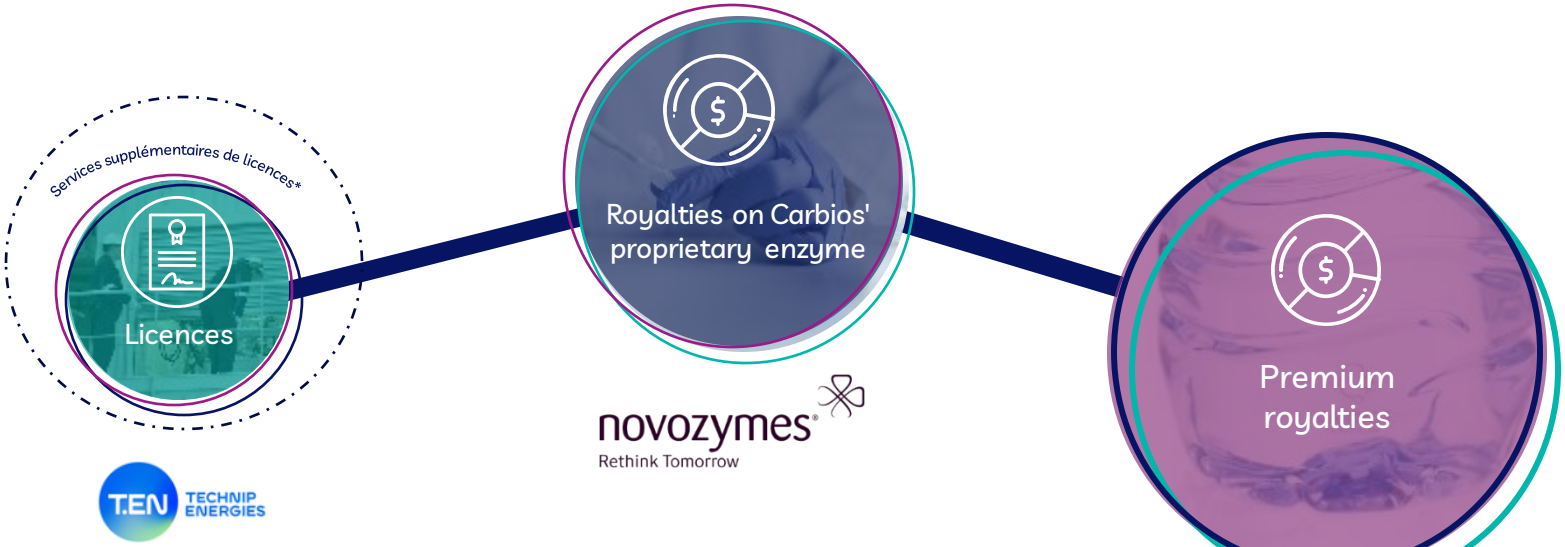
First bottles made from food-grade biorecycled PET

Launch of demonstration plant

2022
Launch of Textile Consortium with On, Patagonia, PVH, Puma and Salomon

Announcement of PET biorecycling plant construction project

Our business model



Upfront License fee + Additional services

To install production capacities (kt)*

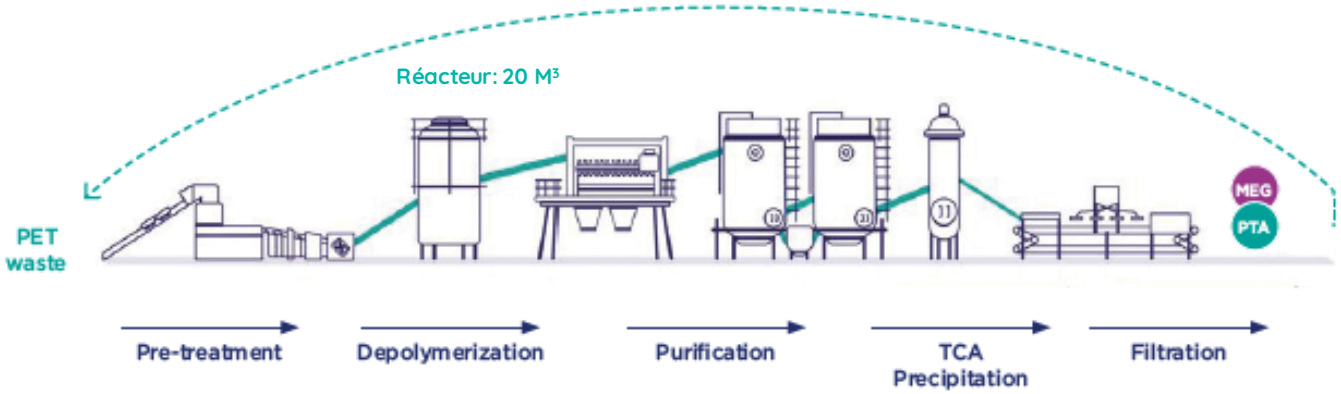
Recurring revenues (€/tons)

Deriving from volumes produced

** : Technical assistance services to licensees such as training and supervision during detailed engineering, construction, commissioning, start-up and performance testing of the units.*

Key process steps

A biological depolymerization, high purity monomers



Clermont-Ferrand

Carbios process goes back to ”food grade quality”

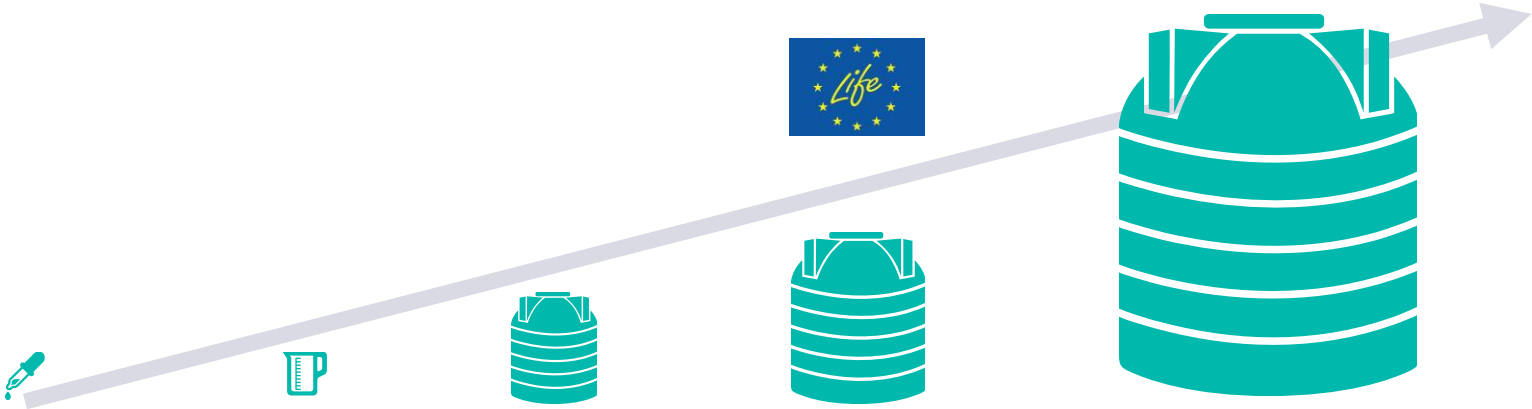
Depolymerization yield greater than 97%

Enzyme selectivity “the extra sorting”

Produces monomers used in >95% units producing virgin PET

From innovation to industrialisation

Scale-up of our technologies



Picoliter - Microliter	250 ml à 5 litres	1 M³	20 M³	4 * 300 m³
Enzyme identification and engineering	*Process scale-up*	*Pilot*	*Demonstration plant*	*PET biorecycling plant*
		100 kg of waste per batch ⇔ 4,000 bottles or 600 T-shirts	2 T of waste per batch ⇔ 80,000 bottles or 12,000 t-shirts	50,000 T of waste per annum ⇔ 2 billion bottles or 300,000,000 T-shirts