



7th Go Circular Summit
March 2026

Sustainable and Circular Solutions for the Polymers Industry

Gijs ten Berge

Vice President Polymers Technology Management



Lummus: Driving the Circular Economy Forward



Global leader in developing technology solutions that make modern life possible and **focus on a sustainable future**

Stellar brand reputation and long-term **relationships with key industry partners** across all regions and end markets

Uniquely positioned to provide technologies to **Make** **Break** **Remake** circular products

Proven track record of scaling & commercializing new technologies with a company **culture of continuous innovation**



160+

Technologies

4

State of the Art
R&D Facilities

20

Countries with
Lummus Presence

2,500+

Licensed Units
Globally



Novolen[®] PP
Gas-Phase Process
Novolen ComPPact[™]
Reactors

Homo Polymer
Random Copolymer
Impact Copolymer

Bio-based Polymer
Verdene[™] PP



EXCENE[™] HDPE
Slurry CSTR Process
2 Reactors

C4-HDPE (incl. bimodal)

Partner: Texplore Co. Ltd

Bio-based Polymer
Verdene[™] HDPE



Hyperlene[™] LDPE/EVA
High-Pressure Process
Autoclave Reactors

LDPE + EVA

Partner: Sumitomo Chemical

Bio-based Polymer
Verdene[™] LDPE/EVA



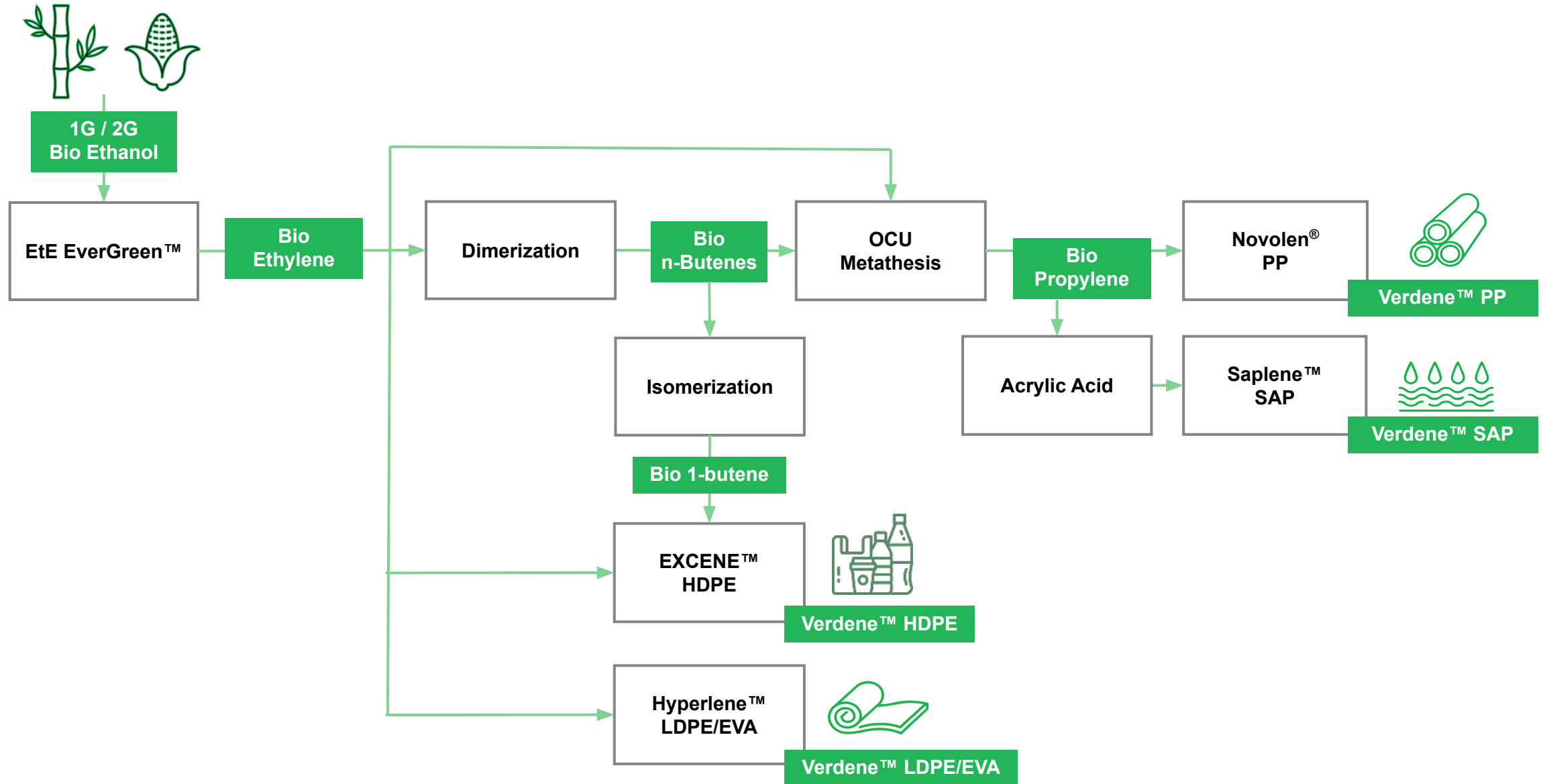
Saplene[™] SAP
Water-based
Solution Process
Belt Reactor

Hygiene Super Absorbents

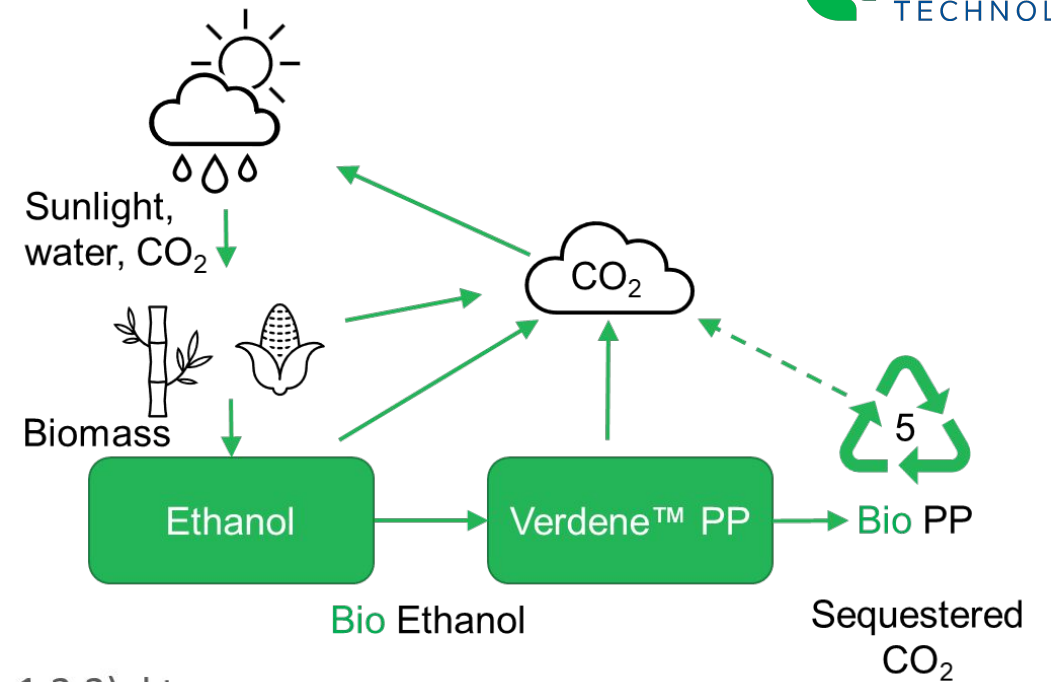
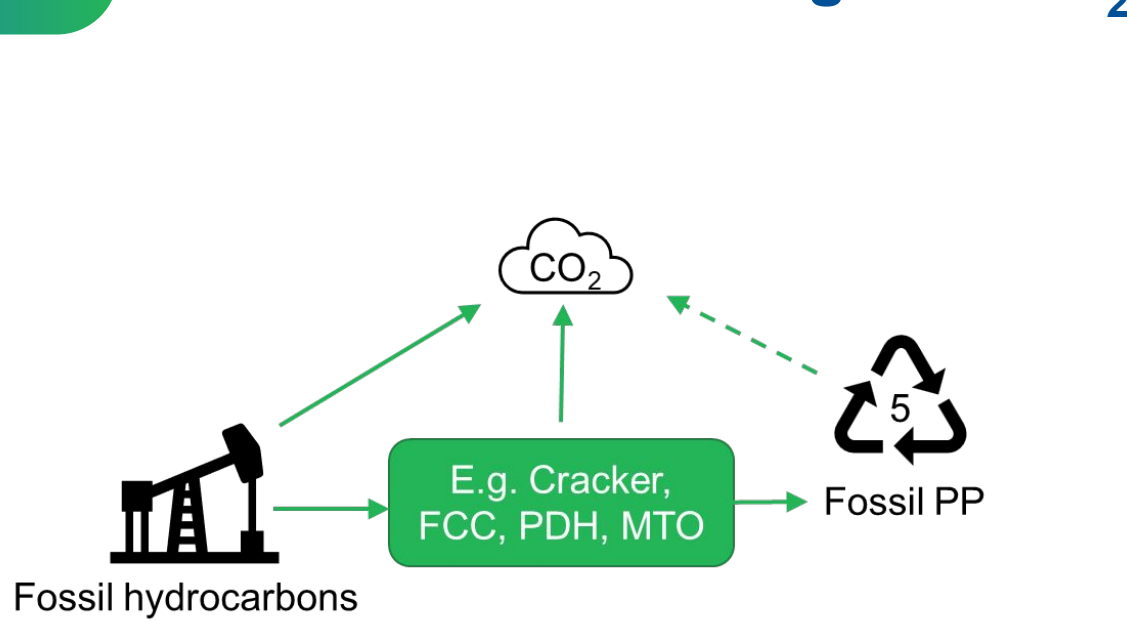
Bio-based Polymer
Verdene[™] SAP

Verdene[™] using ETE EverGreen[™] (EtOH dehydration) Dimer / OCT – Olefin Conversion Technology

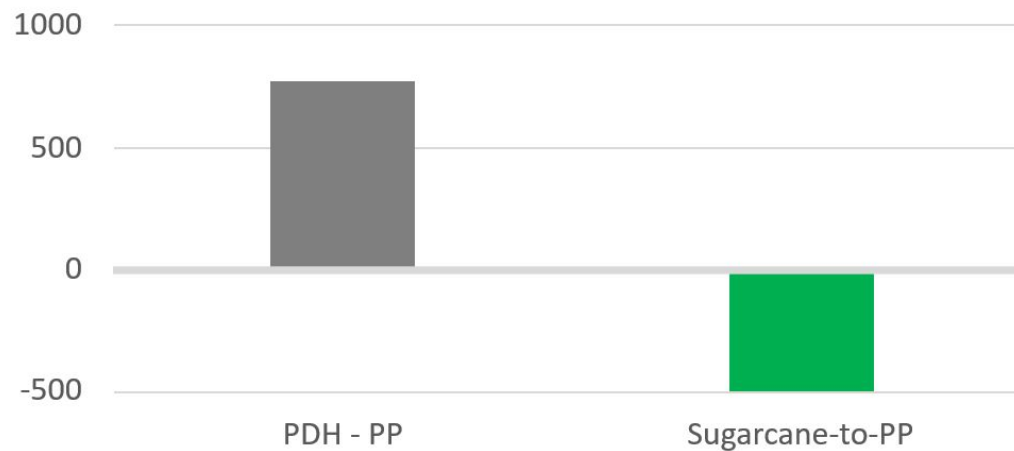
Verdene™ Suite of Technologies for Bio-Based Polymers



Verdene™ PP: Net Negative CO₂ Emissions



Total net CO₂ emissions (scope 1,2,3), kta
(500 kta PP)



> 1,250,000,000 kg CO₂ / y
lower net emissions

Case Study

Citroniq: Our first Verdene™ PP licensee

- Carbon-Negative Materials at Scale
- Corn-based ethanol conversion to PP, using Lummus' Verdene™ PP suite of technologies
- 600+ kta PP in 1st Phase
- Nebraska, USA
- Targeted timing: 2029/2030
- OrganiqPP™, 100% biogenic (ASTM D6866)
 - Packaging
 - Consumer goods
 - Automotive parts
 - Fibers and Fabrics
 - Medical supplies
 - Industrial
- CDR credits through Biomass Carbon Removal & Storage (BiCRS) platform
- <https://citroniq.com/>



Kelly Knopp
CEO & Co-Founder



Mel Badheka
President & Co-Founder

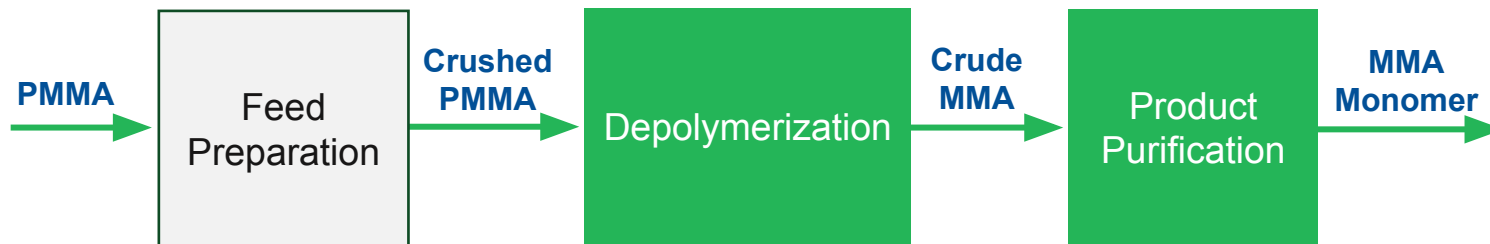
Biodegradable Polymers

- ❏ Polyhydroxyalkanoate (PHA)
- ❏ 100% biodegradable in soil and water
- ❏ Single-use plastic replacement



PMMA Depolymerization to MMA

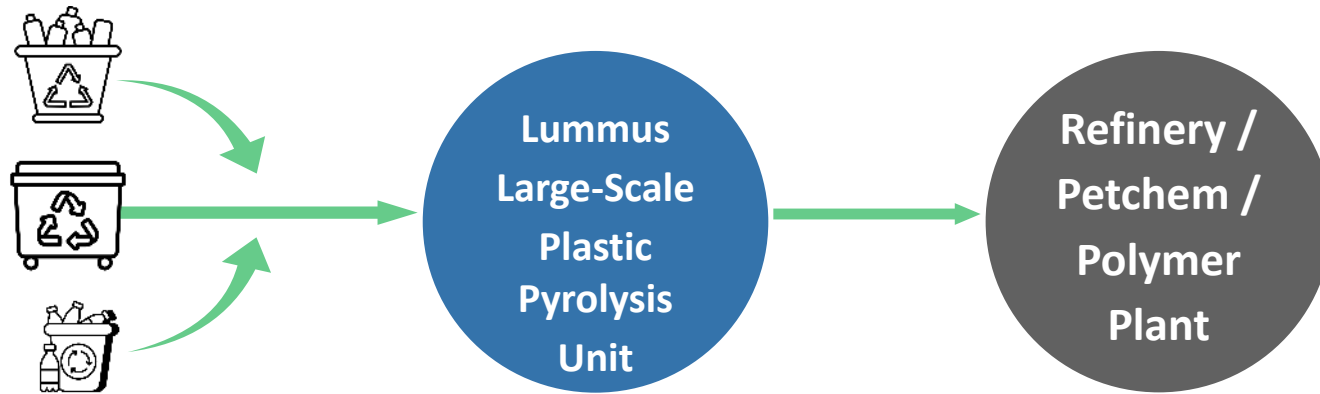
- PMMA – aka acrylic glass
- Self-cleaning extruder-based process
- Virgin-quality MMA monomer product



PMMA Products

Large-Scale Plastic Pyrolysis

- Industrial scale continuous process
- Unmatched Pyrolysis Oil quality
- Integration with Ref/Petchem assets



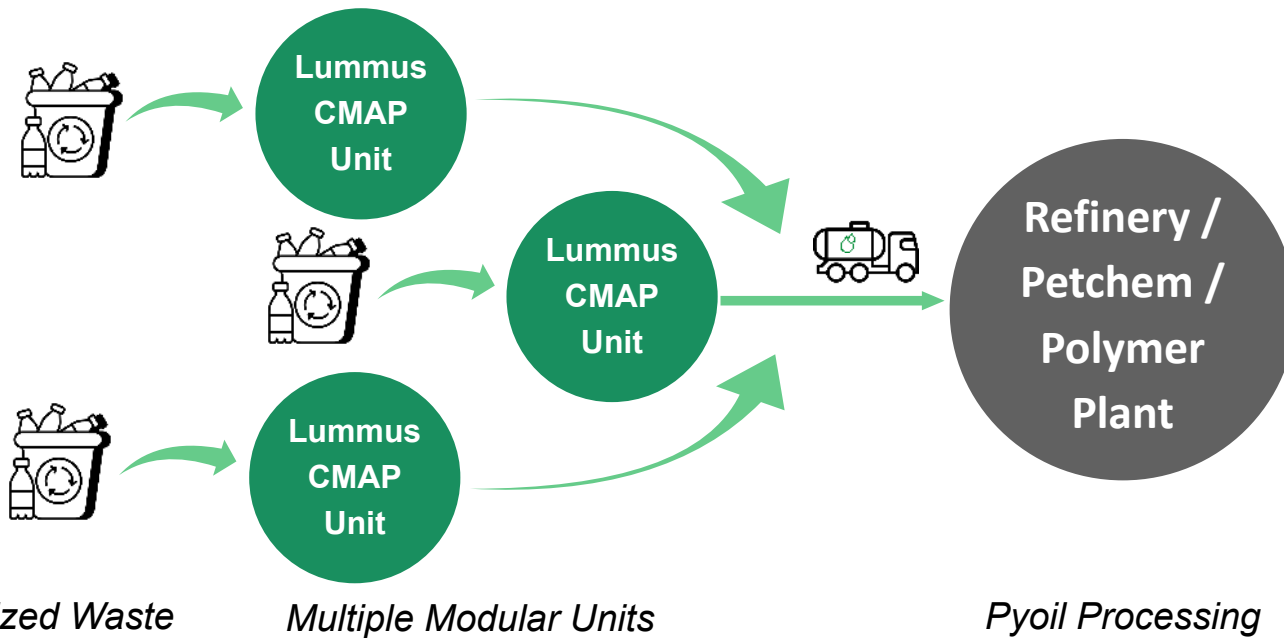
Aggregated Waste

Industrial-Scale Operation

Pyoil Processing

Small-Scale Plastic Pyrolysis (CMAP)

- Microwave powered continuous process
- Standardized module design
- Limits inefficiencies of transporting plastic



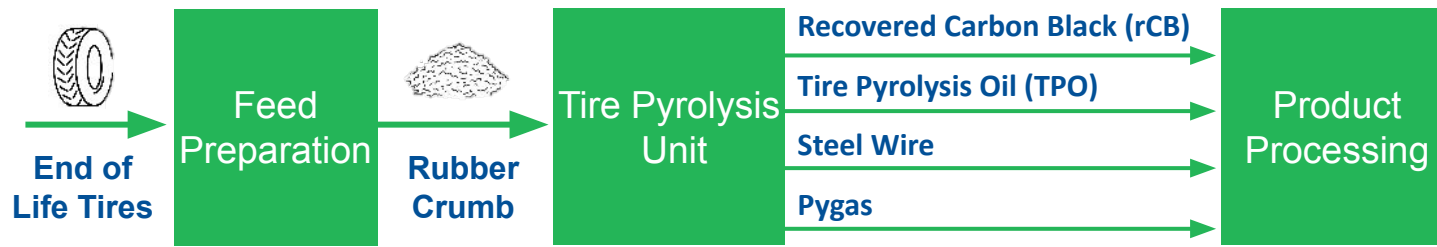
Tire Pyrolysis





- End-to-end solution:
 - Tire Prep
 - Tire Pyrolysis
 - Product Processing








- High value products

Rubber Crumb, rCB, TPO, Steel, Pygas

- Modular and scalable for flexible capacity



-  Lummas Technology offers industrial-scale, sustainable and circular solutions
-  Verdene™ technology available for:
 - Drop-in
 - 100% bio-based
 - Net CO₂ negative } polymers (PP, PE, SAP)
-  + PHA, PMMA depolymerization, plastics and tire pyrolysis technologies
-  to support producers and brand-owners meet their sustainability vision

-  Consumers
 -  Converters
 -  Brand owners
 -  Retailers
 -  Policy makers
-
-  Embrace and enable sustainable industry pathways for bio-based and circular petrochemicals and polymers !
 -  A better world starts with ourselves !