



Van incubator naar industriële speler in bioplastics

BioBased Circular Community Event, 15 april 2025

Gerrit Gobius du Sart

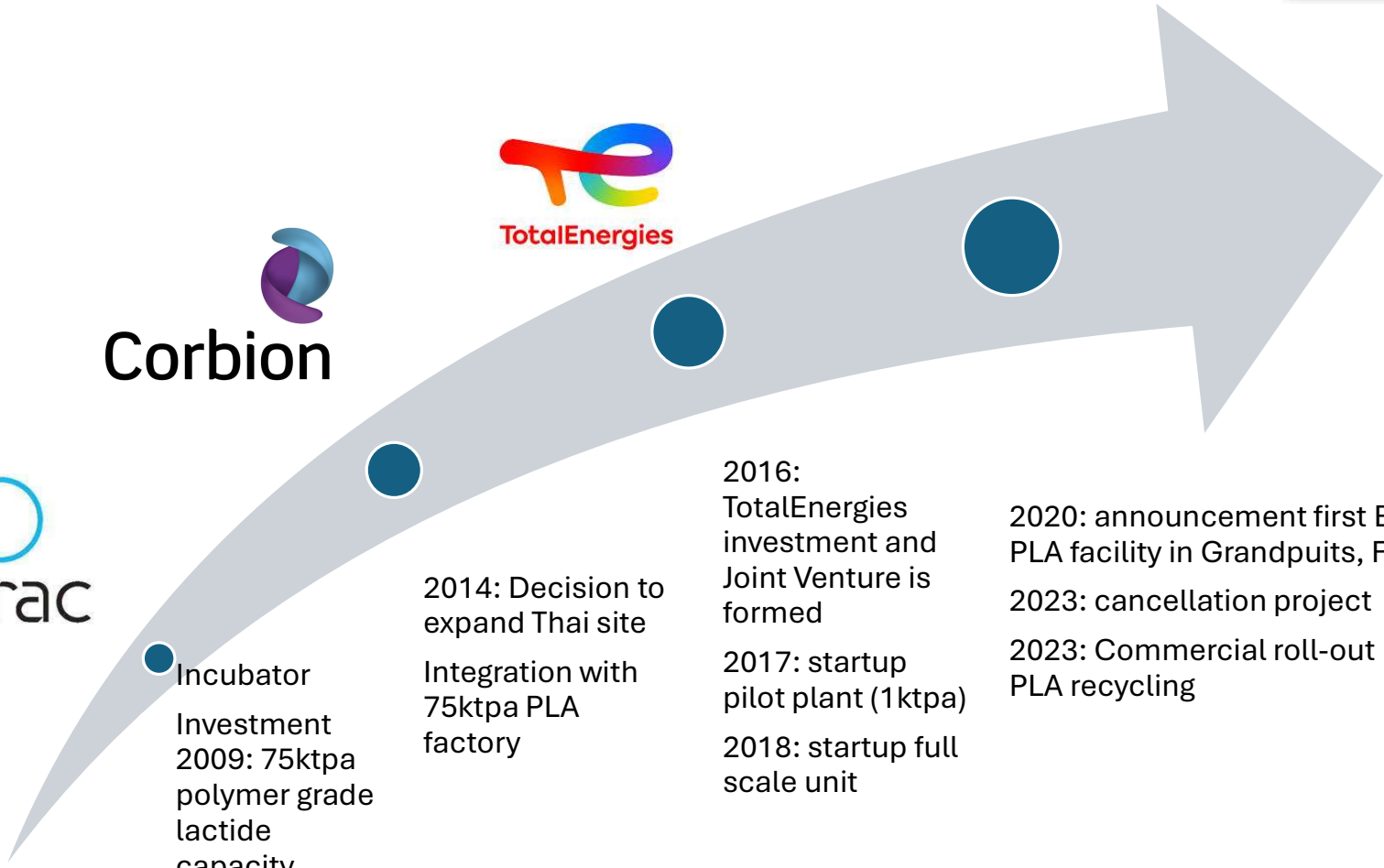
Corporate Scientist, RD&T

Luminy[®]
PLA bioplastics



Overdenking

“...dat jullie goed het perspectief vanuit een succesvolle Nederlands onderneming kunnen toelichten hoe je bioplastics kan produceren in het mondiale klimaat...”



Pre-2009:
biomedical grade
lactide and PLA

Incubator
Investment
2009: 75ktpa
polymer grade
lactide
capacity

2014: Decision to
expand Thai site
Integration with
75ktpa PLA
factory

2016:
TotalEnergies
investment and
Joint Venture is
formed
2017: startup
pilot plant (1ktpa)
2018: startup full
scale unit

2020: announcement first EU
PLA facility in Grandpuits, FR
2023: cancellation project
2023: Commercial roll-out
PLA recycling

Now, a 24-hour Operation


13 countries & 8 time zones



 **Headquarters**
in Gorinchem,
The Netherlands

 **Warehouses**
Norfolk, Virginia, USA
Oss, The Netherlands

 **Plant in Rayong**
Thailand

 **Representatives**
all over the world

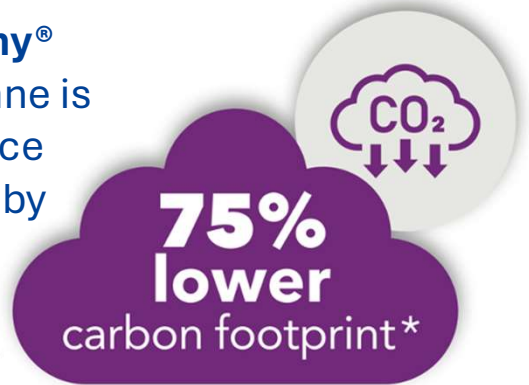
 **Distributors**

Made from plants

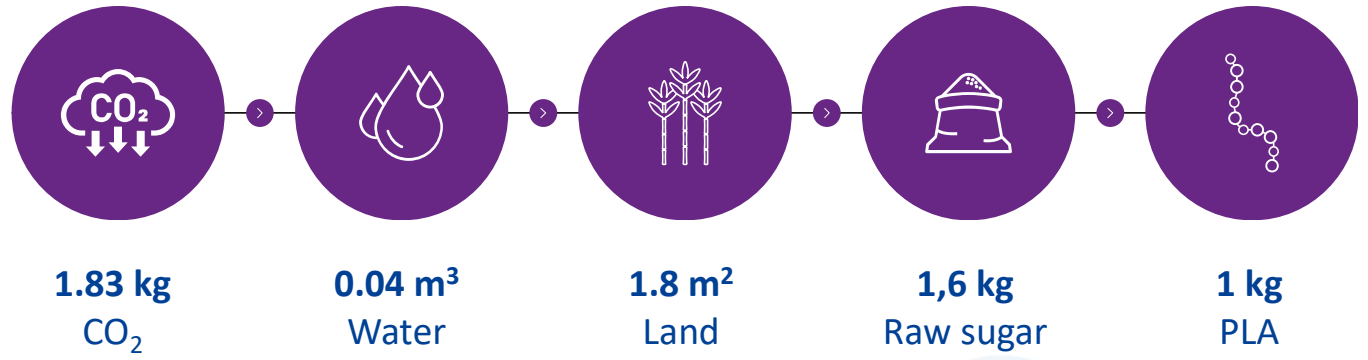
From raw sugarcane to PLA resin



Sugarcane is the starting point for Luminy® PLA. The sugar extracted from the sugarcane is fermented using microorganisms to produce lactic acid, an organic acid also produced by the human body.



* Luminy® PLA bioplastics have a carbon footprint 75% lower than traditional fossil-based plastics when biogenic carbon is taken into account



What is Luminy® PLA?

Polylactic Acid



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100% Biobased

Made from annually harvested renewable sugarcane plants



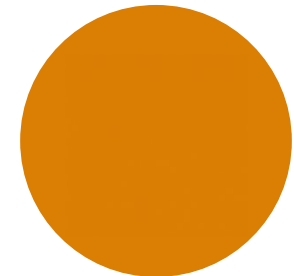
Compostable

Industrially compostable



Recyclable

Mechanically and chemically



Versatile

Used anywhere conventional plastics are used

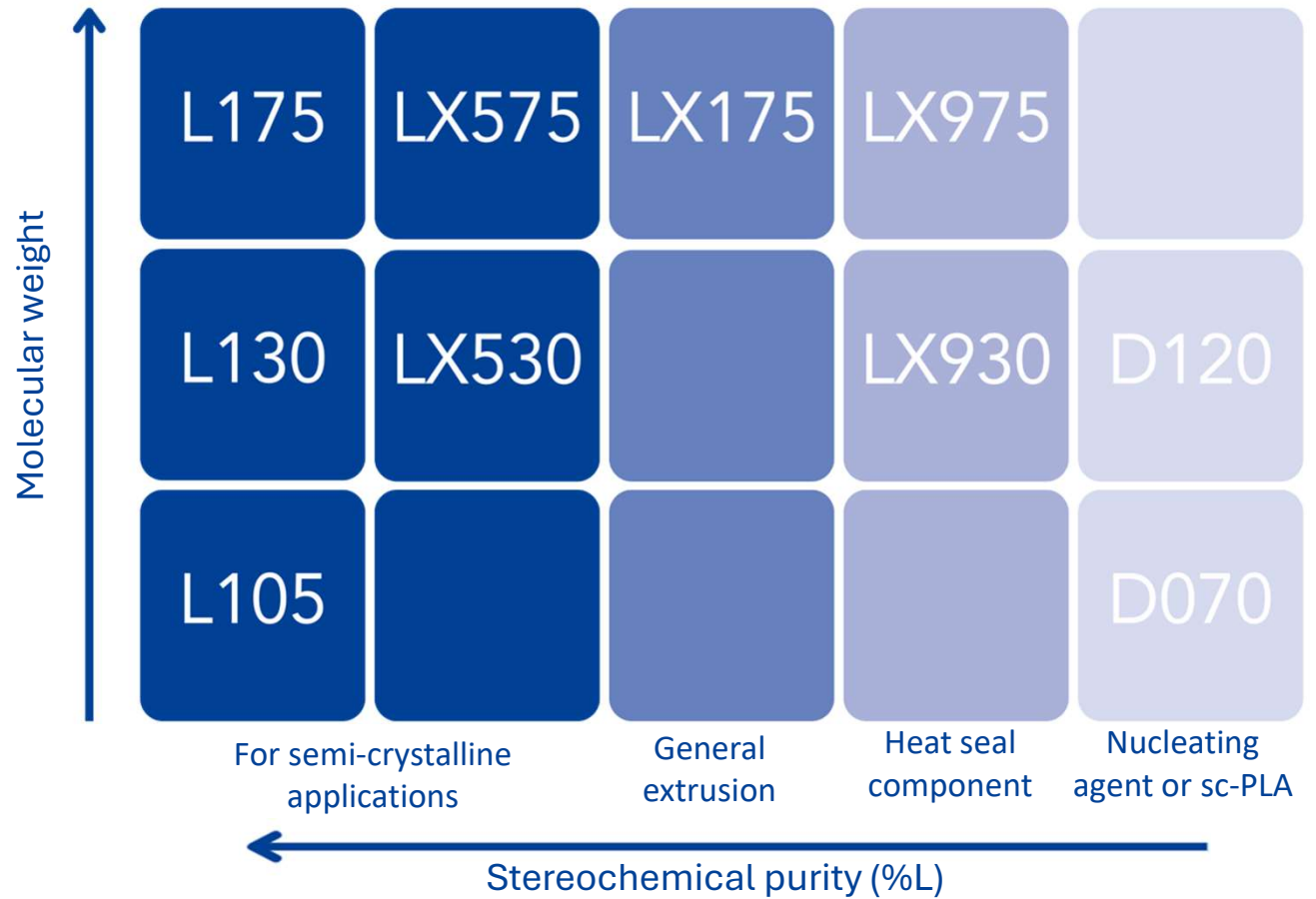


Luminy® PLA portfolio

All grades also available at 20-100% recycled content



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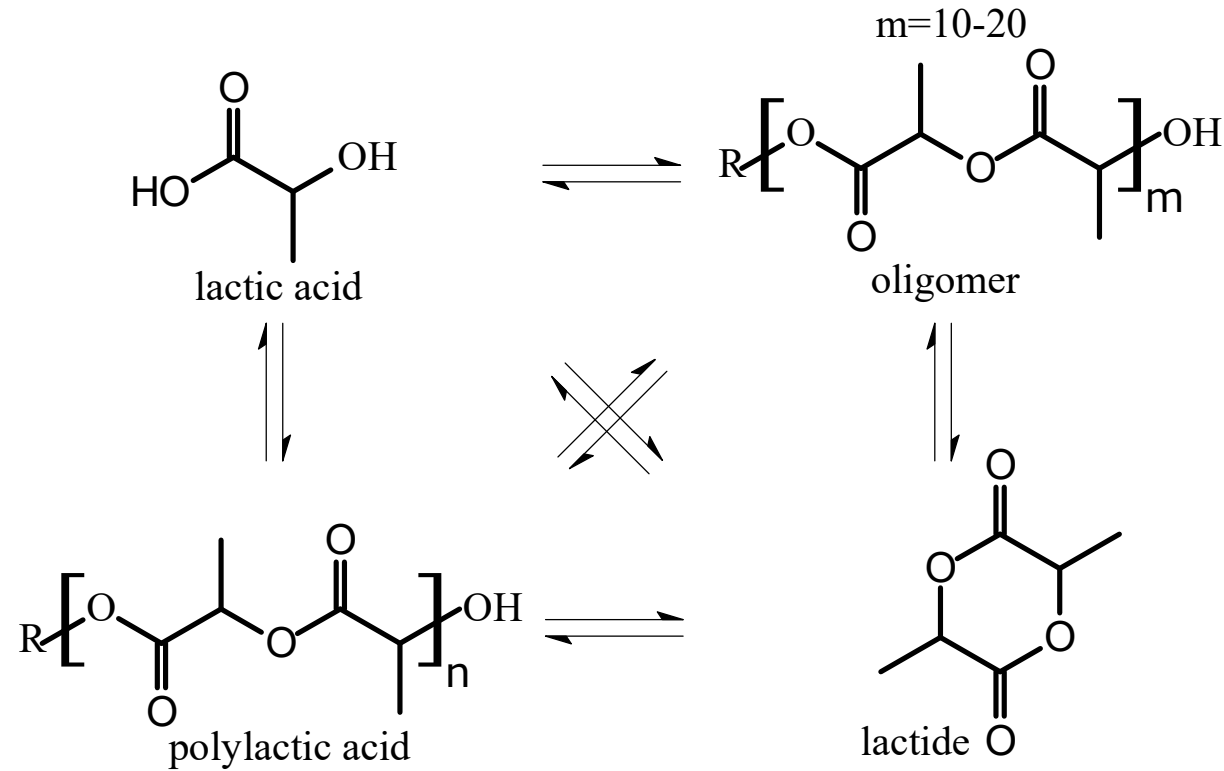


PLA chemical recycling

Enabled through equilibria

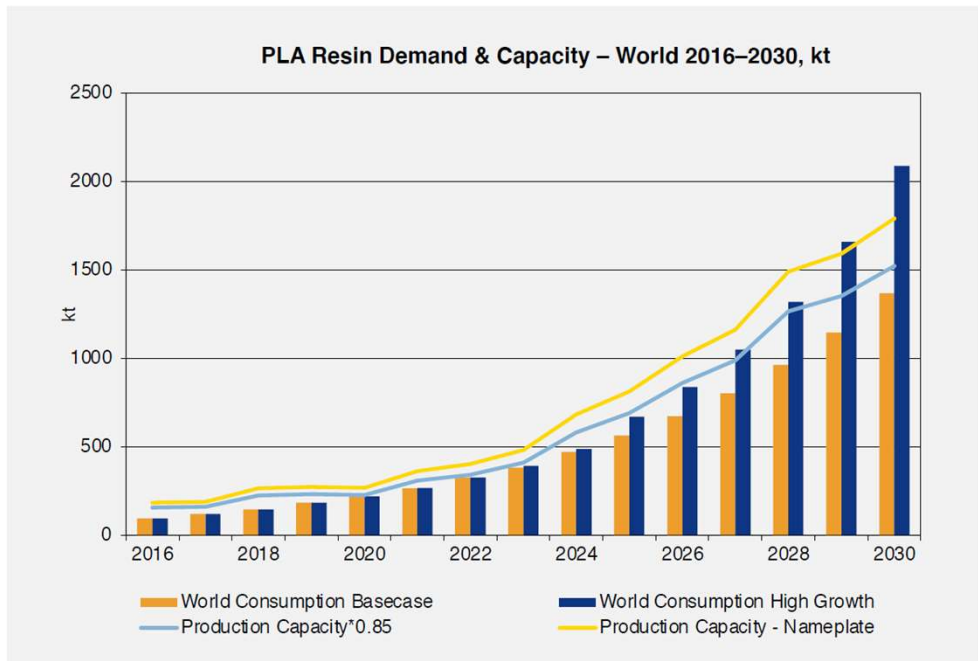
Several technologies developed

- Hydrolysis
- Solvolysis
- (catalysed) Back-biting...
- ...and combinations of the above





PLA Market Development



Source: Nova Institute market report

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Market Overview:

- Growing demand for sustainable plastics driven by consumer awareness and regulatory pressures
- Shift from conventional plastics to bioplastics fueled by corporate sustainability initiatives

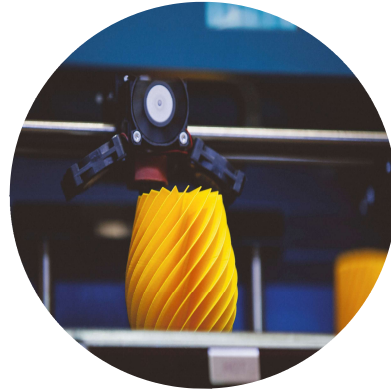
Key Market Trends:

- Rising adoption in food packaging, agriculture, textiles, 3D printing, and automotive industries
- Technological advancements in enhancing PLA properties, production efficiency, and recycling are improving performance and reducing costs
- Significant growth in Asia-Pacific and Latin America due to favorable government policies and industrialization

Market Projections:

- Global PLA market is expected to grow at a CAGR of 15-20% over the next five years
- Major manufacturers investing in capacity expansions to meet growing demand

Our global market segments



3D printing



Durable goods



Flexible packaging



Food service ware



Nonwovens



Rigid food packaging

PLA for nonwoven products - Tea bags & coffee pads

PLA products with a high content of compostable material

Benefits:

- Biobased
- Industrial compostable according to EN13432
- High heat resistance: can withstand boiling water
- Aroma neutral
- Soft & silky touch

Materials:

- Luminy L130
- Luminy LX930 for bi-co fibers
- Sometimes combined with cellulose fibers



PLA for nonwoven products - Face masks

People around the world are getting more and more used to wear masks, especially during pandemics.

Benefits:

- Biobased
- Anti-bacterial
- Skin friendly
- Compostable according to EN13432
- Chemical recyclable

Materials:

Multiple PLA grades used for different layers:

- High flow PLA
- Luminy L130
- Luminy LX930



PLA for rigid food packaging - High heat coffee capsules

Industrially compostable coffee capsules

Benefits:

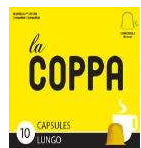
- Biobased
- Industrial compostable
- High heat resistance: can withstand boiling water
- Good barrier properties
- Good processing economics

Materials:

- Compound based on Luminy L130 and Luminy D070, mineral fillers and other additives



www.groupati.com



Advanced
Technology
Innovations



PLA for durable products - Cosmetics packaging

Injection molded natural fiber filled PLA containers

Benefits:

- Biobased
- Stone/wood look & feel
- Combination of ecology, luxury and almost unlimited design possibilities
- Reduced weight of the part
- Good processing economics

Materials:

- Luminy L105 combined with wood chips and biodegradable natural binders

www.sulapac.com



PLA for food service ware - Foamed applications



Benefits:

- Lower material use while stiffness remains
- Density reduction: 10-15x
- Improved thermal insulation
- Better force dissipation
- Can be heat resistant
- Other product surface appearance than dense products

Material:

- Luminy L175 or Luminy LX575 or Luminy LX175 based on high heat requirements
- Modified to improve the melt strength

www.koreabiofoam.com



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PLA for food service ware - Extrusion coated paper cups

PLA for industrial compostable and recyclable paper cups

Benefits:

- Complete biobased product: Paper and PLA
- Industrial compostable according to EN13432 and D6400.
- Good flavor and aroma barrier.
- Excellent grease and mineral oil resistance.
- Certified recyclable by paper industry.
- Food contact approved for ready-to-eat containers for microwave and oven heating.

Materials:

- Luminy LX175 or Luminy LX930

www.metpack.com/en/

METPACK
C U P S T O C K



PLA for flexible packaging - BO-PLA film

Bi-axial oriented PLA film for transparent flexible packaging

Benefits:

- Very thin films possible: Up to 15µm
- Higher stiffness than BO-PP
- High transparency with low haze
- Better printability than BO-PP
- Very good heat sealing when using a double layer- BO-PLA film
- Biobased and industrial compostable

Materials:

- Standard PLA as main layer
- Low heat PLA as heat-seal layer

www.chuang-su.com.cn

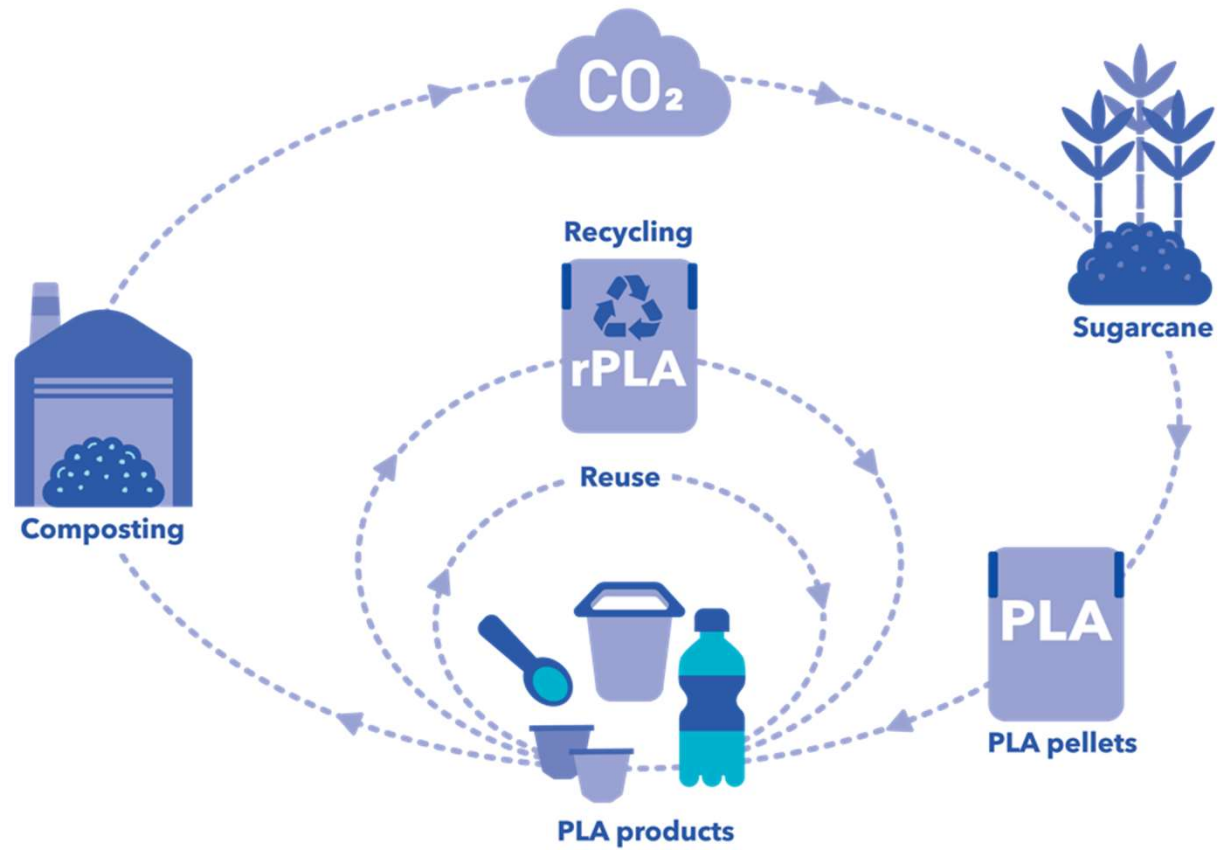
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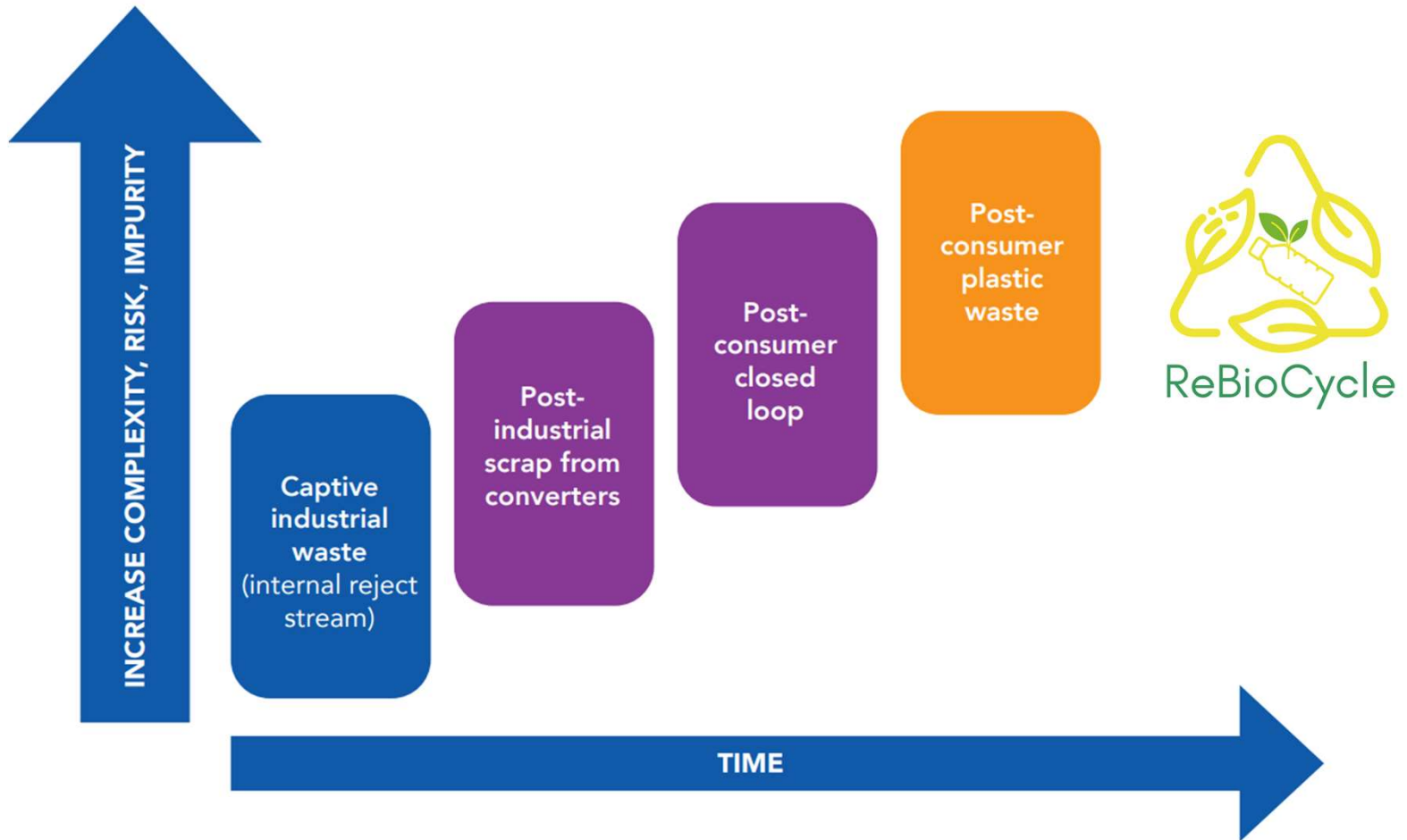
Closing the loop with Luminy®

PLA is reusable, recyclable, and compostable

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Road Map PLA Recycling



ReBioCycle: Biobased plastics recycling



ReBioCycle

Developing advanced bioplastic sorting and recycling technologies for biobased and biodegradable plastics

ReBioCycle hubs

Are a critical unit of activity and replication

Dutch Hub

Upscaling chemical technologies to TRL6 to recycle PLA and PHA after reclaiming from mixed plastic waste



Regulatory Framework: EU

PPWR-Recyclability

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Opportunities

- Luminy PLA is available commercially at 20-100% recycled content for *Food Contact Approved applications*
- EU commission is assessing biobased content to complement recycled content targets (Feb 28th 2028 assessment deadline)

Challenges: Will PLA be regarded as *recyclable*?

- By 2030 all packaging must be recyclable in line with its ***design for recycling*** standard (**DfR**)
- By 2035, all packaging materials must be recyclable ***at scale*** based on ***post-consumer recycle***
- Recycled content can come from **outside EU** if the manufacturing site respects EU standards
- **2030 Targets for recycled content** per manufacturer site
 - 30% in SUP beverage bottles
 - 30% in PET Packaging
 - 10% in non-PET contact sensitive packaging
 - 35% in other packaging

Regulatory Framework: EU

PPWR - Biobased & Compostable

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Opportunities for PLA

- Regulation recognizes sustainable potential for biobased plastic packaging: Article 8-biobased
 - By 2028, the EC must assess the environmental benefits of biobased plastics and review potential targets
- Article 9: two types articles mandatory industrially compostable (EN13432)
 - Tea or coffee bags and permeable soft after use units
 - Fruit & vegetable stickers
- Member states must register additional applications to be mandatory in their country by end 2026
- Involvement in the PEF materials methodology update - recognition of biogenic carbon benefits

Nationale Circulaire Plastic Norm

https://wetgevingskalender.overheid.nl/Regeling/WGK026285/Download/0b99fa33-e626-4807-b6f5-1b651dfb2611_1.pdf

Ontwerpregeling 07-01-2025



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- Vooruitlopend op EU-wetgeving wordt per 2027 een nationale verplichting voor plasticproducenten ingevoerd om de toepassing van **gerecycled plastic** of **biogebaseerd plastic** te stimuleren
- De **nationale circulaire plastic norm** gaat in per 1 januari 2027
- Startpercentage onduidelijk (15%?), oplopend tot 25%-30% circulair polymeer in 2030
- Deze verplichting is van toepassing op alle plastics die in Nederland en voor de Nederlandse markt worden geproduceerd en wel op *'de partij die polymeren(mengsels) verwerkt tot eind- of deelproducten'*
- Zowel **biogebaseerd** als **post-consumer plastic** is inboekbaar als circulair polymeer

Voortgang



Concluding remarks



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- Polylactic acid (PLA), has been established as a technical grade thermoplastic, which is both biobased and compostable
- PLA supply and demand have been maturing: established markets, several suppliers
- Beyond end-of-life options, PLA offers significant carbon footprint advantages
- Luminy® PLA with chemically recycled content offers further potential to reduce plastic materials' emissions
- Teaming up with partners in North-Western EU to establish local recycling hub



Thank you

Luminy® PLA bioplastics

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