



# Shaping the future of biobased plastics

Groundbreaking Ceremony  
Lactide Plant  
31 March 2010

Arno van de Ven  
Vice President Chemicals and Pharma



# Agenda

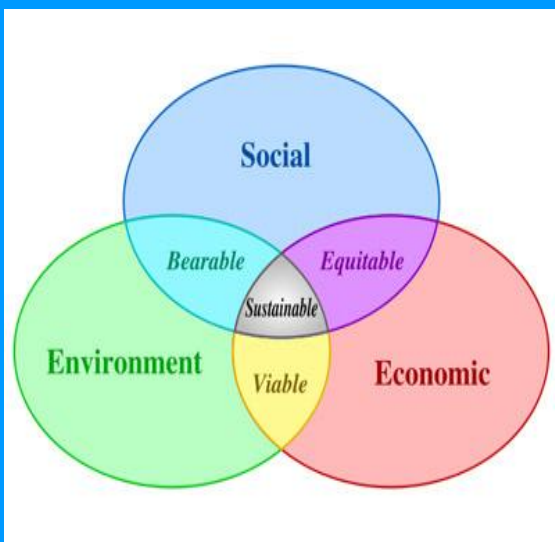
- **Shaping the future of bioplastics**
- **Signing ceremonies - Joint bioplastic development**
  - Address by Dr. Wantanee, NIA
    - NIA – Purac – TBIA
- **Biopolymers - Business opportunity for a sustainable future**
- **Biofoam expansion in Europe**



McKinsey&Company

Synbra

# Sustainability elements



## Safety

Non-toxicity

EBD (Biocides)  
Food-ingredient  
REACH (Chemical)  
Antibiotics ban (Feed)

Environmentally friendly  
Biodegradable  
Non-GMO

## Renewability

Concerns green house gasses  
Bio-based not fossil based  
Finite fossil resources

## Sustainability

People – Planet - Profit



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pure by nature

# Drivers for bioplastics

- Consumer demand for “green” products
- Retailers and brand-owners longing for green image
- Positive framework conditions
- Reducing CO<sub>2</sub> emissions
- Oil availability limitations



# Purac value proposition

- 2<sup>nd</sup> generation PLA
- Favorable CO<sub>2</sub> footprint
- PLA polymerization process
- Partnership model

# McKinsey PLA market estimate

## Segments with highest penetration potential for PLA

### Packaging

- Largest market for PLA
- Simple application with high visibility for consumers relying on price premium and lower recycling tax than oil based polymers

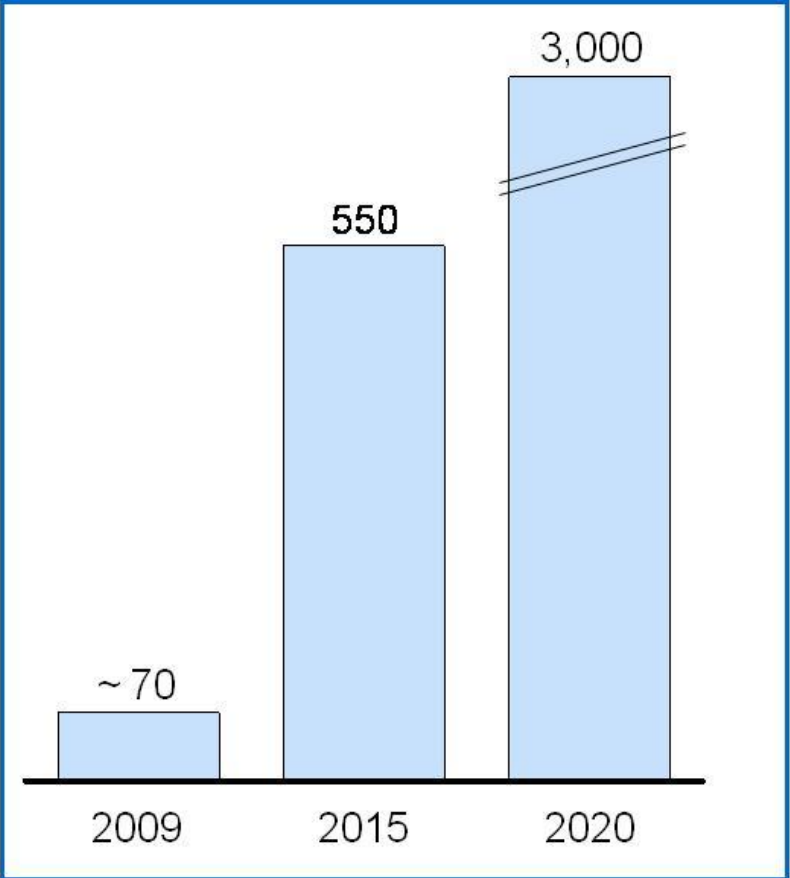
### Fibers

- Close match of PLA and PET fiber properties, need for high temp resistance prompting for high temperature PLA (sc-PLA)
- Penetration in high end apparel markets and some non-woven products

### Consumer products

- Mostly PS replacement in durables

## Estimated market potential for PLA kt



# PLA technology development path

## 1<sup>st</sup> generation PLA

A polymer from NatureWorks

## 2<sup>nd</sup> generation PLA

PLA based on L and D lactides with superior heat resistance properties opening new application areas

## 3<sup>rd</sup> generation PLA

PLA based on a gypsum free lactic acid process that are carbon neutral

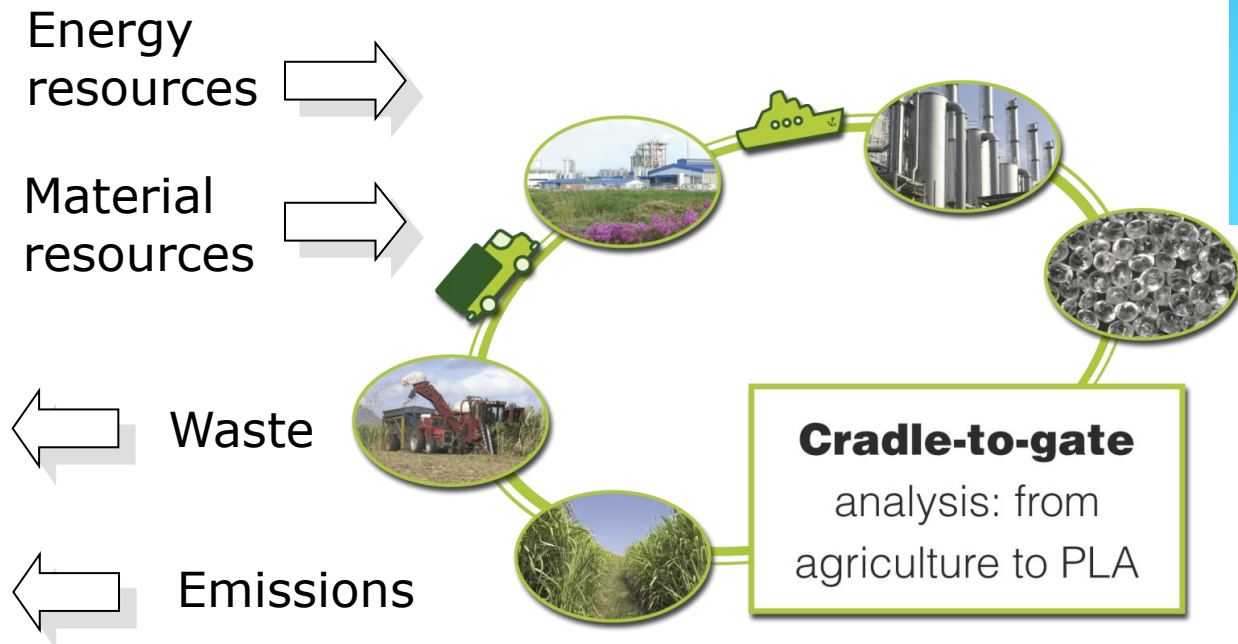
## 4<sup>th</sup> generation PLA

PLA based on a gypsum free lactic acid process using non-food biomass as substrate.



# Life Cycle Assessment of PURALACT<sup>®</sup> based PLA

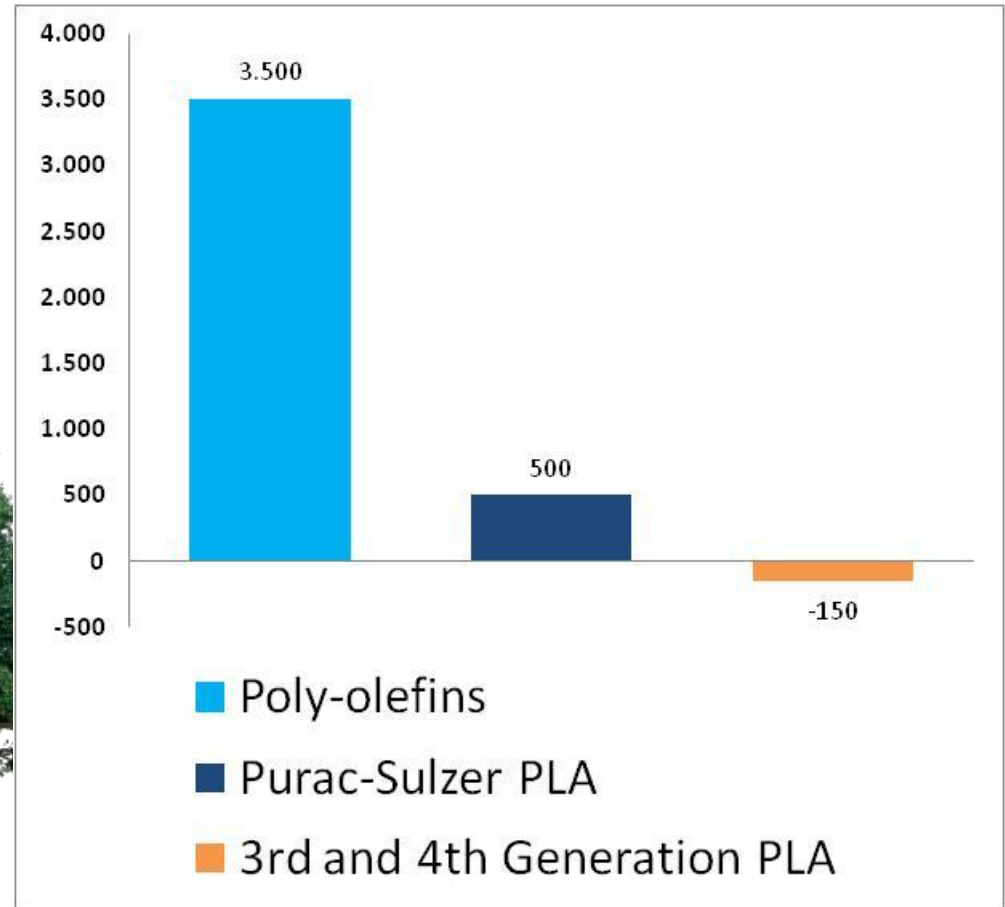
*LCA can be used to demonstrate the benefits of a bioplastic compared to fossil based polymers, e.g. with respect to energy use and CO<sub>2</sub> emissions*



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# CO<sub>2</sub> emissions next generations of PLA

- New generations:
  - 3<sup>rd</sup> : gypsum free
  - 4<sup>th</sup> : biomass based



# Total PLA solution

**SULZER**



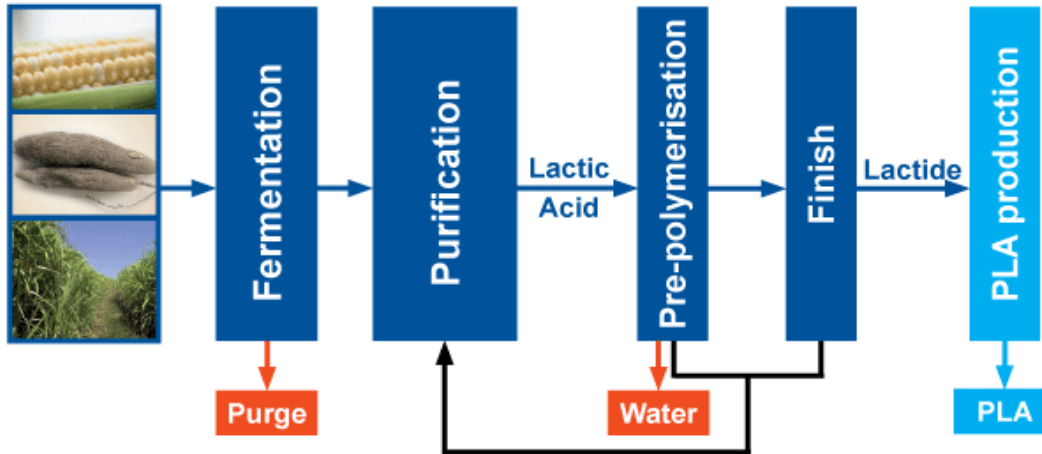
PLA  
BIOFOAM

Purac  
Partner

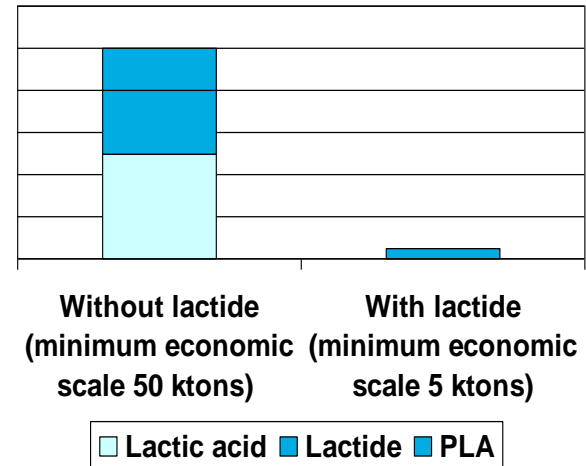


# Purac-Sulzer PLA technology lowers entry barriers for PLA producers

	PURAC	PURAC	Partner
Step	Lactic Acid	Lactides	PLA
Investment	50%	30%	20%



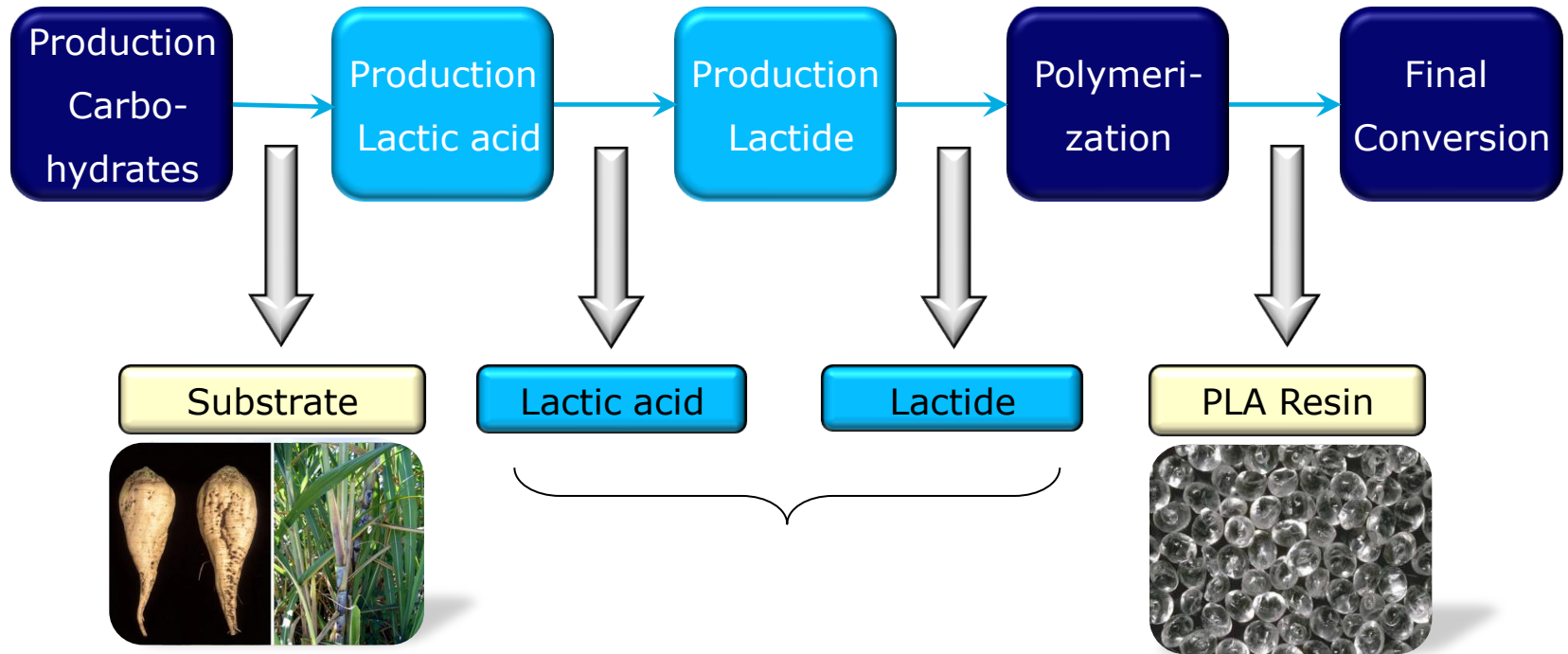
Investment hurdle for PLA producer



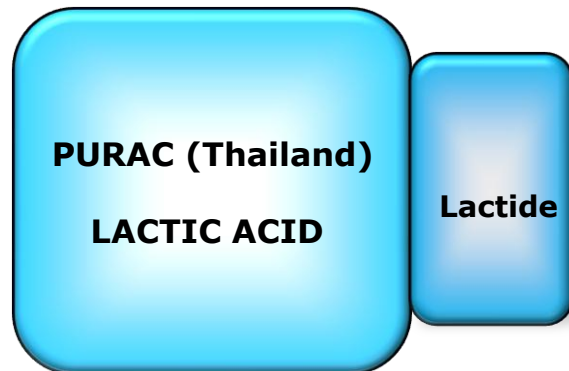
PURAC is enabling PLA producers by reducing:

- Minimum scale for investment
- Investment hurdle
- Technology hurdle
- Investment risk

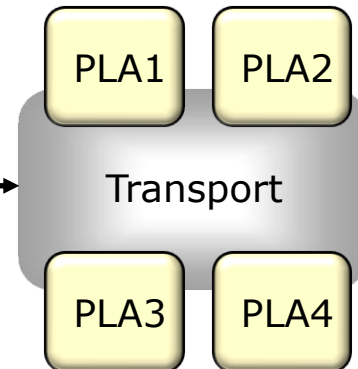
# Partnership model for Purac's PLA business



## PURAC POSITION



## PURAC PARTNERS



# Progress Purac PLA Program

## Significant # customers became partners

## Customer interest accelerated

- Supported by announcement of Thailand lactide facility



## End user interest further increasing

- Major countries support bio development
- Major consumer product companies express interests



## Manufacturing base established

- World class economies of scale



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