



Exploiting new biobased building blocks Succinic Acid

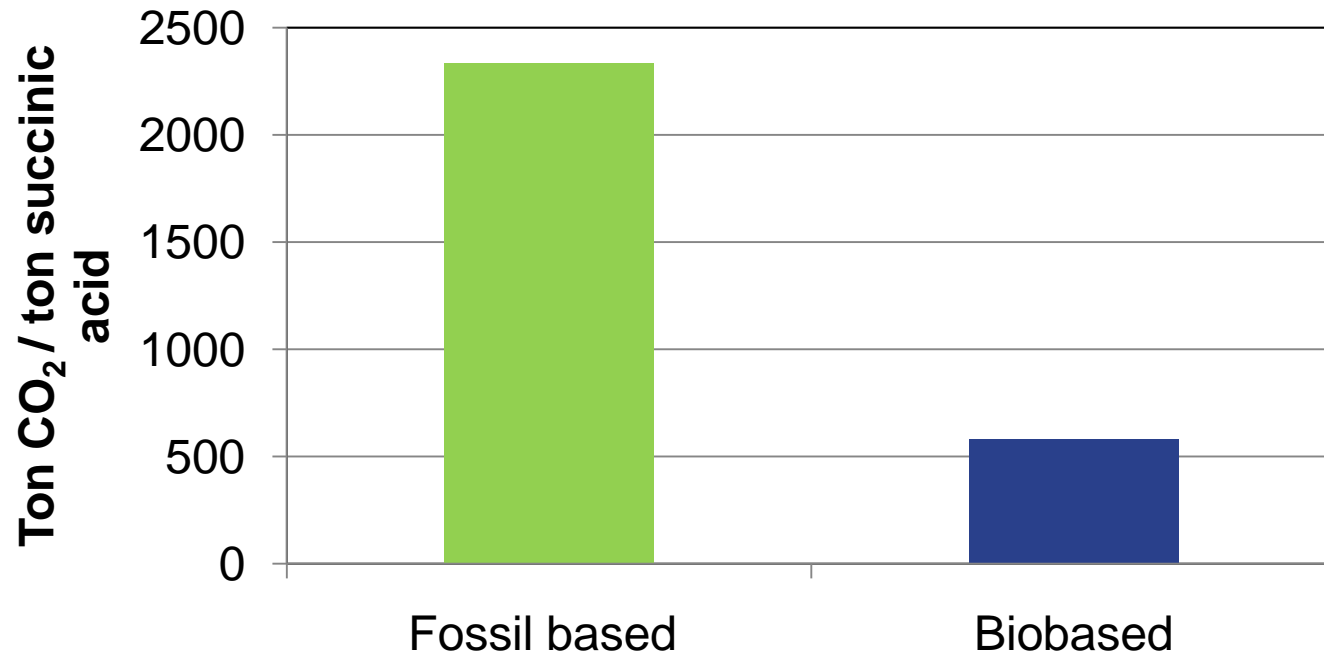


CSM Investor Event
27 April 2011
Arno van de Ven
Vice President Chemicals & Pharma

Agenda

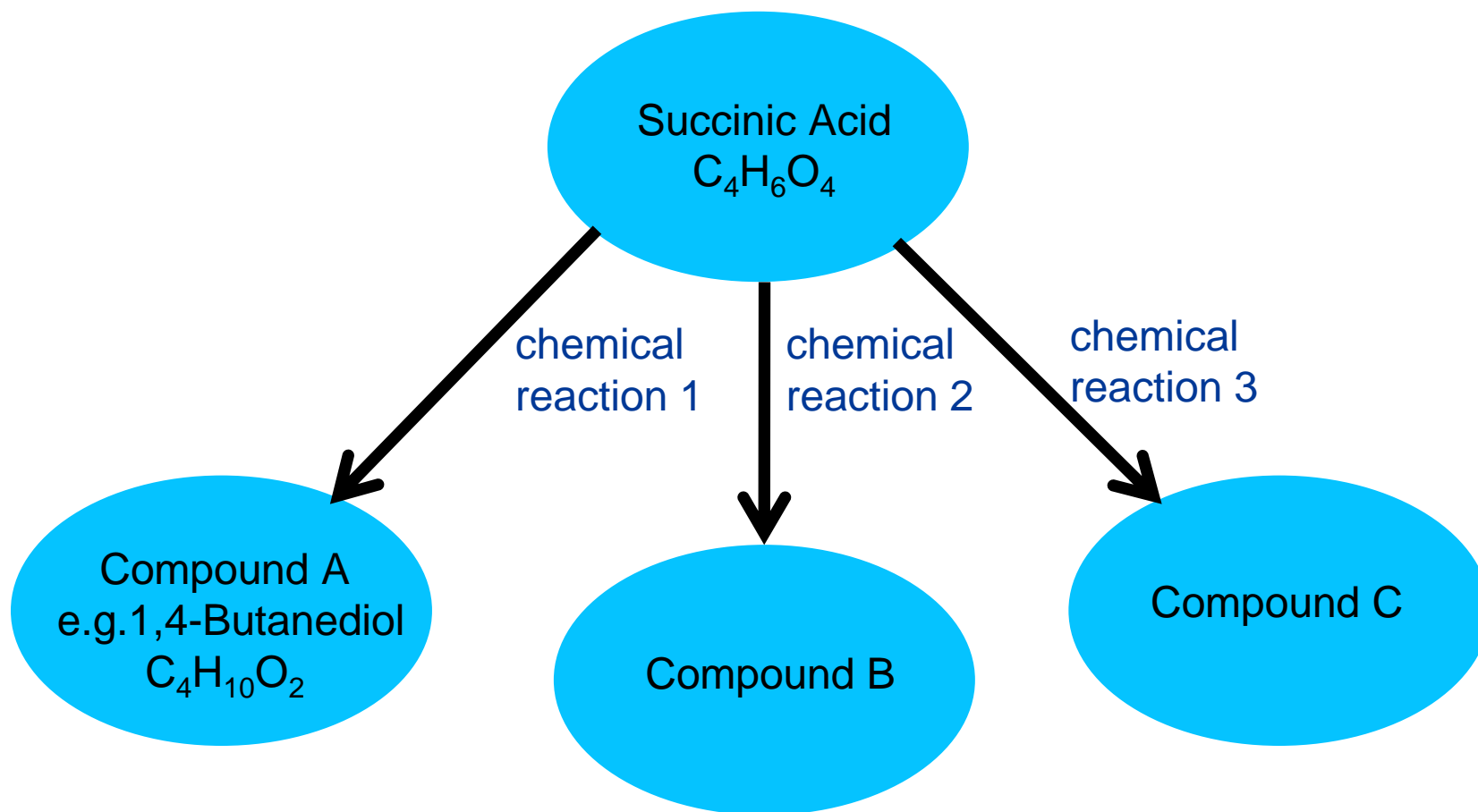
- Drivers
- Succinic Acid as high volume building block
- What is a platform molecule?
- Applications
- Cooperation Purac-BASF
- Developments in the Succinic Acid arena

Succinic Acid is a CO₂ friendly platform chemical

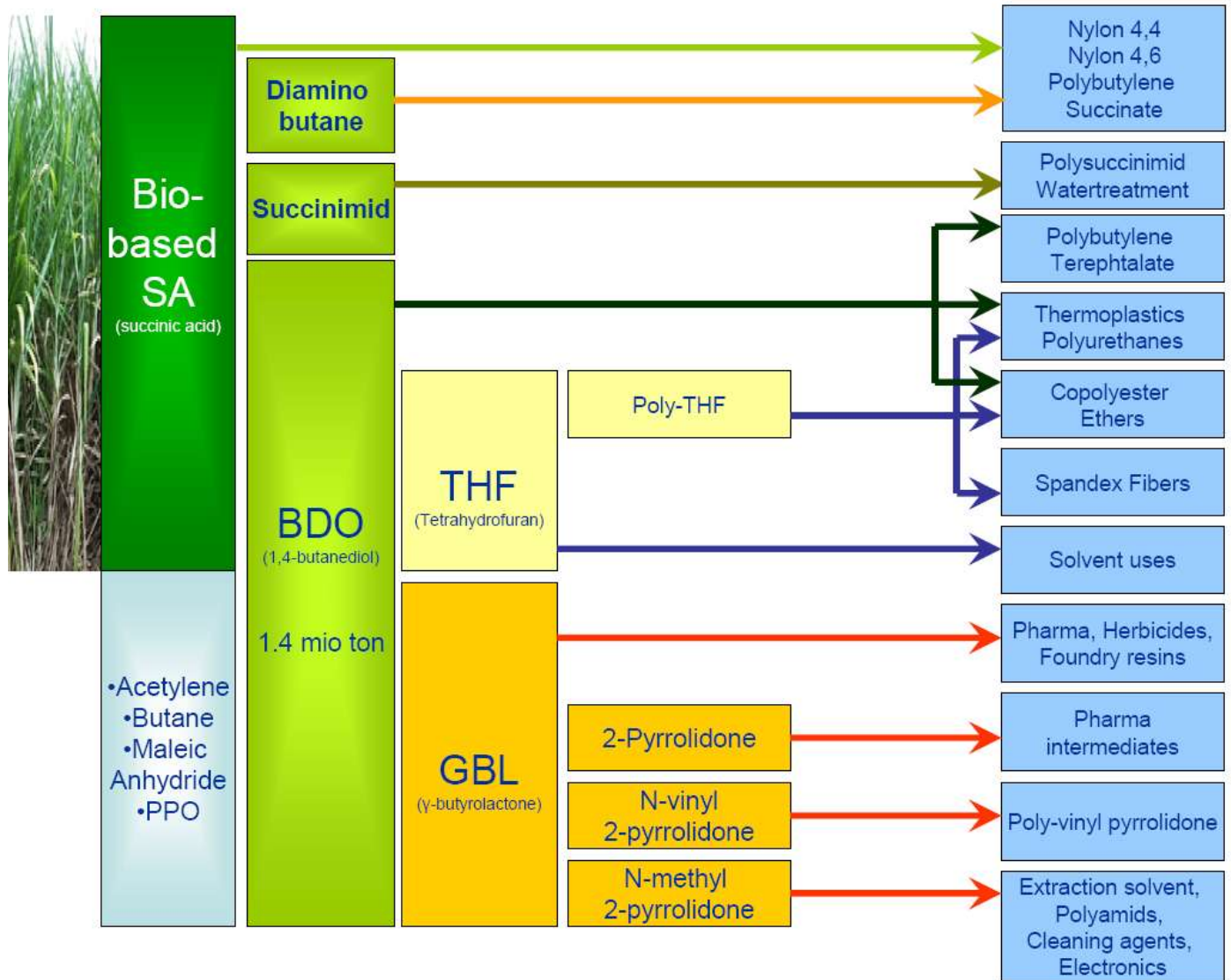


Source: BASF Eco-efficiency analysis

What is a platform molecule ?



Succinic Acid as a platform chemical



Application fields of biobased Succinic Acid



Food



Pharma



Coolants
Deicers



Fuel
Additives



Polyamides



Plasticizers



Fine
Chemicals



Personal Care



Polyurethane



Solvents

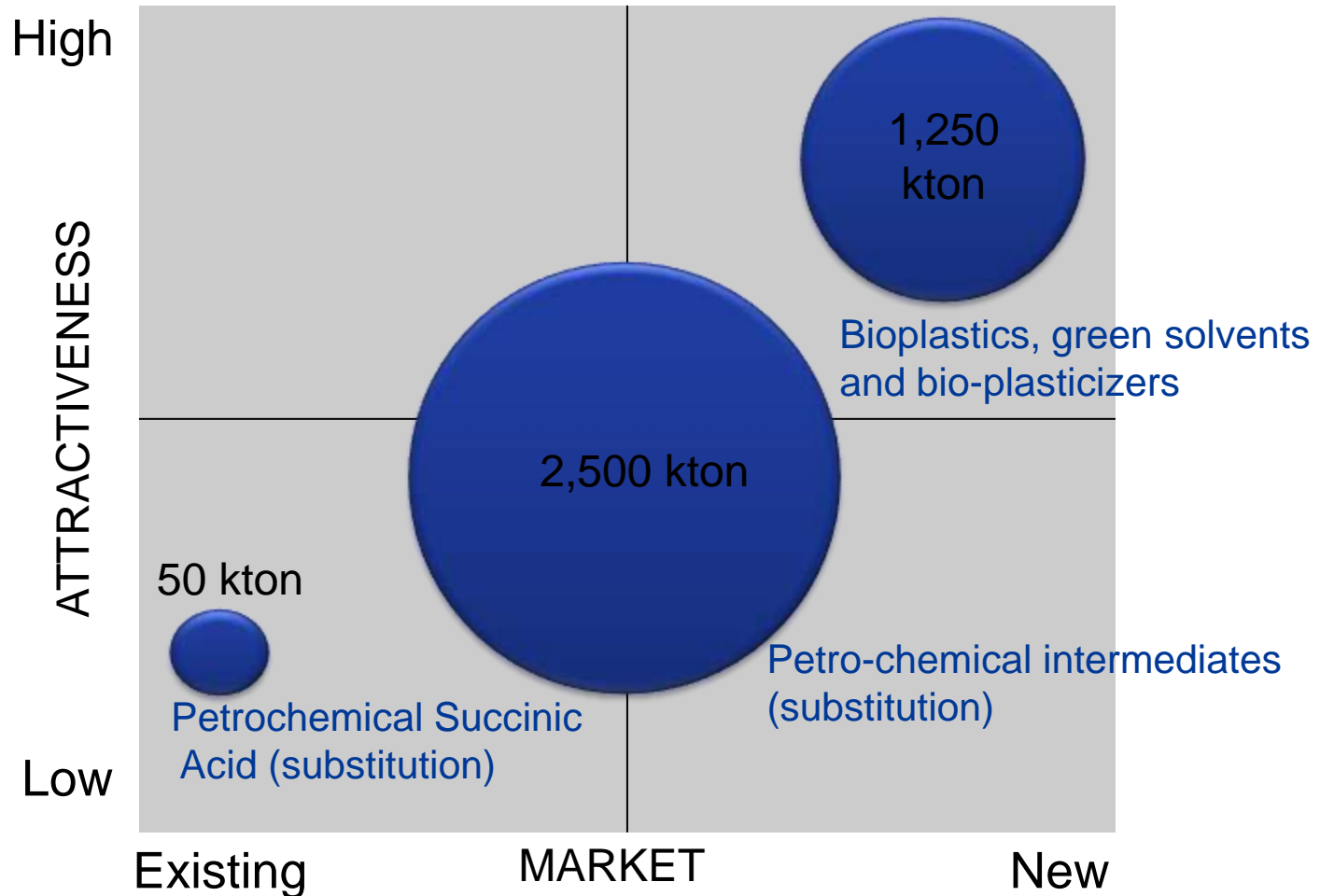


Biopolymer
Polyesters



Intermediates

Biobased Succinic Acid potential in 3 key markets driven by cost competitiveness and performance



Global interest for biobased Succinic Acid



A new industry will be created through alliances between agro, biotech and chemical companies

Value of Succinic Acid recognized by leading chemical companies



- Industrial trials running
- Preparing for the next step



- Various partnerships in chemical industry a.o. Dupont, Mitsui, Sinoven, Greenfield Ethanol, Basic Solutions
- Partners represent various market segments a.o. de-icers, cleaning solvents and polymers
- Pilot plant in Pomacle France (EUR 37 mln investment)

Value of Succinic Acid recognized by leading chemical companies



- DSM and Roquette started in 2010 a JV named Reverdia
- 100 mton pilot plant under construction in Lestrem, France



- USD 60 mln investment of PTT in Myriant (50 % share)
- Myriant announced construction of 13.5 kton Succinic Acid plant in Louisiana, USA (USD 70 mln investment)
- Investment of JV PTT and Mitsubishi Chemical Corp. in Poly Butylene Succinate (PBS) production (USD 200 mln for 20,000 mton capacity)

Purac has joined forces with the strongest and most experienced chemicals intermediate player in the world



Joint Media Release
September 30, 2009

BASF and CSM announce joint production development of biobased Succinic Acid

LUDWIGSHAFEN, GERMANY and DIEMEN, NETHERLANDS, September 30, 2009 -- BASF SE and CSM nv today announced the cooperation between their respective subsidiaries BASF Future Business GmbH and PURAC for the development of the production of biobased succinic acid. Both partners have been working on the development of the industrial fermentation and down-stream processing of biobased succinic acid and will start production of commercial quality and volumes in the second quarter of 2010.

Strengths of succinic partnership with BASF

- Complementary businesses:
 - BASF: Market leader in chemicals, chemical intermediates and polymers
 - Purac: Leading company in fermentation and biotechnology
- Complementary competences in technology
- BASF: Large captive use, value chain integration
- Good strategic fit, leading alliance in Succinic Acid

Progress in Purac-BASF Succinic Acid project

- The first campaign on commercial scale fermentation of succinic acid was carried out in June 2010. Critical process steps have been validated
- Sample material from the first production campaign has been made available for selected customers and development partners
- Follow-up campaign in Q2 2011

Conclusions

- Succinic Acid is a very promising molecule to cater the biobased economy
- The developments concerning Succinic Acid are still in an early stage, though in the period until 2015 the size of this opportunity will become clear
- Purac-BASF alliance is very well positioned to become a leader in this industry
- Alliances between Agro, Biotech and Chemical companies are required to successfully introduce new biobased chemicals

