Bridging the gap in the value chain

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Agenda

What we do.

What we have learned.

What we offer: a bridge.
We develop new biotech processes
Scale them up
And engineer and build industrial plants

€ 5.6 billion in sales
19,000 employees
What have we learned?

It's not easy being green.

Innovators need a partner with large balance sheet to assume technology and project risk.

Downstream separation has greatest cost impact.
It’s not easy being green

What’s most important?

1. Price. Lower or same.
2. Quality. Equal or higher.
3. Availability.
4. Green.
Downstream Separation and Purification has greatest cost impact

Operating Cost (excl. raw materials)
- Fermentation
- Separation

Capital Cost
- Fermentation
- Separation
Innovators need a partner with large balance sheet to assume technology and project risk.
The new value chain for Biopolymers

Conventional – long-term proven and fully established

- Feedstock
  - Feedstock (oil & gas based)
  - Example: Ethan
- Chemical Conversion
  - Typically multiple steps
  - Ethylene
- Application Technology
  - Polyethylene (Chips)
- Consumer Market
  - Film
  - Packaging

TKIS scope

Biotechnology – to be newly established and to be proven in detail

- Feedstock
  - Feedstock (bio-based)
  - Example: Sugar
- Conversion by Bioprocess
  - Biotechnology
- Chemical Conversion
  - Chemical Conversion
  - LA
  - DLAC – PLA (Chips)
- Application Technology
  - Film
- Consumer Market
  - Packaging

New TKIS scope

Typical barriers between players – each player with its own issues
ThyssenKrupp’s Leuna multi-purpose fermentation and separation facility.

Bridging the gap between lab and industrial scale.
ThyssenKrupp
Bridging the gap

Process expertize and scale up

Samples to customers

Full EPC wrap worldwide

From lab to commercial with significantly reduced risk.
We are in it for the long run

“Modern biotechnology is one of the key technologies of the 21st century. ThyssenKrupp has extensive expertise in this area”

- Dr. Heinrich Hiesinger, ThyssenKrupp CEO