

# **Biotechnology in the cleantech sector**

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**Heidelberg  
InnovationForum 22 April 2010**

Dr. Martin Follmann  
BIOPRO Baden-Württemberg GmbH



## **BIOPRO Baden-Württemberg GmbH**

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- / 100% state-owned innovation agency for biotechnology
- / 14 staff members and several external experts  
leadership: Dr. Ralf Kindervater
- / works closely together with ministries of  
state, of economics, of science



## Fields of Activity

### Public relations work



www.bio-pro.de

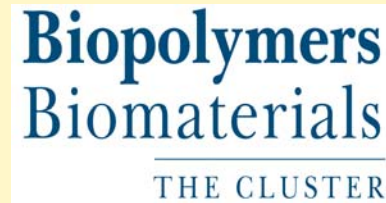


BIOPRO Magazine



Exhibitions

### Area and Cluster development



The Biopolymers / Biomaterials Cluster

### Innovation support, Business development support



SYNPRO



Knowledge Management

### Business start-up services



Start-up handbook

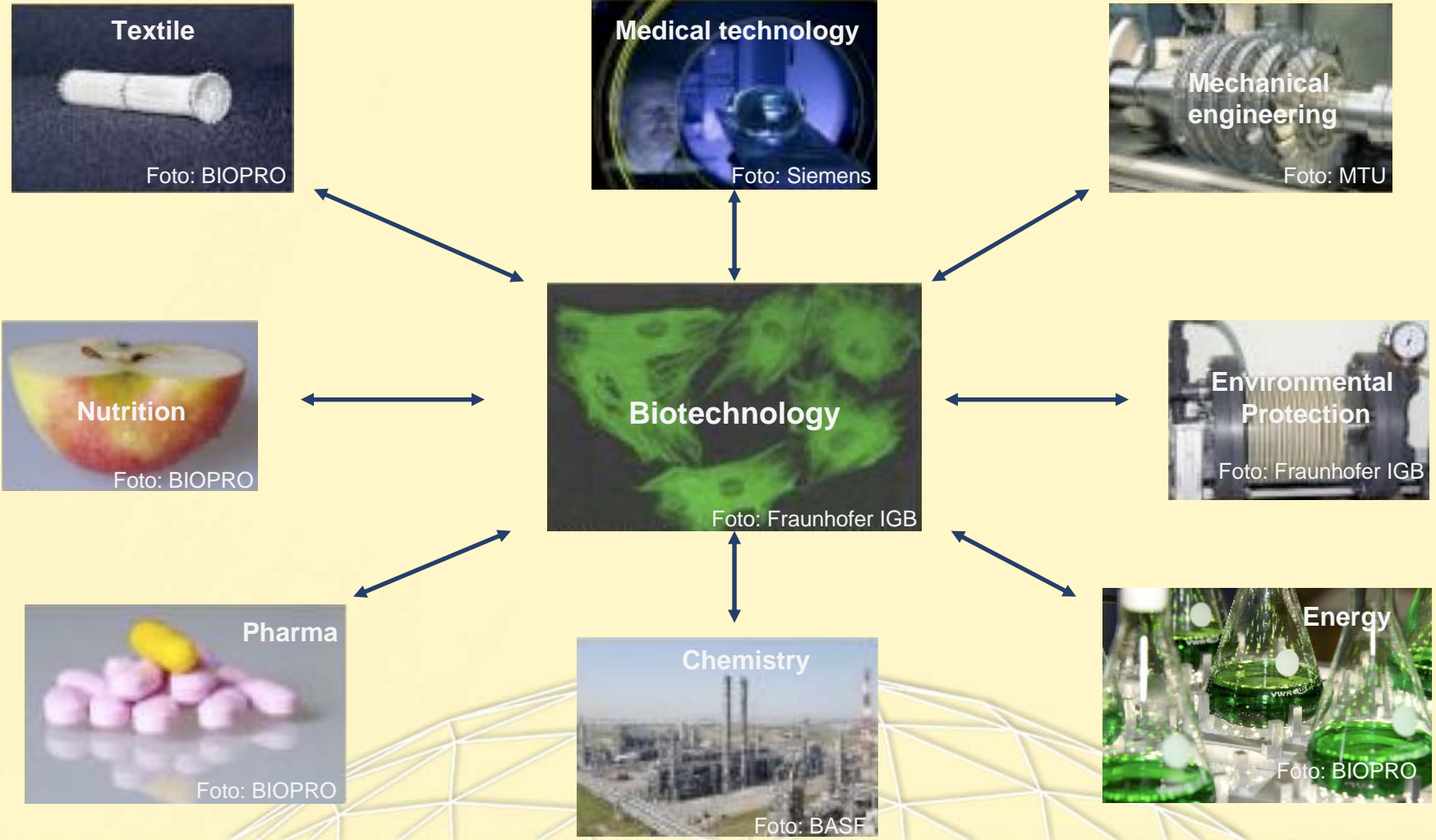
### Location marketing & International networking



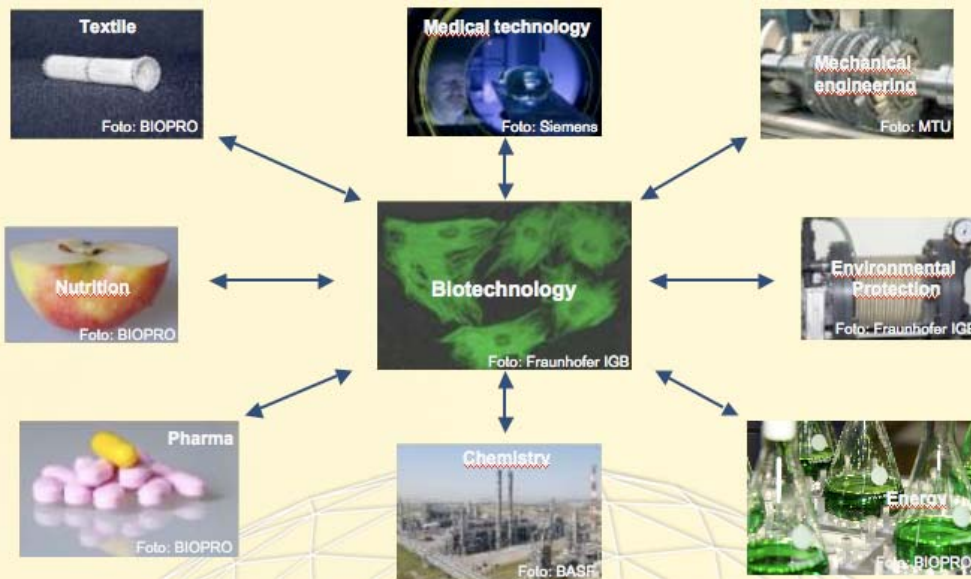
Conferences and trade fairs

Contact to international networks

## Applications of Biotechnology



## Applications of Biotechnology



### Cleantech sector

**Environmental protection**

**Energy**

**Chemicals**

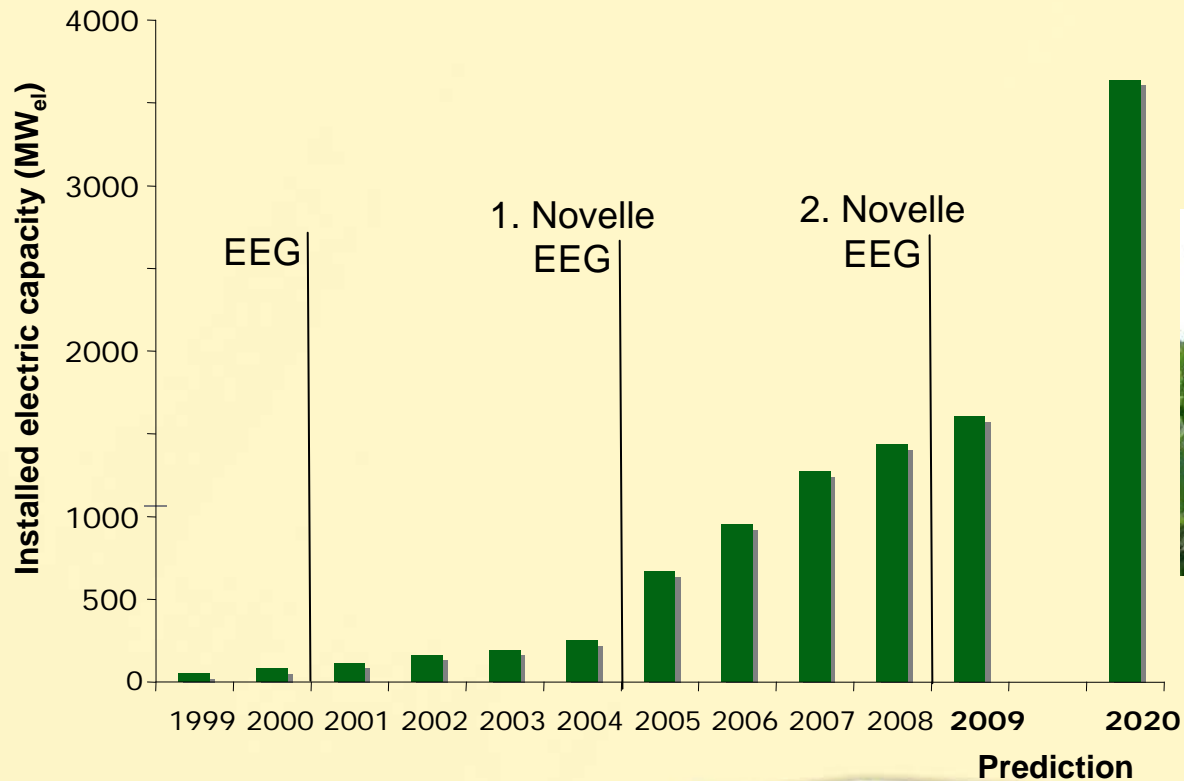
### This panel

**Biogas plants**

**Algae Biotechnology**

**Biopolymers**

## Biogas plants

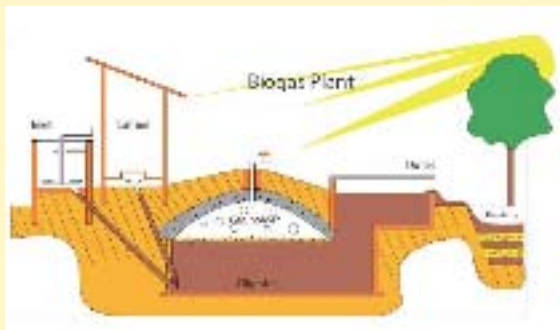


Source: Agentur für Erneuerbare Energien

Sources: BMU and FNR (2009),  
Studie Bioenergiemarkt D 2009 (DBFZ und Öko-Institut)

# Biogas plants

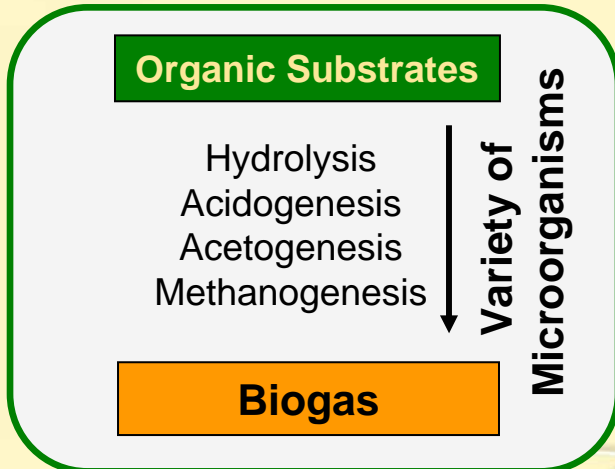
## Simple sketch of a biogas plant



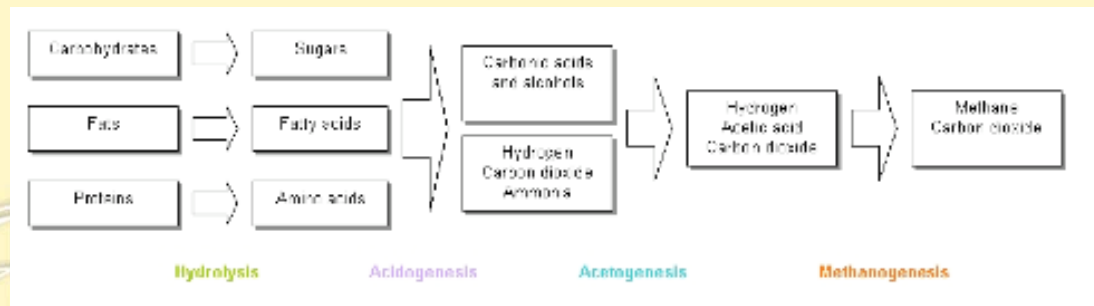
## Composition

Compound	Chem	%
Methane	CH <sub>4</sub>	50 - 75
Carbon dioxide	CO <sub>2</sub>	25 - 45
Other	H <sub>2</sub> O, O <sub>2</sub> , N <sub>2</sub> , H <sub>2</sub> S, NH <sub>3</sub> , H <sub>2</sub>	each < 2

## Anaerobic Fermentation

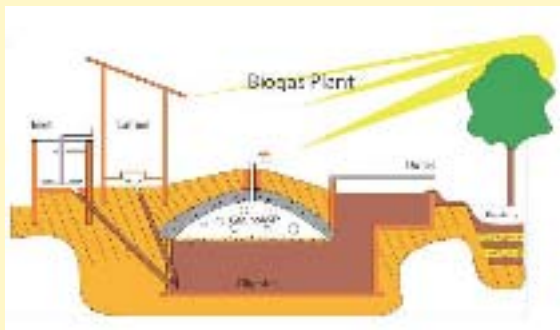


## Anaerobic Fermentation



## Biogas plants

### Simple sketch of a biogas plant



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### Anaerobic Fermentation

#### Organic Substrates

Hydrolysis  
Acidogenesis  
Acetogenesis  
Methanogenesis

↓  
Variety of  
Microorganisms

**Biogas**

### Presentation

Dr. Bernhard Nüßlein, nadicom GmbH  
Metagenome analysis as a tool for the optimisation  
of biogas plants

## Biogas plants

### Applications

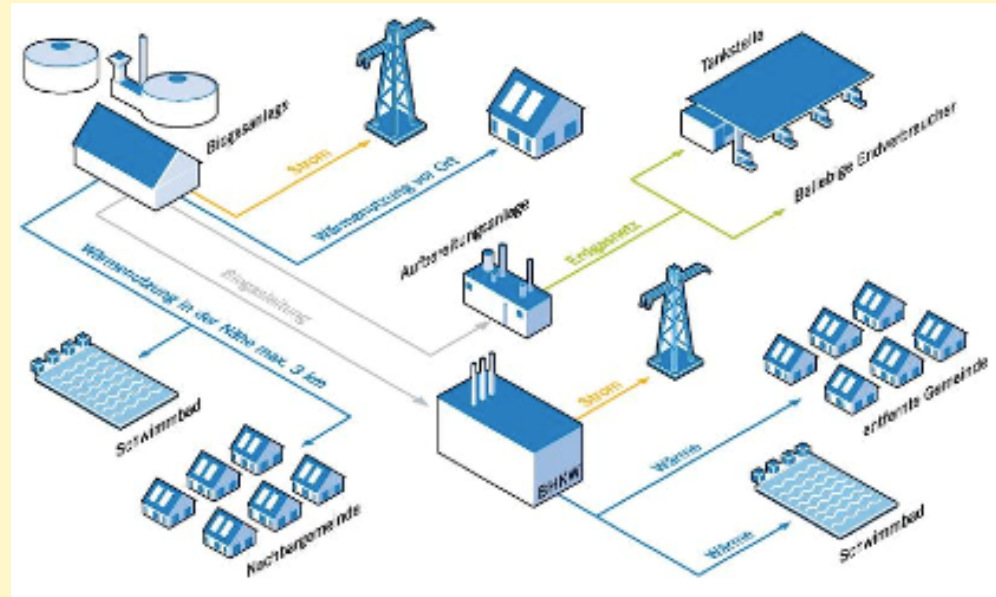
#### **CHP gas engine**

- electricity
- local heating

#### **Biogas upgrading**

- local gas network

#### **Conversion to Methanol**



Source: Fachverband Biogas e.V.

### Presentation

**Alois Hauk, AEN autarke Energie GmbH**  
**Decentralized CO<sub>2</sub> neutral Bio-Methanol**  
**Production system**

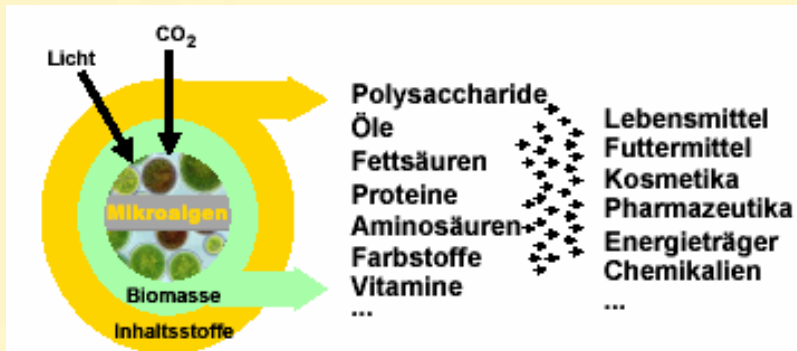
## Algae Biotechnology

### Microalgae

- bind CO<sub>2</sub> and convert it into biomass
- cultivation does not require agricultural land
- higher photoconversion efficiency (PCE)
- production of high-priced substances, biopolymers, biodiesel



### value creation chain



Source: DECHEMA e.V.

### Presentation

Dr. Peter Ripplinger, Subitec GmbH  
Industrial production of microalgae biomass  
with flat-panel airlift photobioreactors

**Biopolymers**

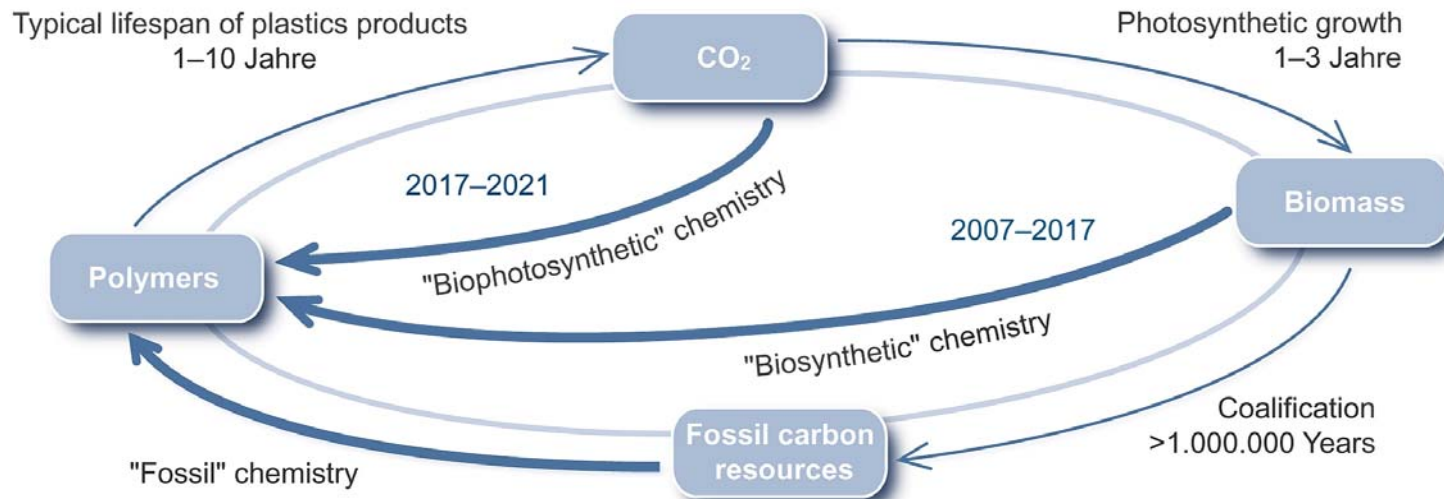
# Biopolymers Biomaterials

THE CLUSTER

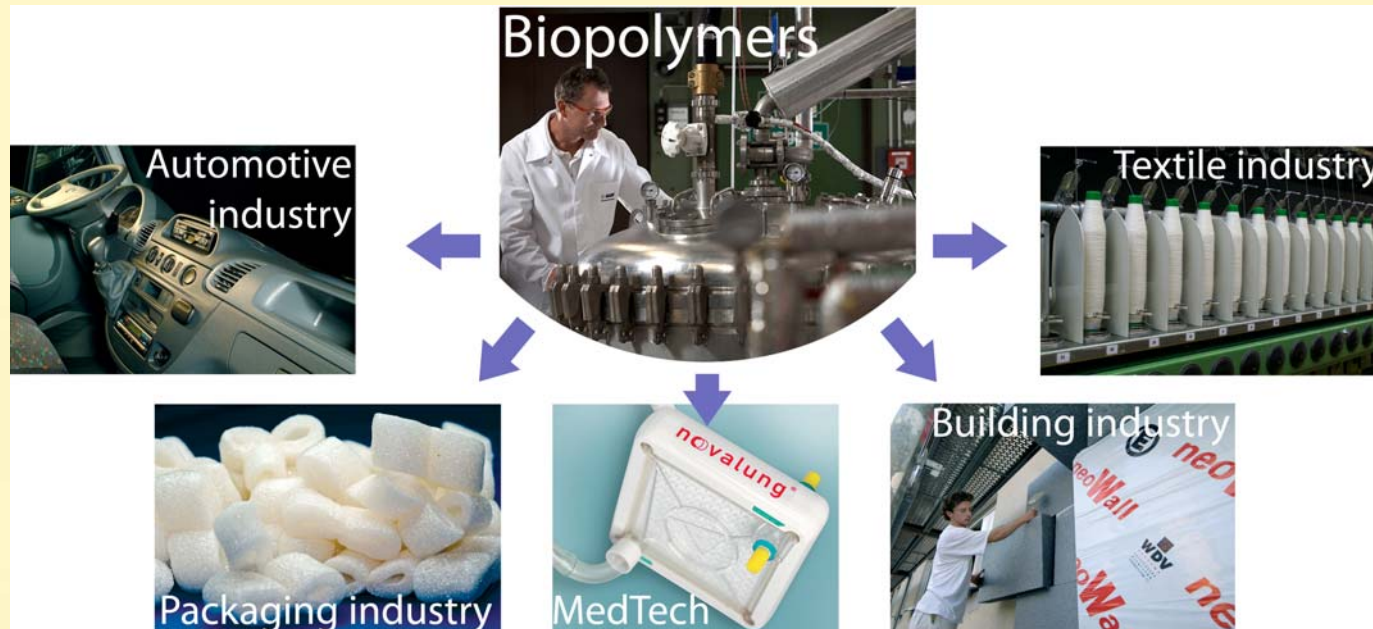


## Biopolymers

### Sustainability through new bioplastics



## Biopolymers



### Presentation

**Dr. Arnold Schneller, BASF SE**  
**Bringing high performance bioplastics to market -**  
**Challenges and business strategies**

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# Contact

## [www.bio-pro.de](http://www.bio-pro.de)

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[www.bio-pro.de/umwelt](http://www.bio-pro.de/umwelt)

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## Biopolymere Biowerkstoffe

Netzwerktreffen 2010 am 8. Juni in Stuttgart

[www.bio-pro.de/biopolymere](http://www.bio-pro.de/biopolymere)

