



Hur villig är industrin att ställa om?

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The transition in a nutshell

Petroleum Refinery

Established Industry

Legitimate



Chemistry

- Petrochemicals
- Fossil fuels

Biorefineries

New Business Concept

Legitimate???



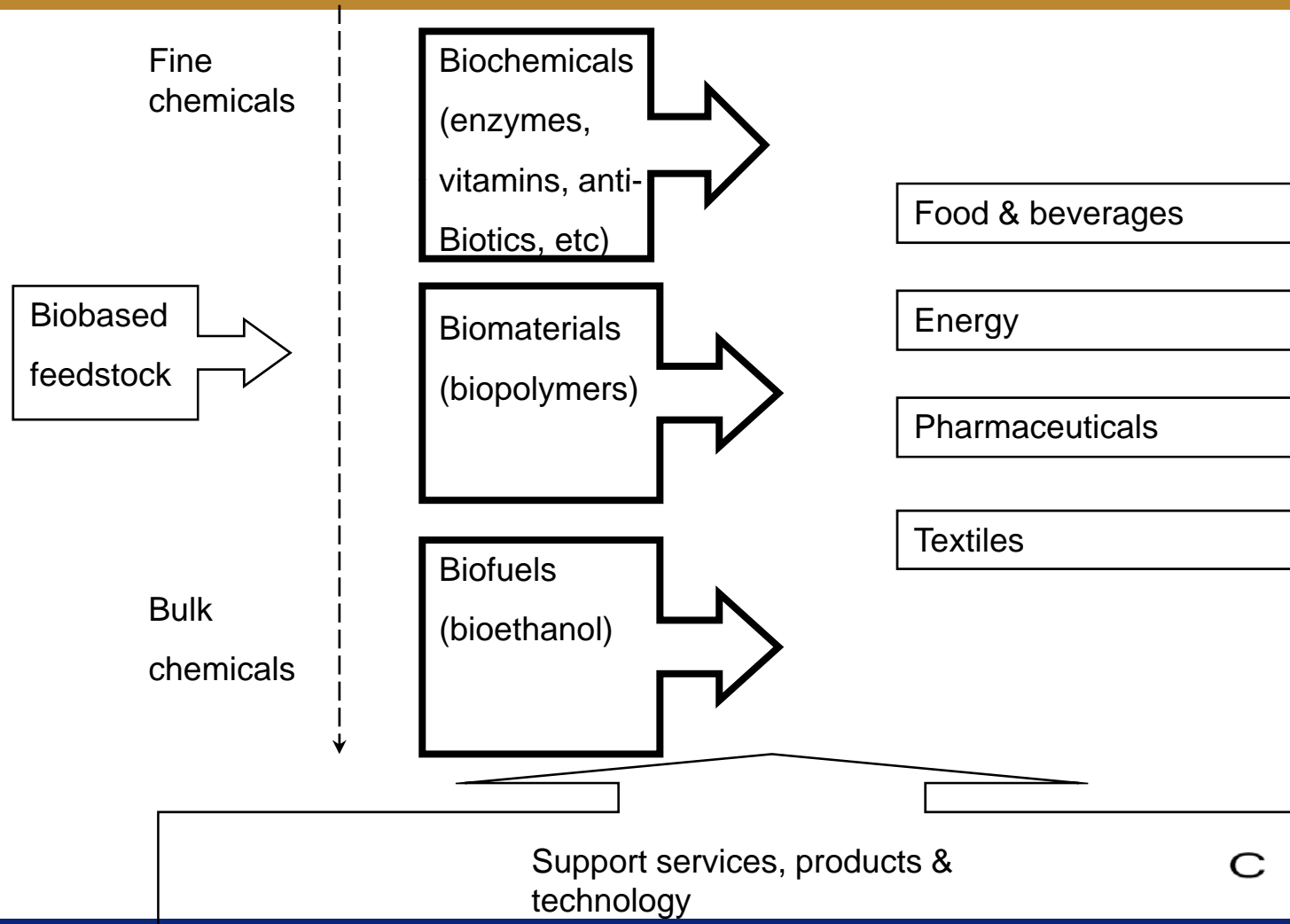
Material Utilisation & Chemistry

- Basic & Fine Chemicals
- Biopolymers & Bioplastics
- Biofuels





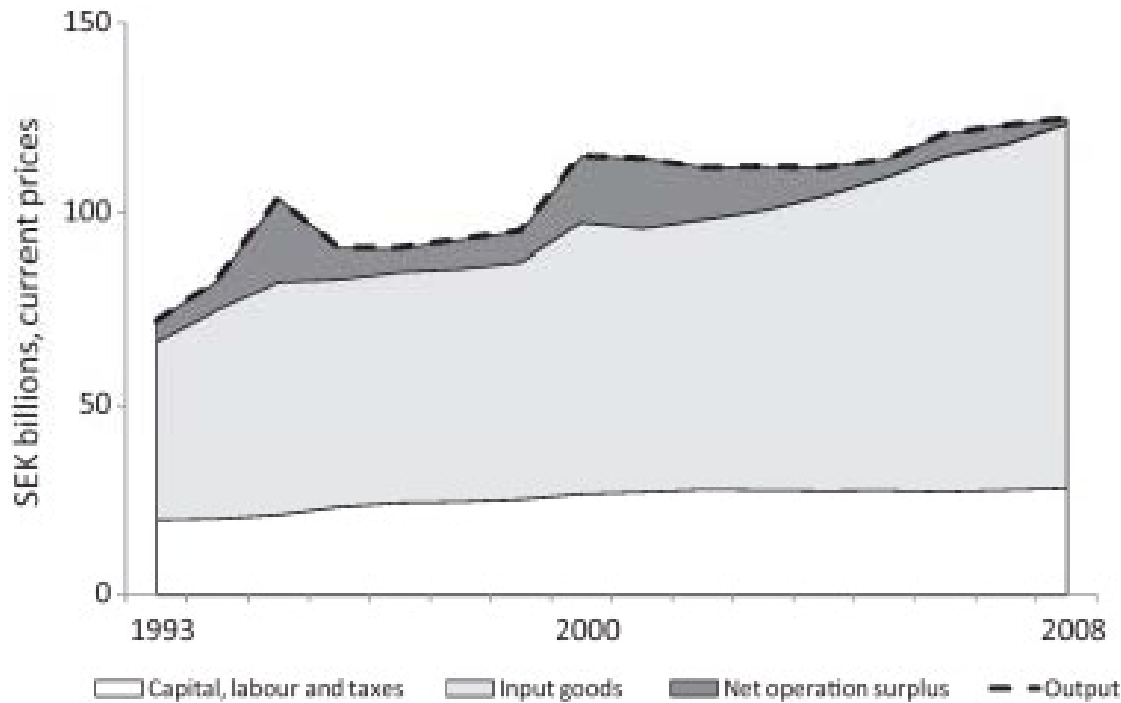
Biorefinery value chain



Source:
adapted
from Enzing
& Kern
(2004) and
DSM



The competitive need for a transition



- Increased input prices
- Threat of substitution
- Tightening global competition

Source: Karltorp & Sanden (2012)



Barriers

Technological barriers

- the technologies applied are still in their infancy <> very mature petrochemicals industry (and petrochemistry)
- uncertainty about future developments

Investment barriers

- most (all) biorefineries are still to be built <> existing petrochemical complexes

Market barriers

- biorefineries are still at a small scale <> economies of scale of large petroleum refineries
- difficulty to get a price premium
- dependence on public policy support



Biorefinery Strategies

- Incremental – focus on biofuels
 - Retrofitting existing mills
 - High volume, low value added
 - Compatible with existing business model
 - Dependent on partners
- Disruptive – product portfolio
 - Creating new value chains
 - Low volume, high value added
 - Requires new business models
 - Vertical integration or clusters?



Stakeholders in biorefinery value chain

- Forest industry
 - Competitive advantages: access to biomass & know-how of harvesting practices
 - Stake: better exploitation of mills & business diversification
- Chemical and energy industry
 - Competitive advantages: process capabilities & relations to 'end-users'
 - Stake: access to homogenous fossil-fuel free feedstock & commercialization of new, green bioproducts
- Technology providers
 - Competitive advantage: proprietary technology
 - Stake: upscaling of technology & sales of IPR



Lessons for policy

- R&D funding necessary but not sufficient: alternative policy support needed (standard-setting, procurement)
- Biofuels 'low-hanging fruit' but also low value added
- Stimulate networking and partnership along the value chain of biorefineries
- Improve the absorptive capacity for biorefineries among pulp & paper companies
- Provide 'reliable' policy



Tack!!

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