Research Agenda „BIOBASED INDUSTRY“

contracted by BMVIT

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Worked out in cooperation of

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ENERGIE INSTITUT

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Objective

„….a resource economy oriented on and **embedded** in natural cycles, that provides the world with **healthy** food and **high-quality** products **out of biogen resources** in a **sustainable way**….“

Ways of Utilisation of biogen resources

- Use of the Synthesis of Nature – **Separation, maybe some modification**
  - Wood, straw,…
  - Cellulose, starch, lignin, hemicelluloses
  - Fat, oil
  - Protein, colorizers, pestizides…...
- **(bio)chemical conversion** of the biogen basic materials to **intermediates** - Ethanol, lactic acid, butyric acid, butandiol, furfural…
- **complete destruction to Syn-gas**, gasification to CH_4, $CO + H_2$

Considered options

- Increased application of **natural materials like natural fibers** in technical application and in the market for textiles
- Manufacturing of **chemical bulk materials** (mostly) from biogenic materials
- Preferably **complete utilisation of biogenic materials** in the sense of integrated biorefinery

Platform-Chemicals as turning point

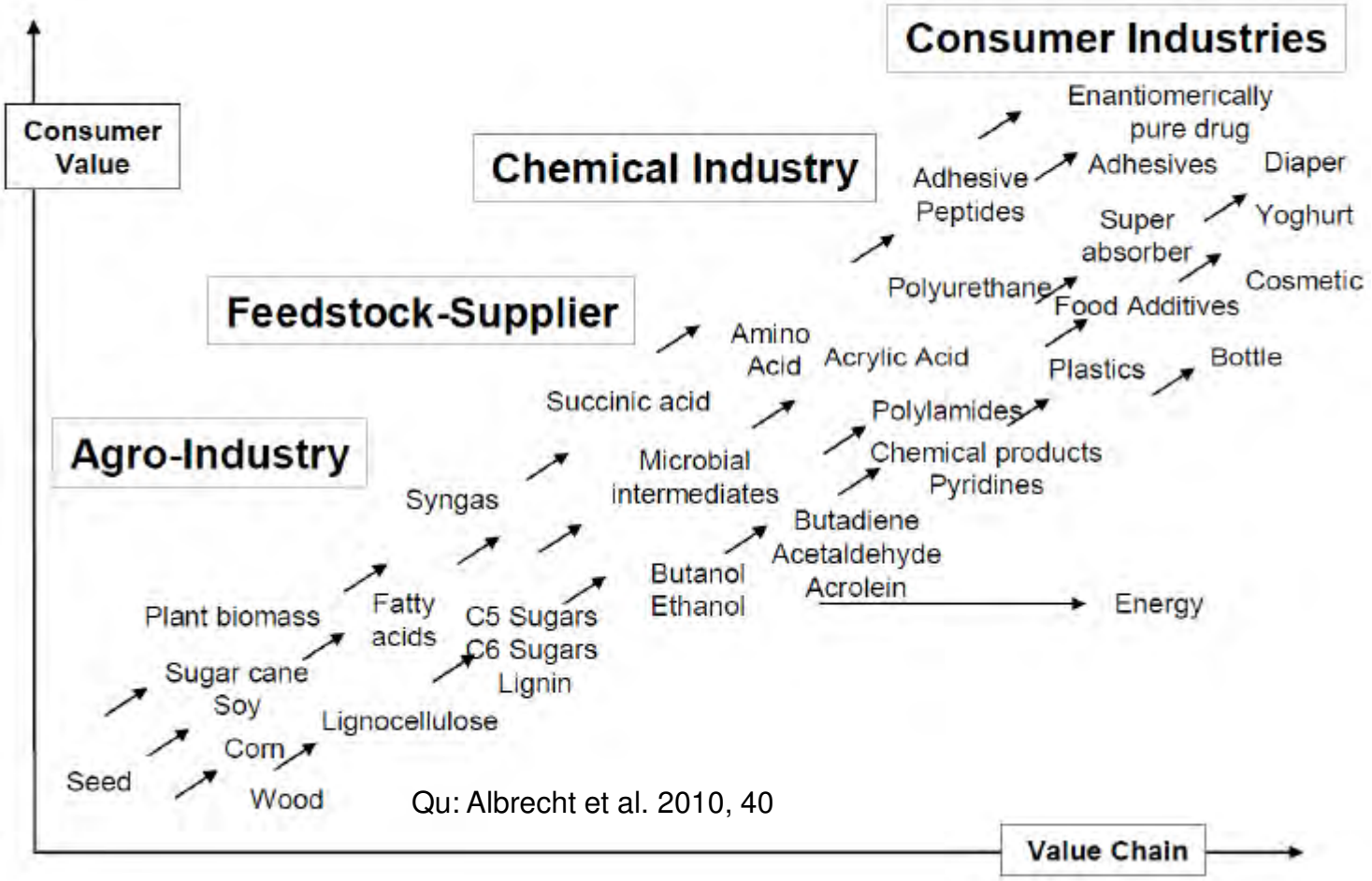
- Production of bulk chemicals with efficient processes
  - biotechnological conversion (aerob, anaerob),
  - Physico-chemical (separation, milling, pressing)
  - thermo-chemical (gasification, pyrolysis).
- Raw materials could be
  - Sugar or starch containing substrates or hydrolysates
  - Residues of wood processing
  - Residues of processing of NAWAROS

Bulk chemicals - selection

Plattformchemikalien *(Bsp.)*

C3	C4	C5	C6
• Acrylsäure	• Asparagin-säure	• Furfural	• Adipinsäure
• Brenztrau-bensäure	• 1,4-Butandiol	• Glutamin-säure	• 2,5-Furan-dicarboxyl-säure
• Glycerin	• Fumarsäure	• Itakonsäure	• Gluconsäure
• 3-Hydroxy-propion-säure	• Bernsteinsäure	• Lävulinsäure	• Isosorbid
• Milchsäure	• Tetrahydrofuran	• Milchsäure-ethylester	• Sorbit
• 1,3-Propandiol		• Xylitol	
• Propylenglykol			

Possible value chain



Qu: Albrecht et al. 2010, 40

Promising Options

- Furandicarbonic acid as substitute for PET
  - Conversion and raw material as challenge
- Intermediates through Fermentation
  - Ethanol fermentation of black liquor as 2nd generation biofuel
  - Succinic acid or Butanediol fermentation
- Resins and Tallöl
  - Option for pulp industry
- Lignin as a bulk chemical
  - Phenol as a basic building block for resins

Promising products – biofuels

- Residue potential for biofuels:
  - Biodiesel from waste-fat
  - Biodiesel from animal-fat
  - Biodiesel from tall oil
  - Biomethan from the fermentation of grass, waste material or algae
  - Bioethanol from lignocellulose (corn-cobs, straw)
  - Bio hydrogen
- Know-how in Austria available
- Limitation through the definition „Biobased Industry“
  - No competition with food products
  - No thermal destruction of the synthesis of nature
- High policy influence

Recommendations (I)

Fostering innovation with specific calls:

- Strategies **for improved value adde chains** from national resources
- **Fostering technology development** in promising sectors - exploration, clustering
- Suppurt of **international linkage** – financial support of networking events
- **Awareness raising** about the utility of biobased products – events, disemination of information

Recommendations (II)

Economy-close realisation – supporting the Austrian companies (in Cooperation):

- Realising biorefineries
  - Expansion and diversification of existing plants
  - Creation of value-chains
- New business models - Joint Ventures between provider and consumer for creating value-chains
- Use the location in central Europe - Assistence of firms by applying patented techniques

Thank you for attention!

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