



Lenzing – Biobased industry since 80 years

Dr. Karin Fackler, Wien 23.11.2016

Our core market: wood-based cellulose fibers

Produced from the raw material wood

 TENCEL®

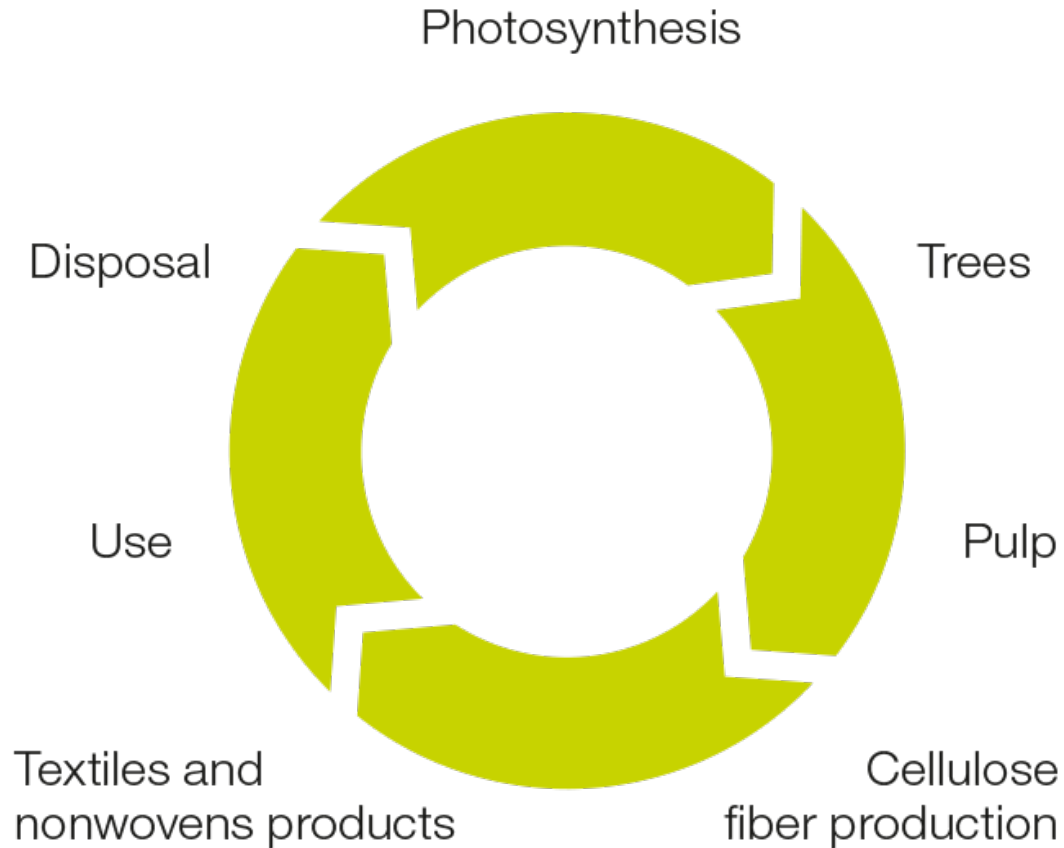
 LENZING
Modal®

 LENZING
Viscose®



Renewable raw material wood

The cellulose cycle



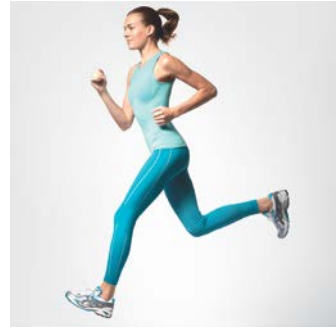
- Cellulose is nature's most important construction material and available in abundance
- Wood and the dissolving wood pulp derived from it are the basis for wood-based cellulose fibers
- Wood contains about 40% - 50% cellulose
- Biodegradability is confirmed by certification



Lenzing fibers fields of application

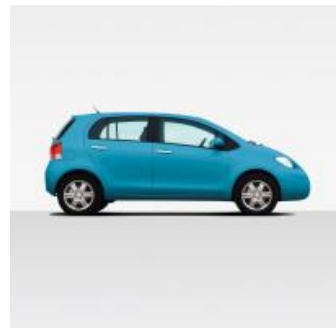
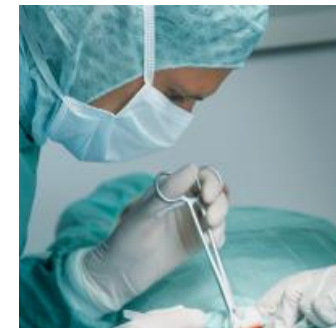
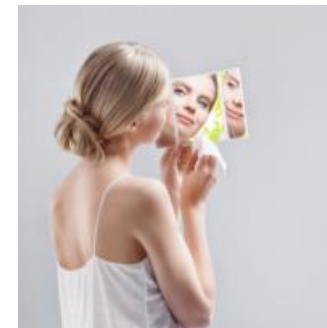
Textile industry

Fashion, home textiles, technical applications



Nonwovens industry

Wipes, hygiene, medical and technical applications



Location Lenzing, Austria



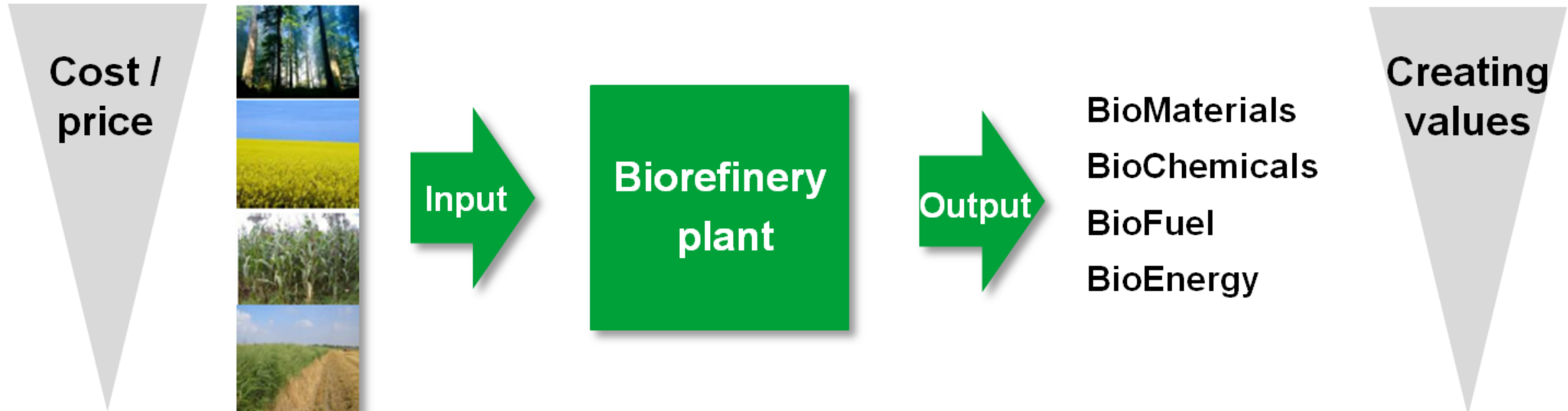
Location Lenzing, Austria

- World's largest fully integrated dissolving wood pulp and viscose fiber production
- Production capacity dissolving wood pulp: 297,000 tons per year air-dried
- Production capacity fibers: 339,000 tons per year
- Staff: close to 2,700
- TENCEL® plant: capacity 67,000 tons p.a.



Understanding a biorefinery

- Sustainable processing of biomass into a spectrum of marketable products (food, feed, materials and chemicals) and energy (fuels, power, heat)

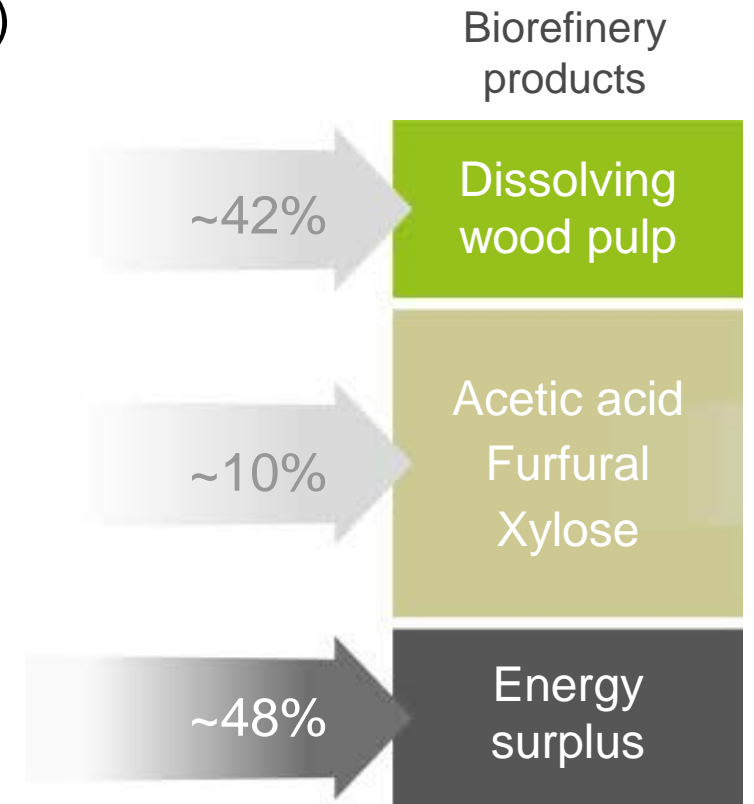


Understanding the biorefinery at Lenzing

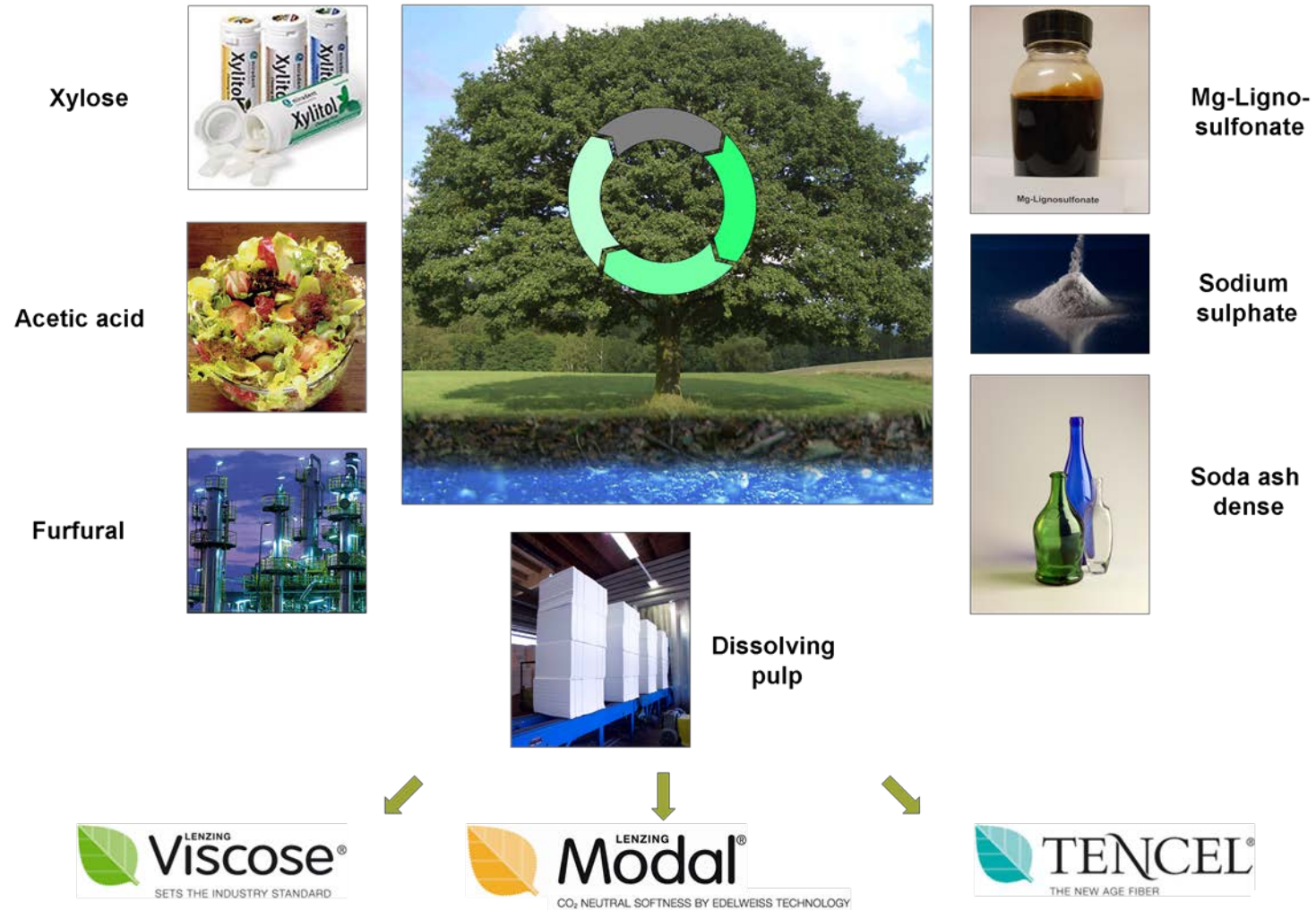
Sustainable processing of beech wood into a spectrum of marketable products (functional material cellulose fibers, chemicals) and energy (power, heat)



Dissolving wood pulp production



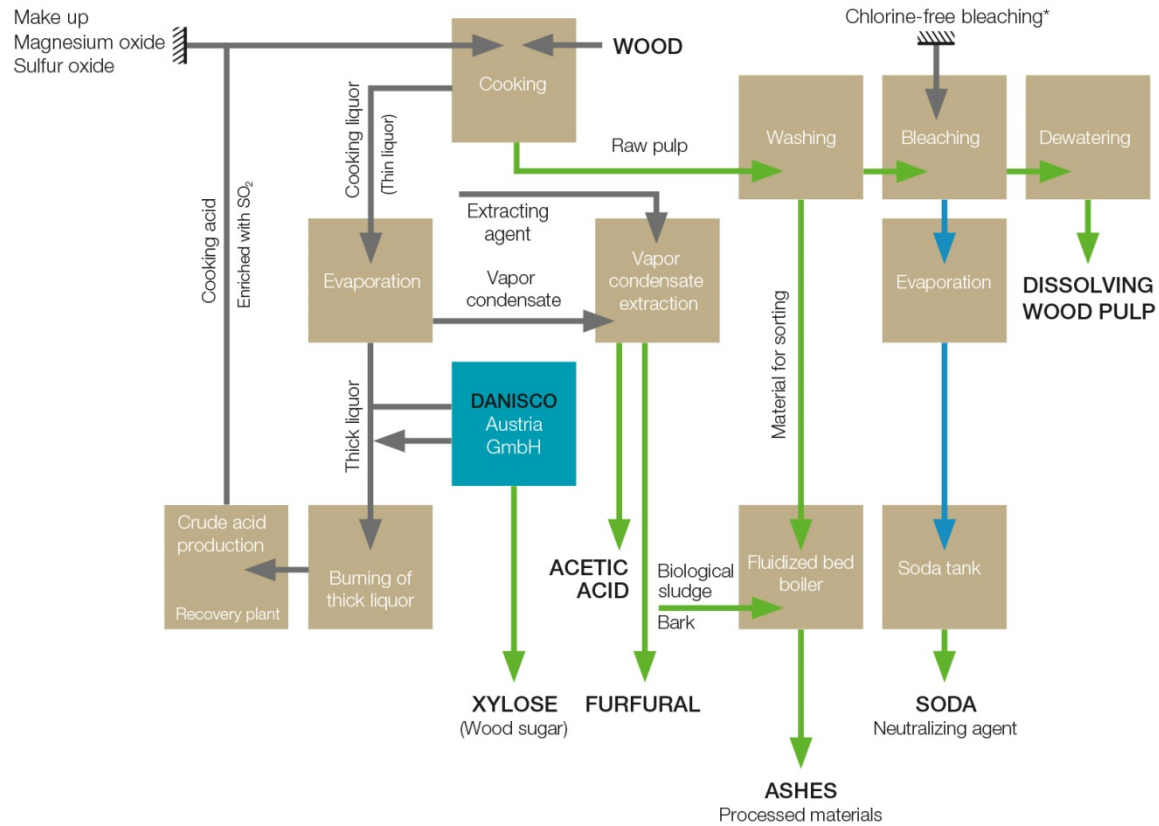
Lenzing's current biorefinery products



Pulp production at Lenzing

Dissolving wood pulp production process – chemical cycles, co-products, utilization

Lenzing site – simplified depiction

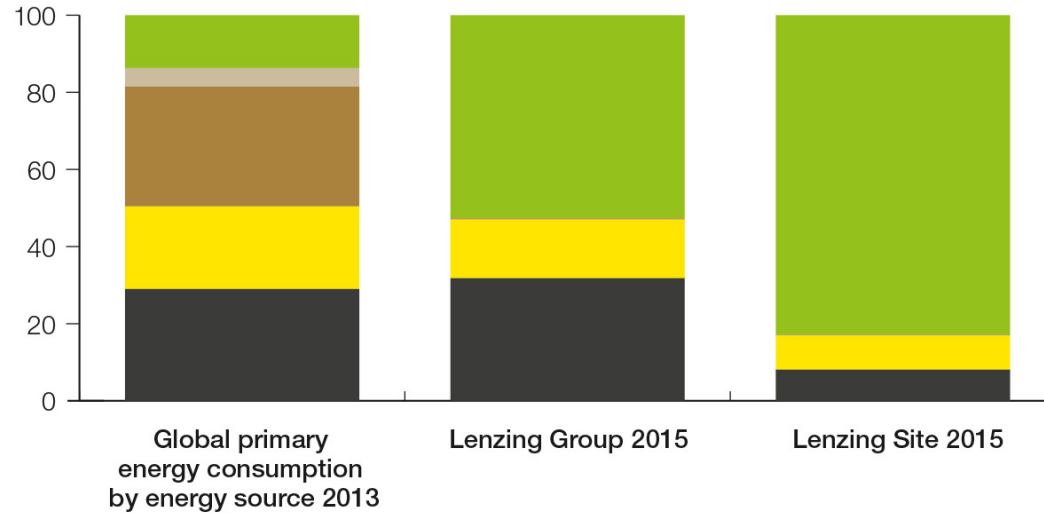


*1) Oxygen, hydrogen peroxide, ozone

Energy integration at Lenzing

Global, Lenzing Group and Lenzing Site*

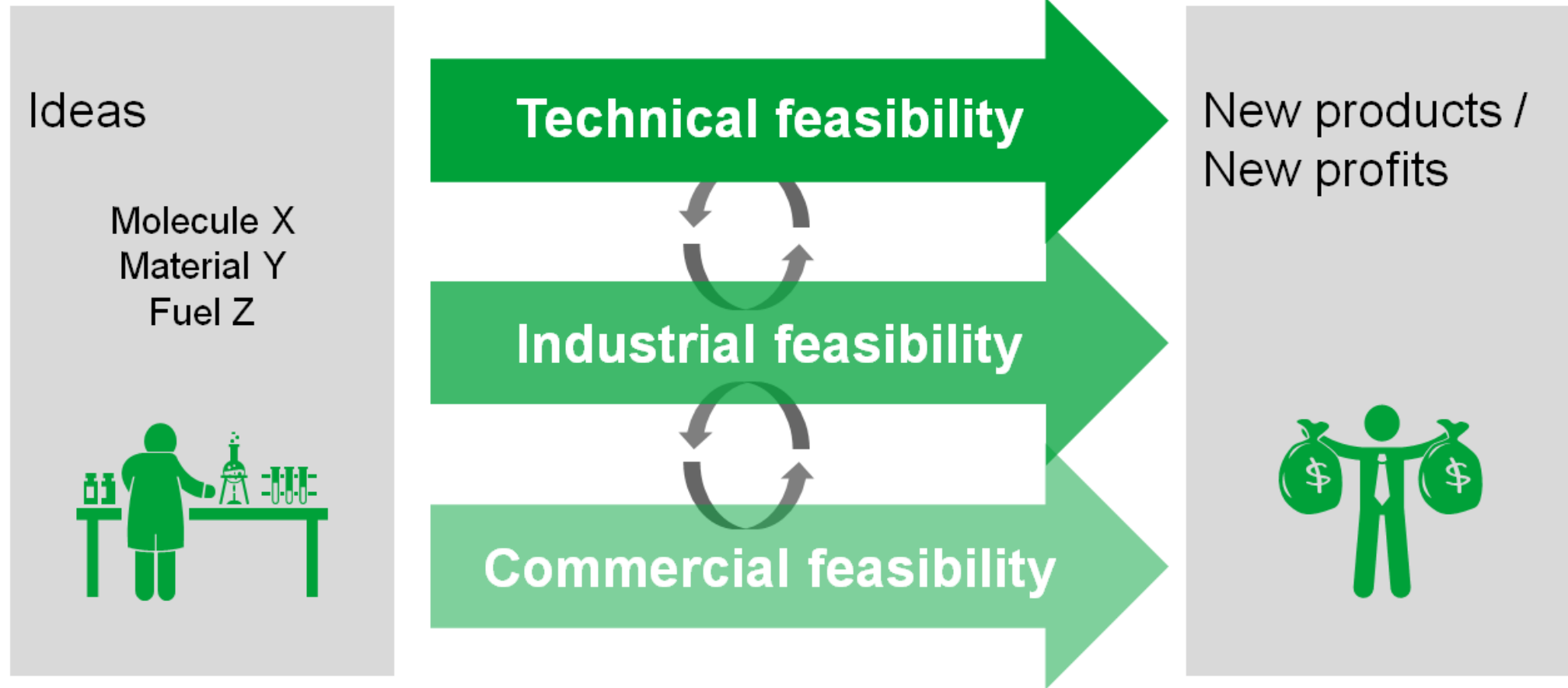
Sources:
World Energy Outlook 2015
Lenzing AG



| | | | |
|-------------------------------------|-------|-------|-------|
| Renewable energy (incl. Hydropower) | 13.7% | 52.7% | 82.9% |
| Nuclear | 4.8% | 0.0% | 0.0% |
| Crude Oil | 31.1% | 0.3% | 0.2% |
| Gas | 21.4% | 15.2% | 8.8% |
| Coal | 29.0% | 31.8% | 8.1% |

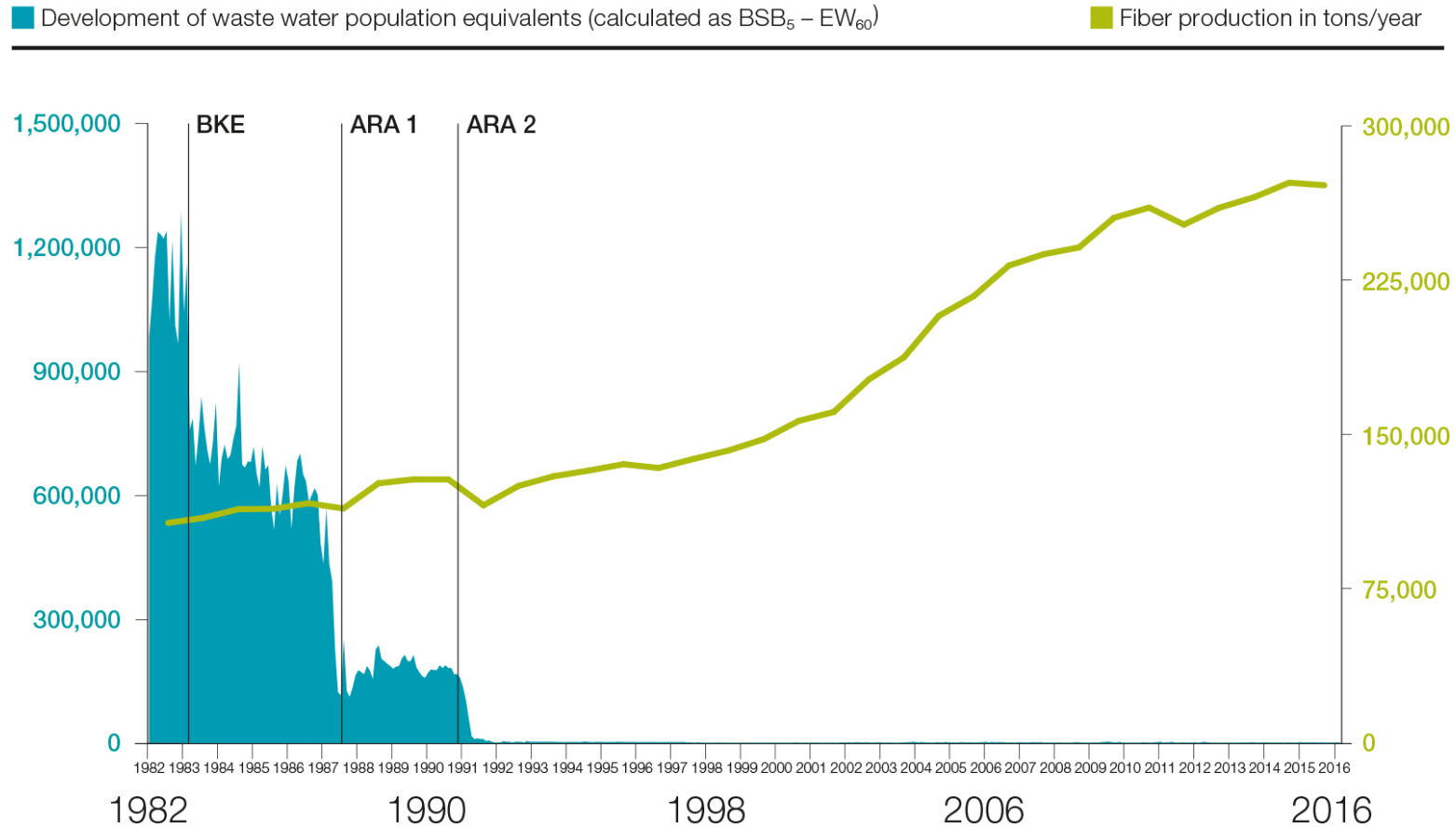
*) incl. RVL

Biorefinery expansion: From ideas to new products



Industrial feasibility – acetic acid

Lenzing site – development of waste water emissions/Production development



BKE: Vapor condensate extraction facility ARA 1: Wastewater treatment plant, 1st expansion stage
ARA 2: Wastewater treatment plant, 2nd expansion stage

Industrial feasibility – xylose/xylitol

- Xylose from spent cooking liquor is extracted at site in Lenzing by partner DuPont (former Danisco)
- Crystalline xylose is produced which is further hydrogenated to xylitol in Finland – commercially available as „Birkenzucker“
- Residual liquor is burnt by Lenzing to recover thermal and electrical energy, and the cooking chemical Mg-Bisulphite

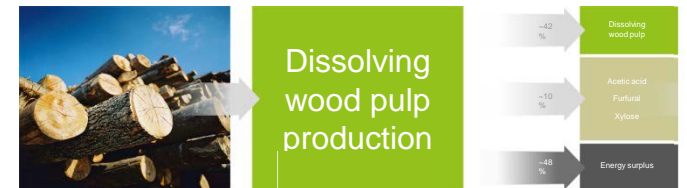
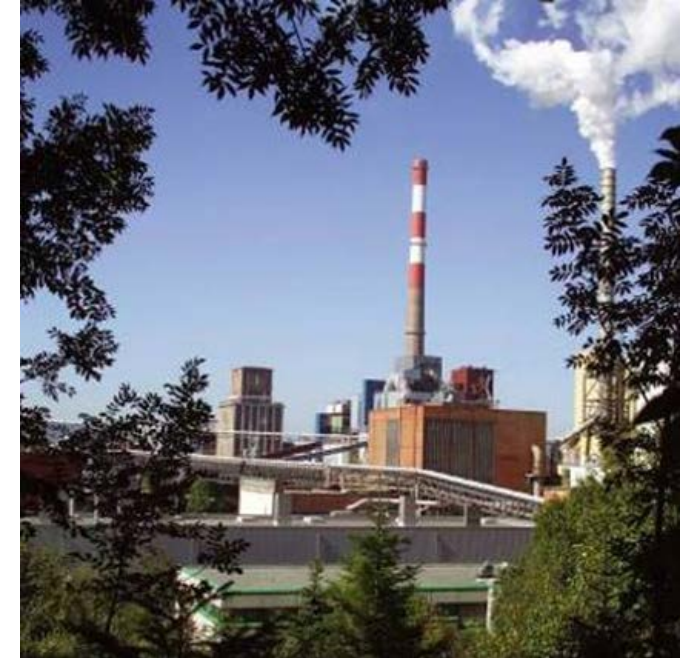


Lenzing's ambitions towards new products

- Perfection the use of cellulose
 - Specialisation
 - Performance
- Further upgrade hemicellulose derivatives
 - Extraction
 - Downstream processes
- R&D on lignin
 - Which value chain?
 - Technology and application development

Summary

- Lenzing's daily business has been biobased for decades
 - Following the Biorefinery concept, biomaterials, biochemicals, and bioenergy (thermal and electrical) are produced
- Core market: Wood based cellulosic fibers
- Significant share of co-products on revenues
- Energy integration on site is one important pillar for a sustainable biobased production
- Production of biobased products is determined by technical, industrial and commercial constraints
 - Site-specific
 - Partnering may be of advantage (as practiced with xylose)



Strategy and mission statement

sC  reTEN

“Lenzing is a performance materials company that turns CO₂ and sunlight into highly functional, emotional and aesthetic products across the globe”

Thank you for your attention

sCreTEN

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