Bundesministerium für
Ernährung, Landwirtschaft
und Verbraucherschutz

Biorefinica 2009

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Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz

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Answers must be found to the following questions:

- **What role can renewable raw materials play in securing supplies of resources?**
- **What are the arguments in favour of using renewable raw materials in industry?**
- **Are supplies of biomass adequate, both in Germany and globally?**
- **How can we steer use of these raw materials to areas in which they bring most benefit?**
- **What needs to be done to ensure biomass is produced sustainably?**

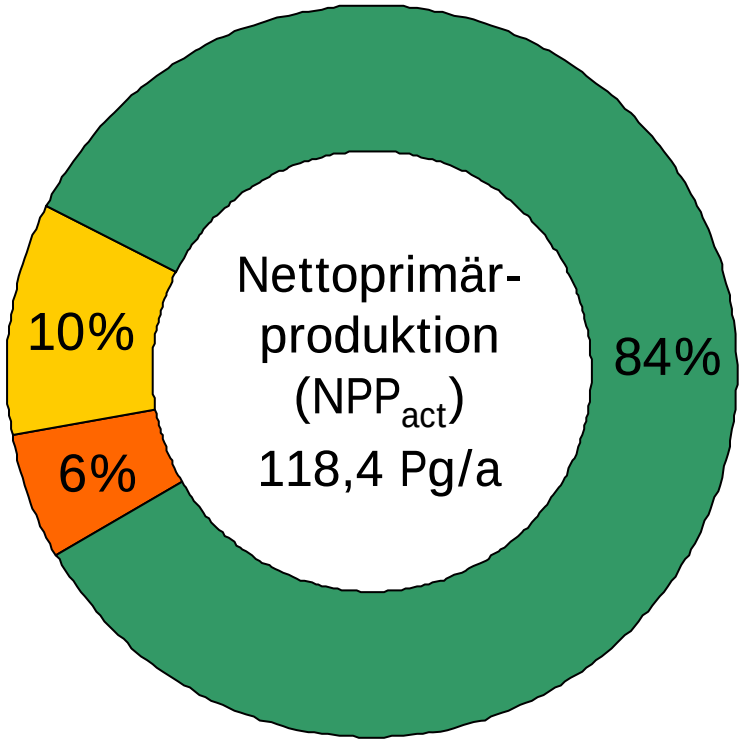
Globale Biomasse

Verfügbarkeit und Entnahme (2000)

Used Biomass Extraction	[Pg]	%
Harvested Crops	3,43	28
Crop Residues	2,94	24
Grazed Biomass	3,84	32
Wood Removal	1,94	16
Total	12,14	100

Unused Biomass Extraction	[Pg]	%
Human Induced Fires	2,49	38
Unused Crop Residues	1,92	29
Unused Belowground	1,50	23
Felling Loses in Forests	0,65	10
Total	6,56	100

1 Petagramm (Pg) = 1 Mrd Tonnen



Unused Biomass } **18,7 Pg/a**
Used Biomass
Biomass in Ecosystem **99,7 Pg/a**

Quelle: Krausmann et al., Ecological Economics 65 (2008) 471-487

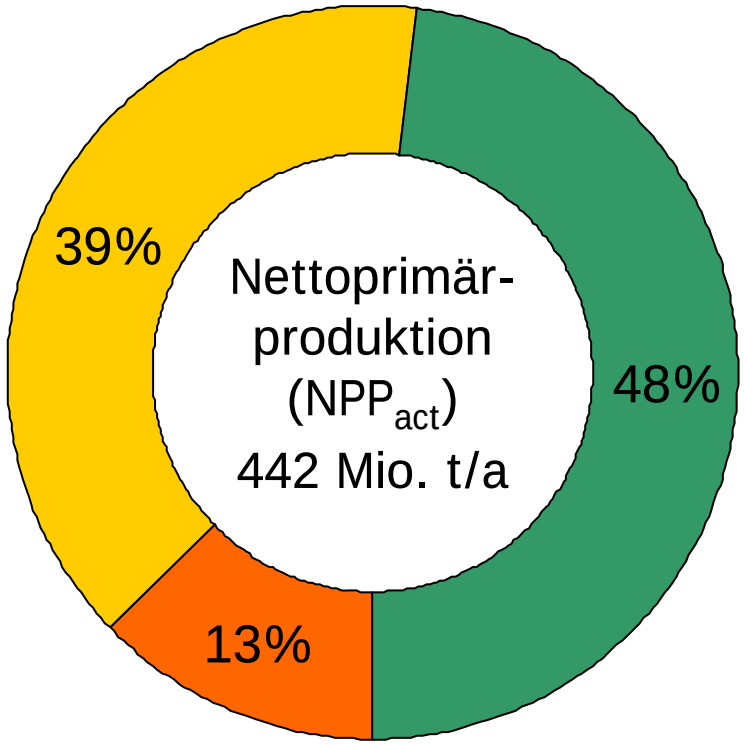
Biomasse in Deutschland

Verfügbarkeit und Entnahme (2000)

Used Biomass Extraction	[Mio. t]	%
Harvested Crops	74	43
Crop Residues	35	20
Grazed Biomass	44	25
Wood Removal	20	12
Total	**173**	**100**

Unused Biomass Extraction	[Mio t]	%
Human Induced Fires	0,1	<1
Unused Crop Residues	27	47
Unused Belowground	25	44
Felling Loses in Forests	5	9
Total	**57**	**100**

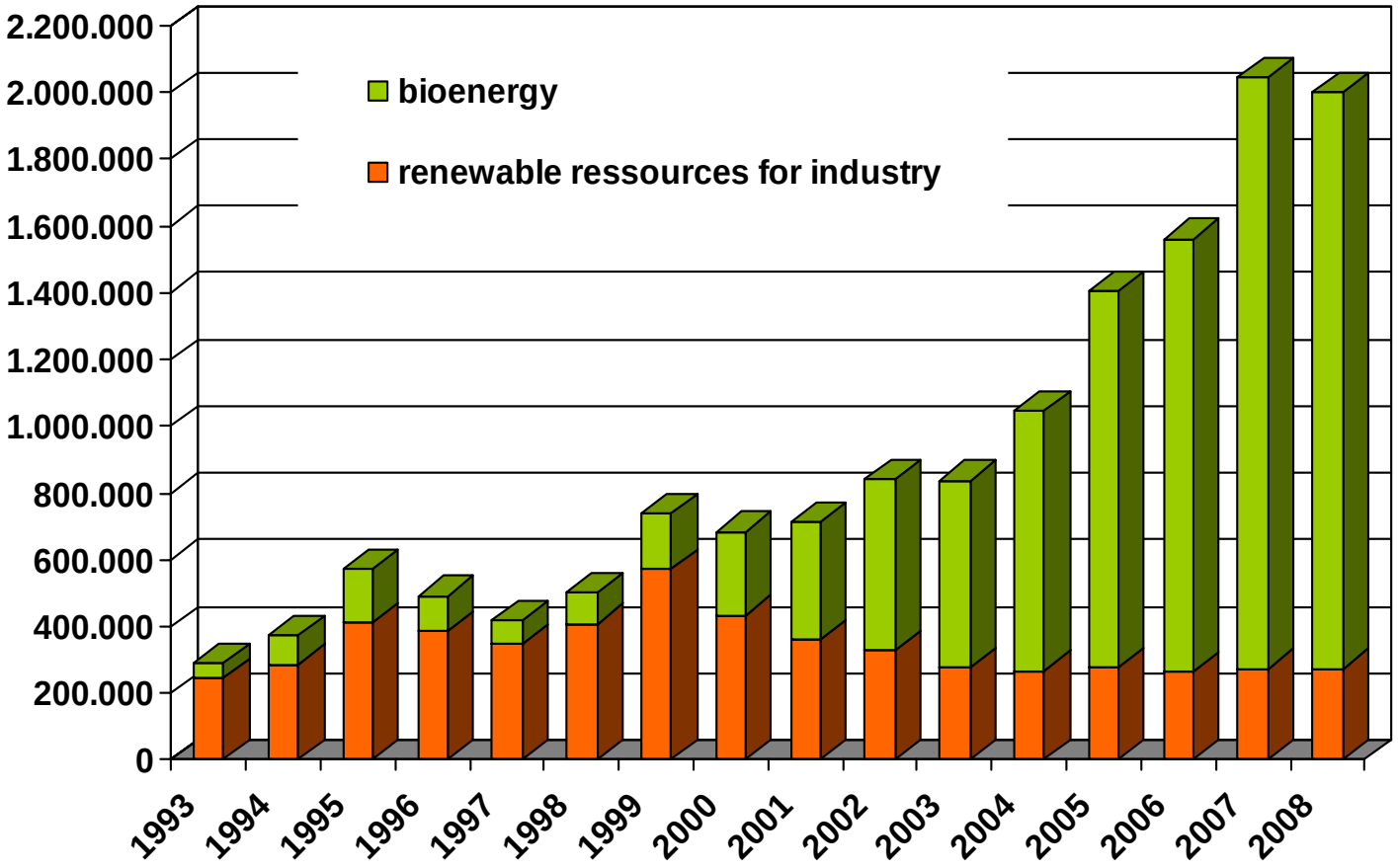
1 Petagramm (Pg) = 1 Mrd Tonnen



Quelle: Krausmann et al., Ecological Economics 65 (2008) 471-487

Non-food arable land in Germany used for non-food production

2008: 2,0 Mio. hectares = 17 % of arable land



Quelle: BMELV, BLE

State-of-the-Art in Bioproducts

RRM in Germany

Currently, about 17 Mio. t fossil and 2,1 Mio. t renewable raw materials are used in the German chemical industry*, i.e. roughly 11% of the raw materials are RRM.

- 1.150.000 t Vegetable Oil and Animal Fat,
- 260.000 t Starch for Chemistry,
- 320.000 t Cellulose,
- 295.000 t Sugar,
- about 117.000 t of other Plant-derived Raw Materials

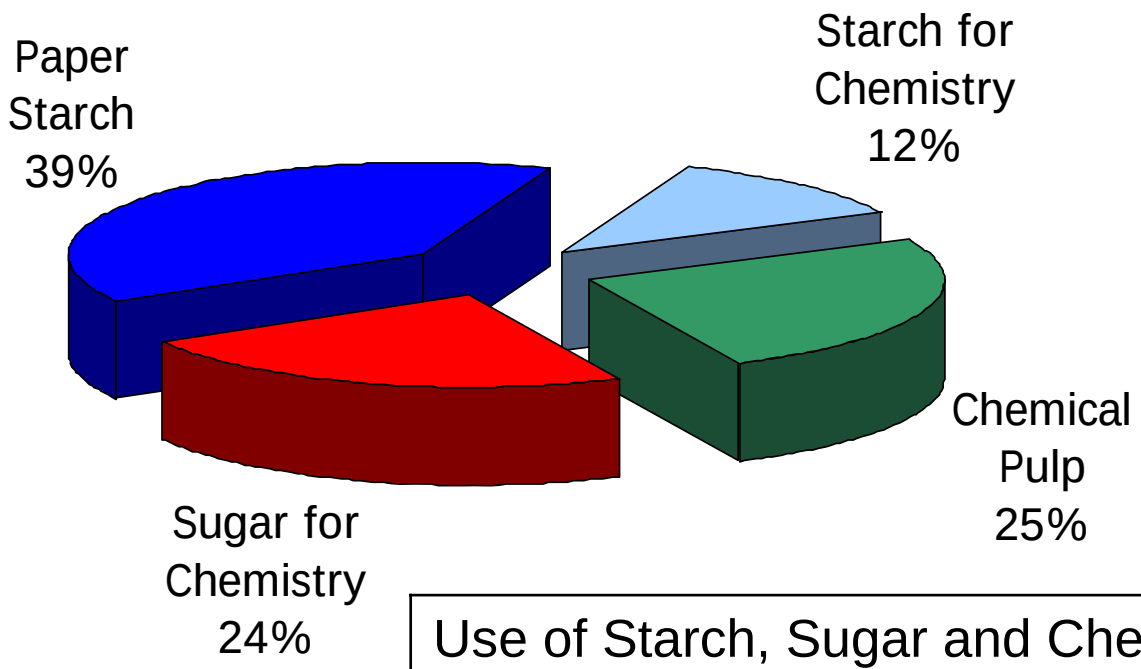
Roughly 2/3 of the currently in Germany used agricultural RRM are imported, whereas 1/3 are domestic.

Source: VCI, FNR, meó

* only chemical and pharmaceutical industry, without paper industry and natural fibres using industry

State-of-the-Art in Bioproducts

Carbohydrates



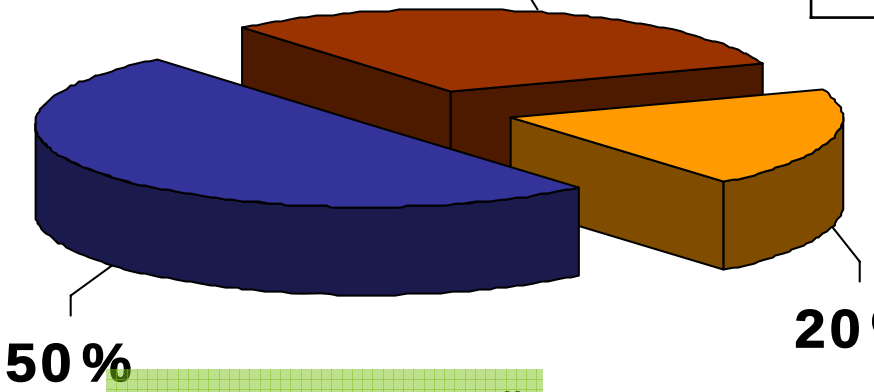
Use of Starch, Sugar and Chemical Pulp in Germany:

1,3 Mio. t (2005)

State-of-the-Art in Bioproducts

Use of Oils and Fats

Non-Energy Use



Animal Fat
Fish Oil

30 %

50 %

Castor Oil
Palm und Soya Oil
Coconut Oil

20 %

Rape Oil
Sunflower Oil
Line Oil
Canola Oil

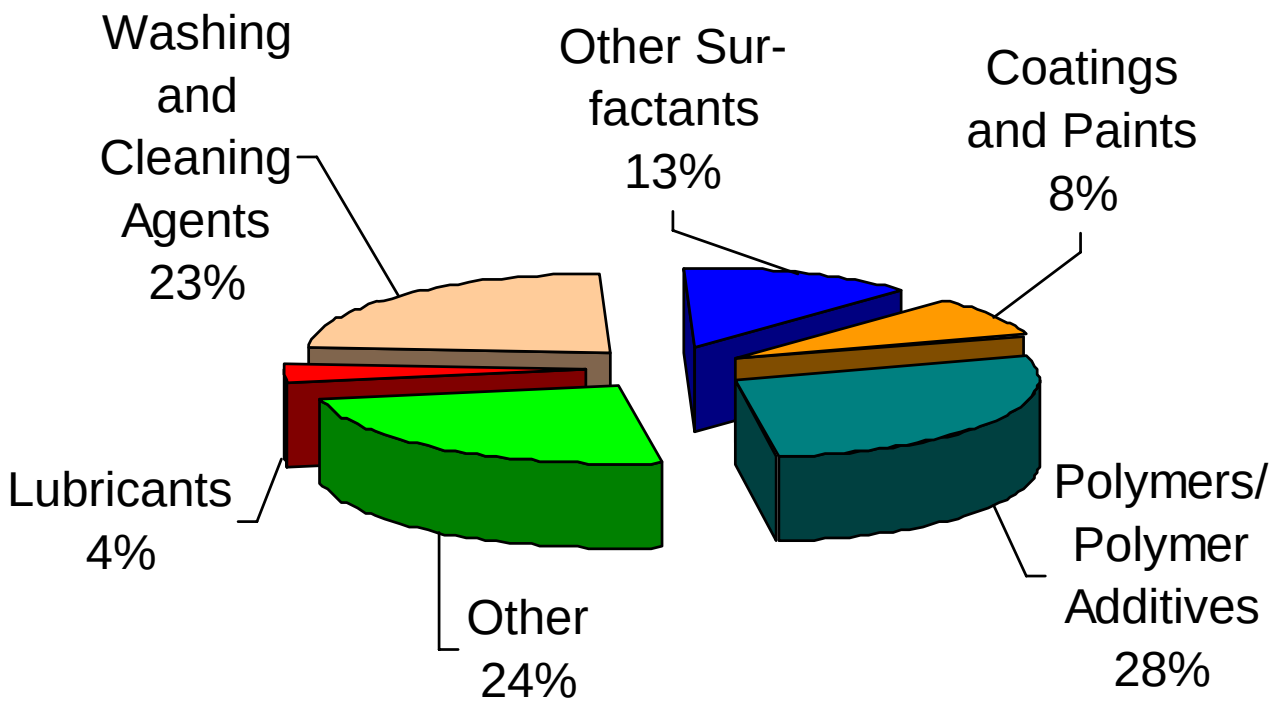
Technical Use in Germany:
1,15 Mio. t (2005)

Source: Kaup “Kölner Forschungen zur Wirtschafts- und Sozialgeographie, Bd. 52” and meó consult

State-of-the-Art in Bioproducts

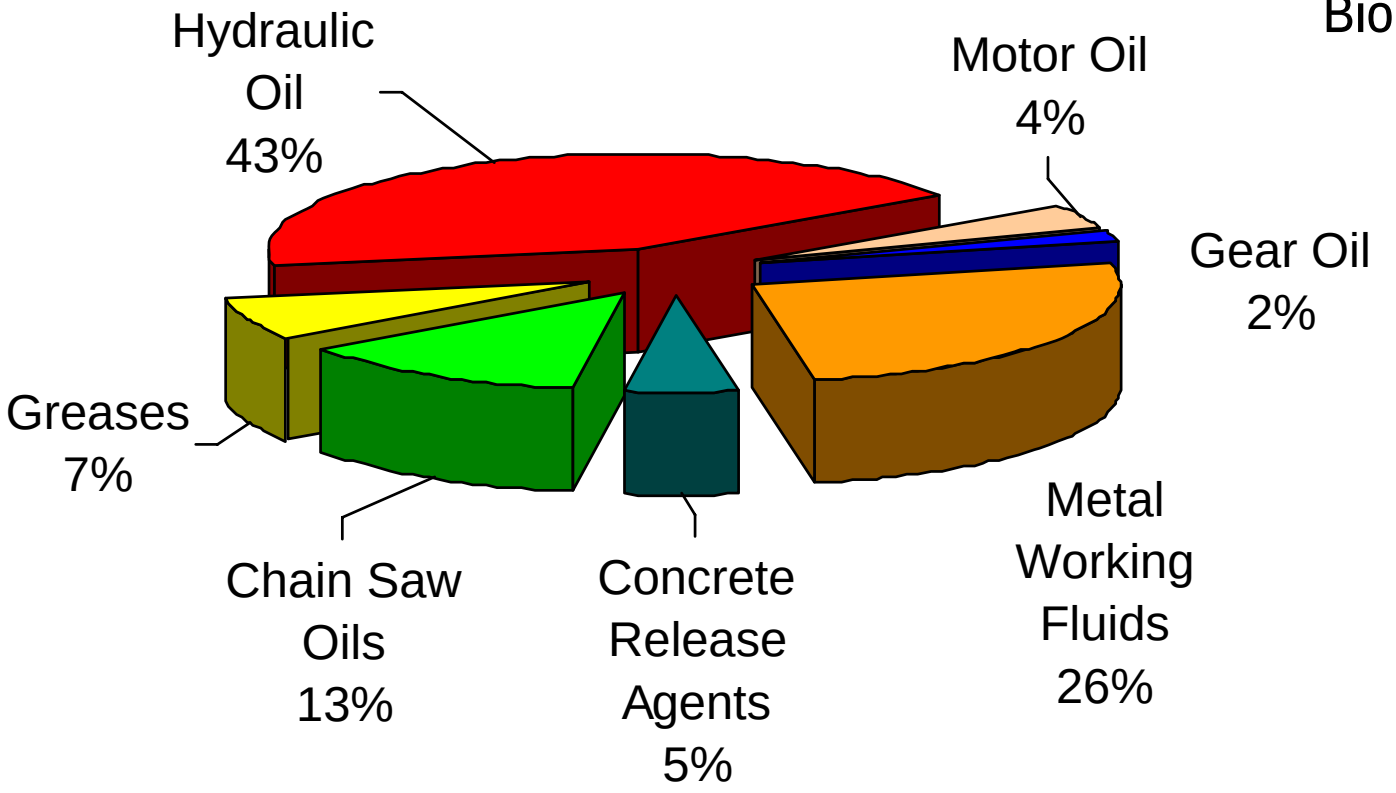
Applications of Oils and Fats

Fields of Non-Energy Use



Source: FNR, meó consult

State-of-the-Art in Bioproducts



Biolubricants in Germany: 46.500 t (2004)
(~4 % of all Lubricants in Germany)

Source: FNR, ISI, meó consult

International Cooperation in KBBE Activities

- **ERA-Net Industrial Biotechnology**
- **SusChem-D in the frame of ETP SusChem**
- **European RRM working group “Renewable raw materials and their use in non-food industries“**
- **ERRMA**

Biofuels Technology Platform

ERA IB

ERA-NET Bioenergy

SusChem Implementierungsplan für Deutschland

Policy Framework for Industrial Use of Renewable Raw Materials

Federal German Government's High-Tech Strategy

- The use of crops to produce raw materials is one of 17 future-focused areas in which innovation policy measures have been defined.

Federal German Government's Sustainability Strategy

- Multiple use of renewable raw materials via cascade use systems and biorefineries

BMELV: R&D Programme on Renewable Raw Material Research, Development and Demonstration

- €45 million in 2009
- Linkage between science and industry; promotion of research clusters and alliances/networks.

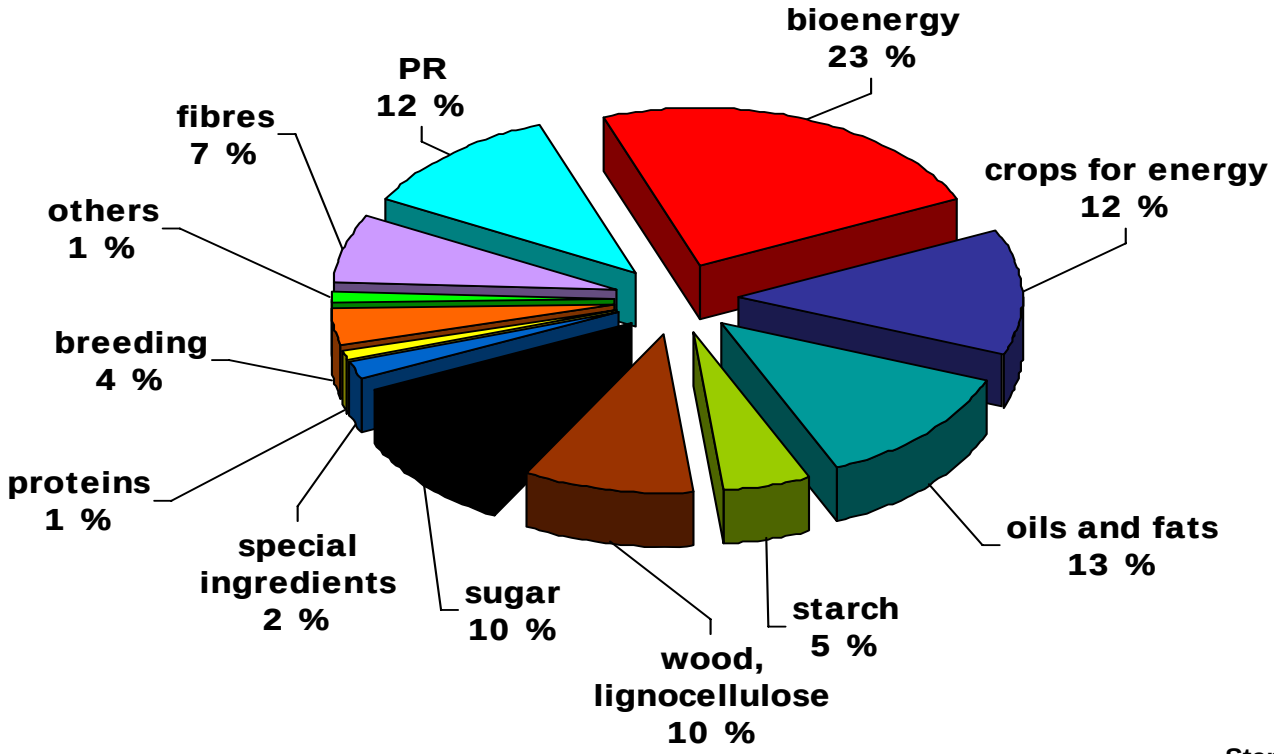
BMBF: R&D programmes - BioIndustry 2021 and BioEnergy 2021

BMU: Environmental studies; preliminary studies involving pilot facility

EU: Lead Markets Initiative

projekt promotion (BMELV/FNR)

amount: 103,6 Mio. €	**projects: 362**



Stand: 2008

Current Biomass-related Calls – Bioproducts (BMELV/FNR)

- **Technical and special Polymers based on RRM & Synthesis of fine and speciality chemicals from biomass (since 2004)**
- **Wood use for construction and materials (since 2006)**
- **Biopolymers, WPC, fibre-reinforced materials (since 2007)**
- **Applied RTD focused on biomass by Young Scientists (2006-2011)**
- **SusChem-D: New Methods of chemical as well as enzymatic and biotechnological transformation of carbohydrates, vegetable oil and animal fats as well as proteins“ (2008-2011)**
- **RTD based on biomass by Innovation Clusters (2008-2013)**
- **Applied RTD focused on multiple usage of biomass, biorefineries (2009-2012)**

Demonstration – LCF Biorefinery (BMELV/FNR)

Pilot projects on a lignocellulose biorefinery and on new enzymes for the degradation of lignocellulose components and the sustainable production of fine chemicals“ (from 2007)

Funding: 2,2 Mio. € (phase 1), N.N. (phase 2)

- **Joint consortium of 19 partners from industry and academia**
- **First phase (2007-2009): proof of feasibility on lab scale**
- **Second Phase (from 2009): construction of a LCF biorefinery pilot plant focusing on bio-based products**

competition food versus non-food

- **Approaches to reduce the competition between food and non food**
  - **use biogenous residues stronger (z. B. liquid manure, straw, inferiour cereals)**
  - **mobilize arable land (abolishment of the obligatory set aside),**
  - **improve yields in food and non-food production**
- **Approaches to reduce the competition between energetic and industrial use**
  - **review of regulations supporting bioenergy**
  - **supporting cascade- and biorefinery concepts**

sustainable biomass production

- **sustainable biomass production in EU is garanteed by cross complaince (no difference between food an non-food)**
- **objektive: worldwide standardisation and certification-system for food and non-food production from biomass**
- **first steps:**
  - **national sustainability regulation for biofuels**
  - **EU-Renewable-Energy-Directive**

Conclusions/Action Needed

Federal German Government's National Biomass Action Plan

- **Managed by BMELV (Referat N2)**
- **Industry recommendations received. These are now being integrated into the plan and will then be put forward for approval.**
- **Scheduled completion: Summer 2009**


Thank you for your attention!
Vielen Dank
für Ihre Aufmerksamkeit!