

Biofuels research in Germany



Ronny Winkelmann

Agency for Renewable Resources

Contents



Bundesministerium für
Ernährung, Landwirtschaft
und Verbraucherschutz

nachwachsende-rohstoffe.de

- ▶ Introduction
- ▶ Biofuels in Germany today
- ▶ R&D projects and innovations for biofuels



Function: Central coordinating agency in the area of renewable resources in Germany

Founded: October 1993

Offices: Gülzow/Tarnow

Support: Federal Ministry of Food, Agriculture and Consumer Protection (BMELV)

Members: 64

Employees: 51



- ▶ **Research promotion / Project sponsoring**
- ▶ **Information and advice**
- ▶ **Public relations**
- ▶ **European activities**

Support Programme „Renewable Resources“



Bundesministerium für
Ernährung, Landwirtschaft
und Verbraucherschutz

nachwachsende-rohstoffe.de

- ▶ The support programme
 - comprises research, development and demonstration projects,
 - addresses enterprises and research institutions
 - is divided into several product lines and
 - currently has a budget of 33,54 mio. € (\$ 46 mio.) per year
 - 300 on-going R&D projects
- ▶ Results: products and technologies
 - biolubricants
 - construction and insulation materials
 - bioplastics and natural fibre composites
 - bioenergy

Biofuel Targets of the Federal Government



Bundesministerium für
Wirtschaft, Arbeit und
Klimaschutz

nachwachsende-rohstoffe.de

- ▶ Environmental/climate protection
- ▶ Security of fuel supply
- ▶ Additional income for farmers and foresters
- ▶ Employment in rural regions
- ▶ Technological developments

Special regulations:

- ▶ Cultivation
 - 45,- €/ha (\$ 56,-) energy crop bonus
 - Cultivation of renewable biological resources on productive as well as set-aside land
- ▶ Biofuels
 - Energy Tax Act (Aug 2006)
 - Biofuels Quota Law (Jan 2007)

Transportation Fuels (2006)

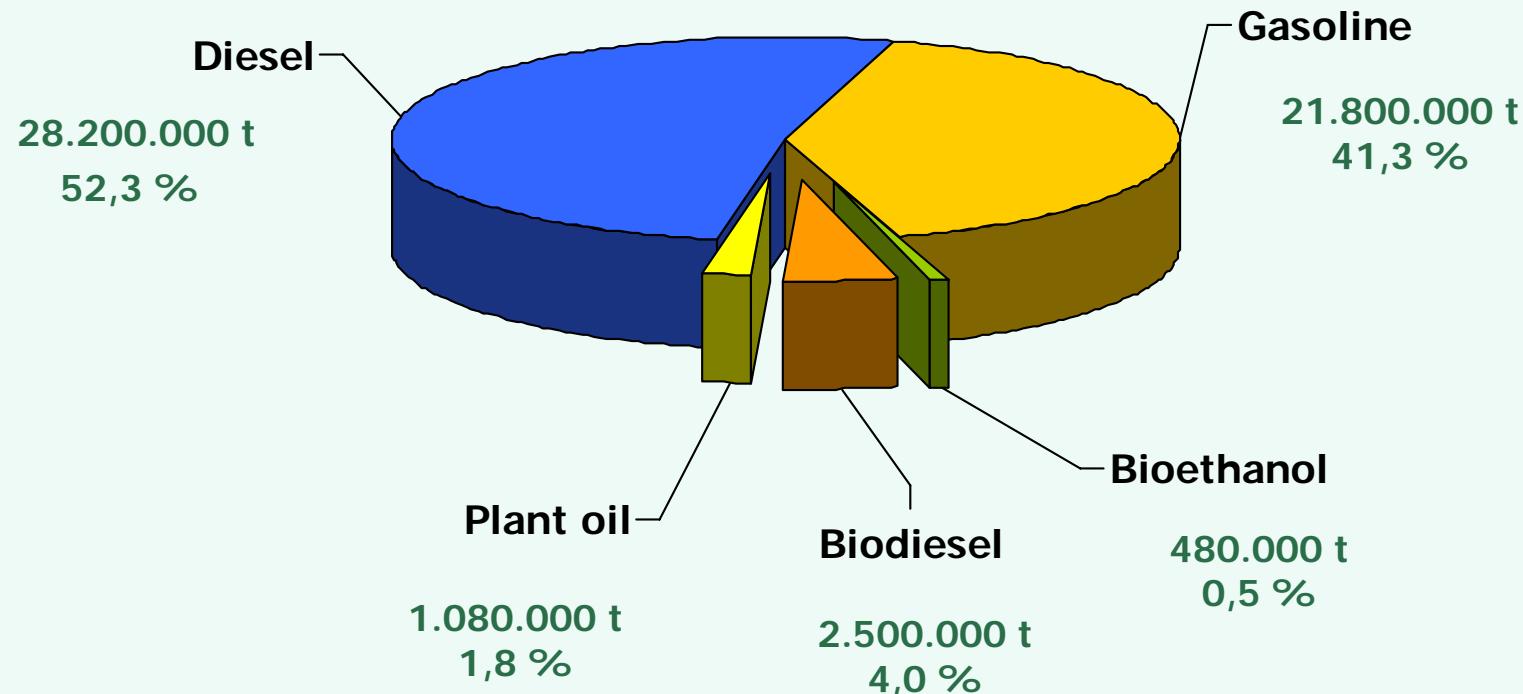


Bundesministerium für
Ernährung, Landwirtschaft
und Verbraucherschutz

nachwachsende-rohstoffe.de

Total consumption 2006: 54 million tons

Biofuels share: 6,3 % (energy content)



% = energy content

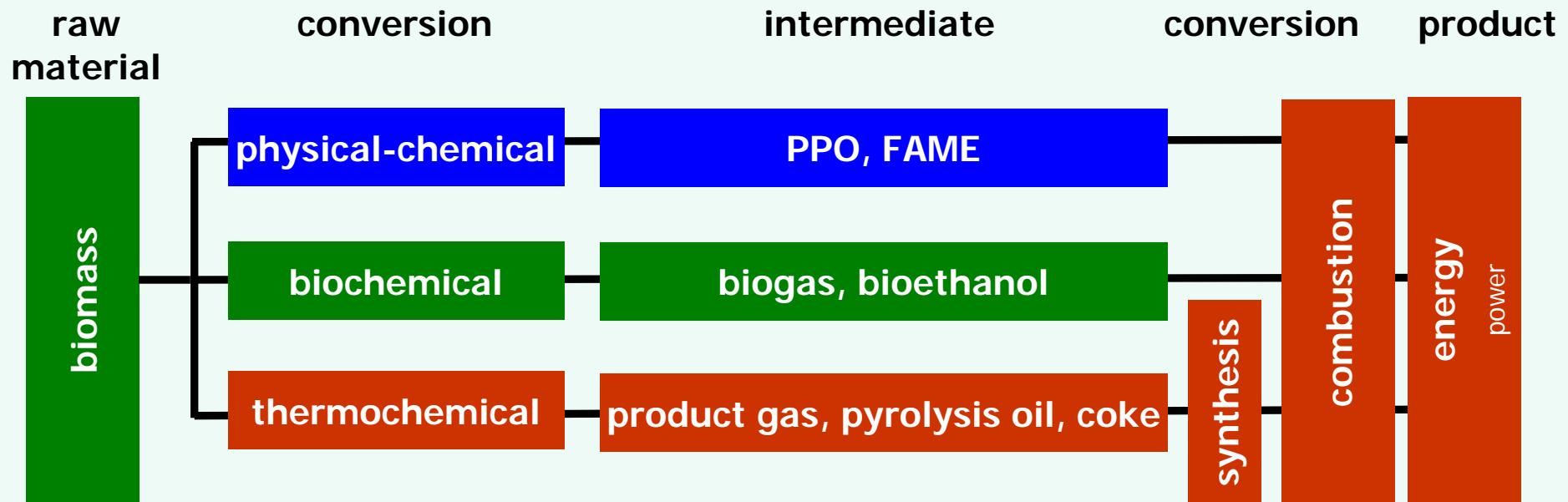
Source: Estimates FNR/BMF

Biofuel Paths



Bundesministerium für
Ernährung, Landwirtschaft
und Verbraucherschutz

nachwachsende-rohstoffe.de



Biofuels research means research, development and demonstration along the whole chain!

- ▶ Raw material supply
 - cultivation, plant breeding, conditioning, logistics
- ▶ 1st generation biofuels
 - Process optimisation, quality assurance, engine concepts, exhaust emissions
- ▶ 2nd generation biofuels (BtL)
 - gasification, gas conditioning, synthesis of biofuels
- ▶ Certification, market analyses, studies

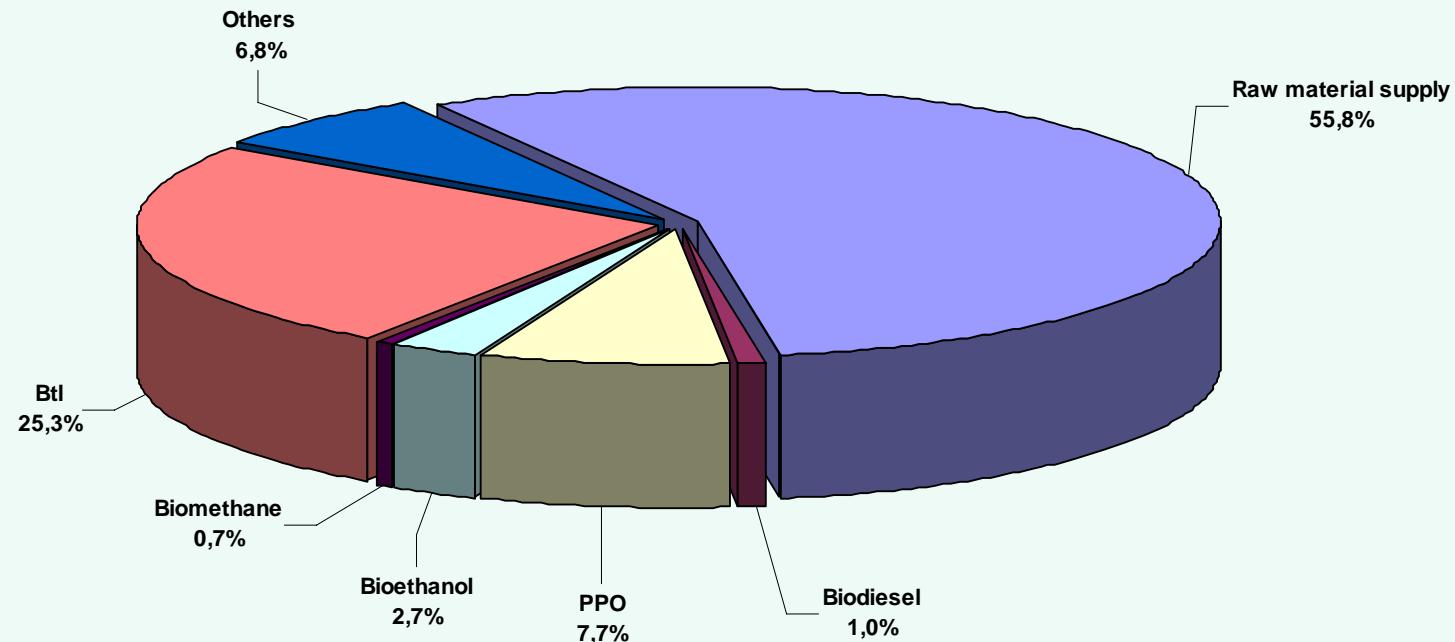
R&D Measures Biofuels



Bundesministerium für
Ernährung, Landwirtschaft
und Verbraucherschutz

nachwachsende-rohstoffe.de

Subsidies for recently finished and on-going
projects: **ca. 15 mio. €**



Projects Raw Material Supply

Energy Plant Breeding



Bundesministerium für
Ernährung, Landwirtschaft
und Verbraucherschutz

nachwachsende-rohstoffe.de

joint project: Development of new biomass genotypes of rye, oilseed rape, bird´s rape, sunflower and sorghum and their integration into productive energy crop rotations



5 sub-projects

May 10th 2005 to December 12th 2008



UNIKASSEL
VERSITÄT

Universität Hohenheim (720) -
Landessaatzauchanstalt

breeding oilseed rape, bird´s rape,
sunflower, sorghum, rye; integration into a
double cropping system



Projects Raw Material Supply

Cultivation



Bundesministerium für
Ernährung, Landwirtschaft
und Verbraucherschutz

nachwachsende-rohstoffe.de

joint project EVA: Development and comparison of optimised and site-specific cropping systems for energy crops



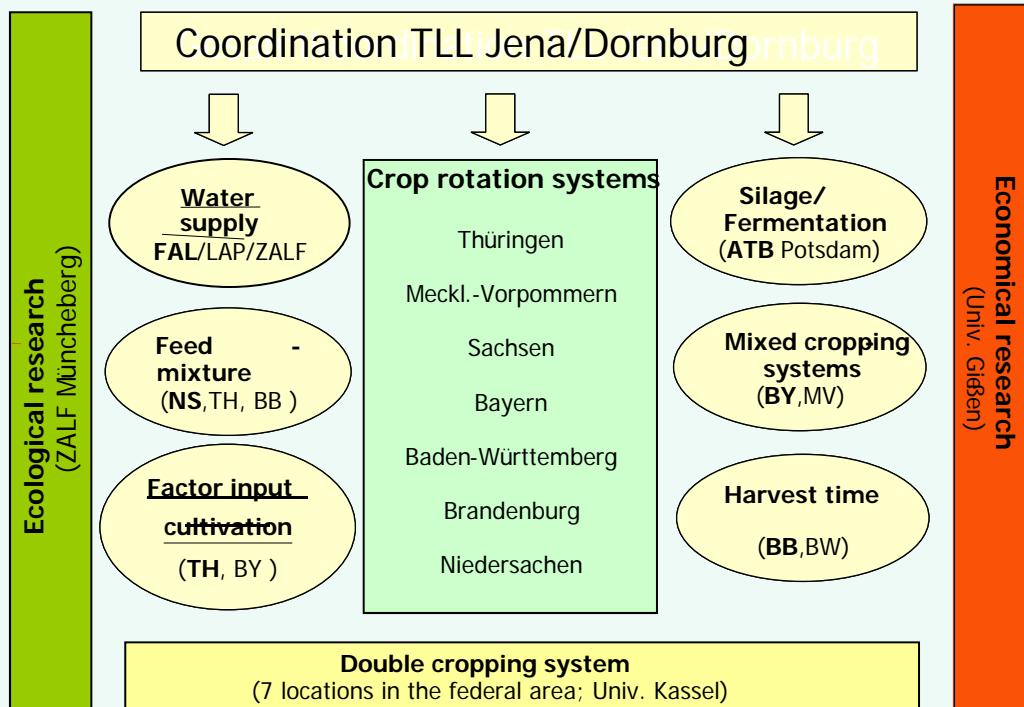
May 2005 to December 2008;

6 sub-projects;

ca. 20 partners from 9 *Länder*
(federal states)



Ecological research
(ZALF Müncheberg)



Projects Raw Material Supply

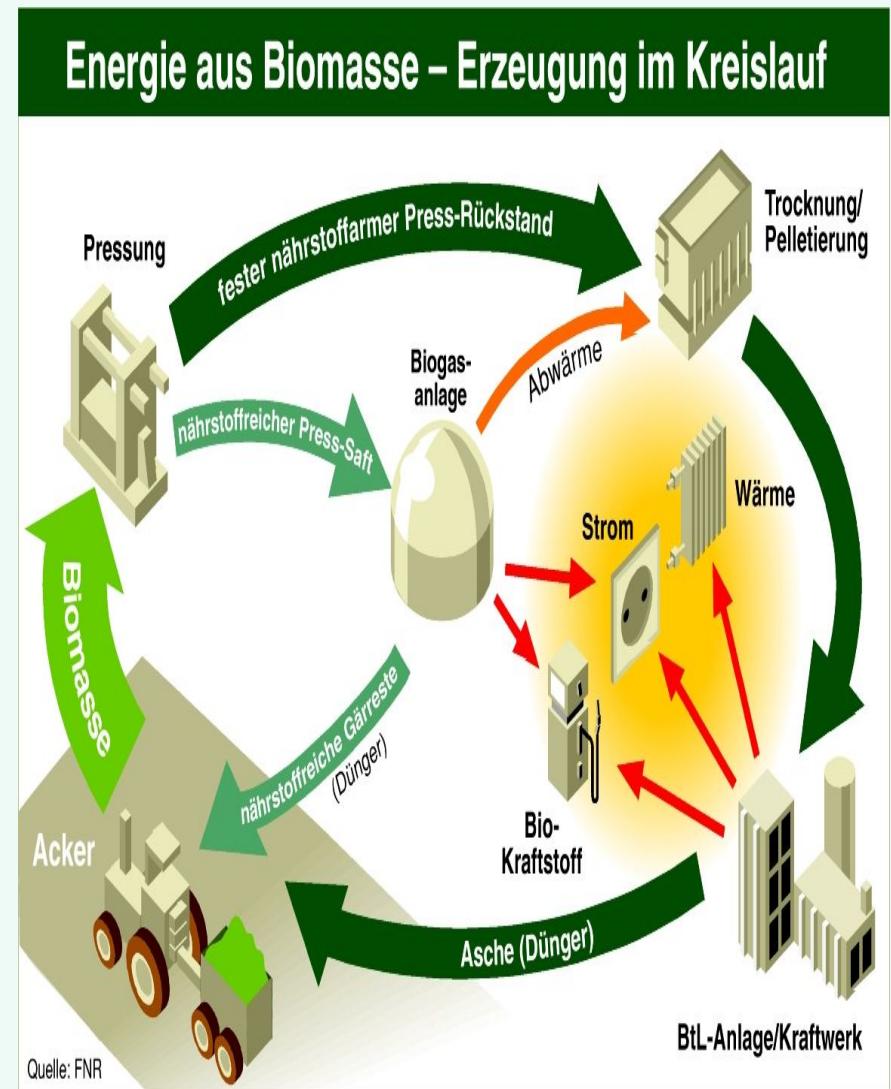
Biomass conditioning and logistics



Bundesministerium für
Wirtschaft, Landwirtschaft
und Verbraucherschutz

nachwachsende-rohstoffe.de

- Joint project BioLog:
Development, testing and demonstration of new logistics concepts for biofuels (6 sub-projects, coordination: Clausthal Institut for Environmental Technology Ltd.)



- ▶ Quality assurance for decentralised production of rapeseed oil fuel (TFZ Straubing)
- ▶ Utilisation of linseed oil as special fuel (University of Rostock)
- ▶ Rapeseed oil fired T3-engines for tractors
 - joint project, 2 sub-projects (JD/University of Rostock)
- ▶ Additives for the oxidation stability improvement of rapeseed oil (2 projects, University of Rostock)

- ▶ Testing ethanol-diesel blends (University of Magdeburg)
- ▶ Decentralised bioethanol production – process optimisation with regard to energy (ttz Bremerhaven)
- ▶ Denatured bioethanol for direct ethanol fuel cells
 - Joint project, 2 sub-projects (Südzucker Inc. / Fraunhofer Institute)

- ▶ Emissions of particulate matter from diesel engines using biodiesel (FAL)
- ▶ Utilisation of RME-based glycerin in a micro-gasturbine (University of Rostock)
- ▶ Biofuel SNG - Techno-economic and environmental analysis and assessment (IE Leipzig)

Biomass to Liquid (BtL)

Current projects



Bundesministerium für
Ernährung, Landwirtschaft
und Verbraucherschutz

nachwachsende-rohstoffe.de

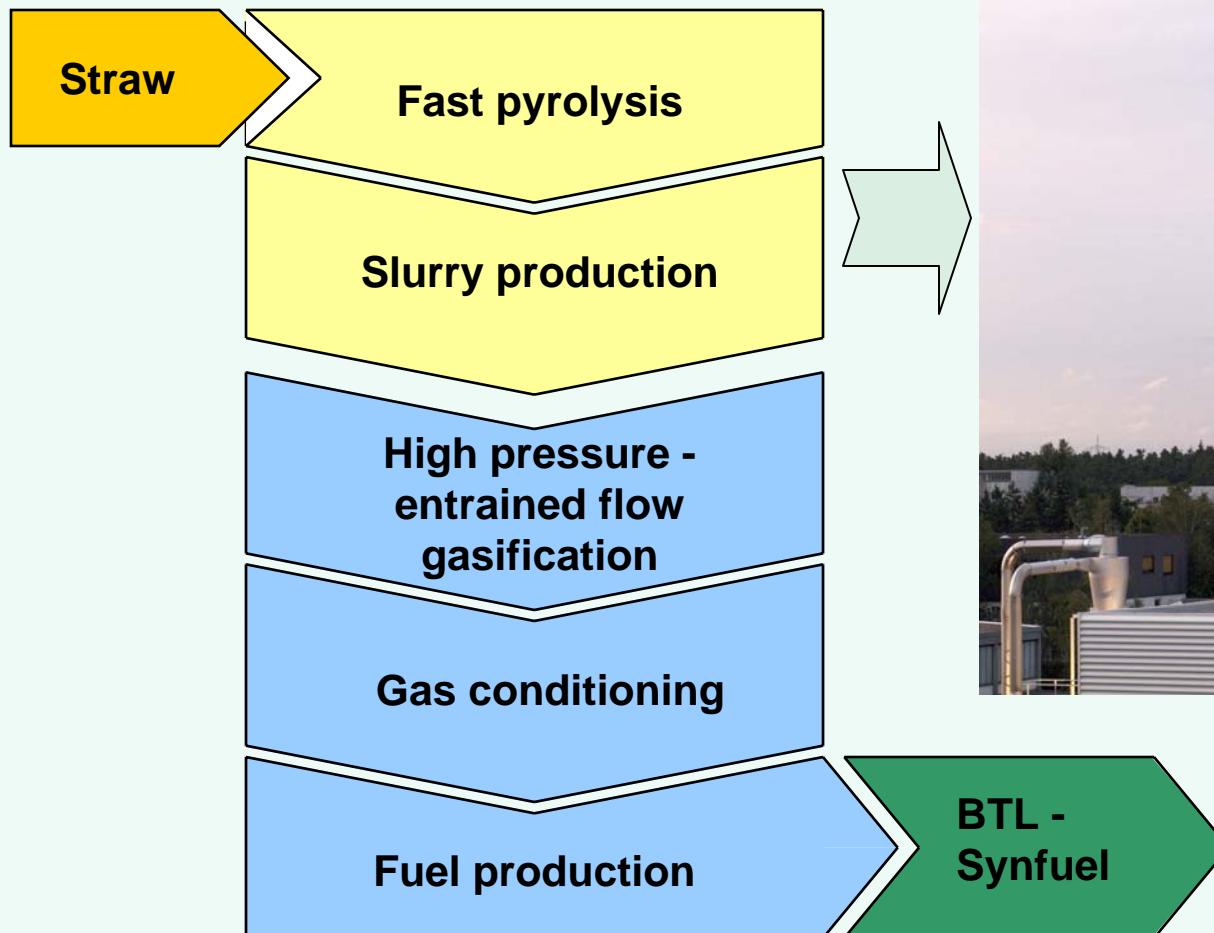
- ▶ Improvement of product gases by means of Knudsen membrane reactor using the example of concrete (TU Berlin)
- ▶ Synthetic fuels from biomass - production and gasification of slurries through flash pyrolysis resp. high pressure entrained flow gasification and synthesis of methanol from biomass – phase 1: pyrolysis and slurry production
(Forschungszentrum Karlsruhe)
- ▶ Investigation of specific costs and environmental effects of BtL production (Technical University Bergakademie Freiberg)

The Bioliq® Pilot Plant



 Bundesministerium für
Ernährung, Landwirtschaft
und Verbraucherschutz

nachwachsende-rohstoffe.de

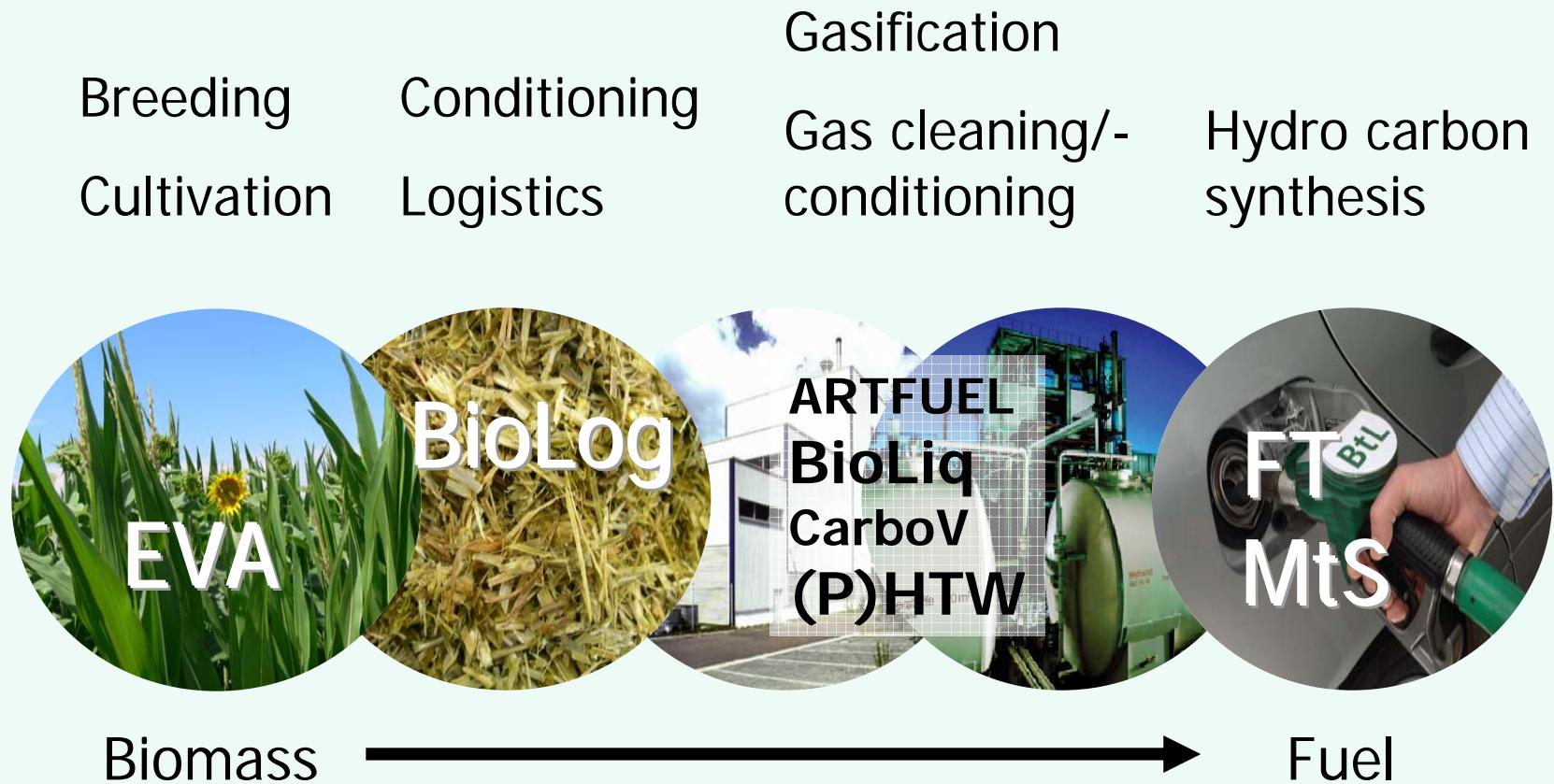


Picture: Forschungszentrum Karlsruhe

Chart: Forschungszentrum Karlsruhe

- ▶ Certification of biofuels (meo consulting)
- ▶ Biofuels – a comparative study for decision makers in politics, administration and economy (meo consulting)
- ▶ Exhaust emissions of biofuels and blends (TU Graz)

Considering the whole supply chain



Need for action



Bundesministerium für
Ernährung, Landwirtschaft
und Verbraucherschutz

nachwachsende-rohstoffe.de

- ▶ 1st generation biofuels:
 - Standardisation, quality assurance
 - Further development of powertrains
 - Suitability of fuel blends
- ▶ 2nd generation biofuels
 - Evaluation of other conversion routes from biomass to hydrocarbons, e.g. biocrudeoil
- ▶ Economic, environmental, technical and legal assessment of promising biofuel production routes
- ▶ Development of sustainability strategies

Thank you for your attention!



Bundesministerium für
Ernährung, Landwirtschaft
und Verbraucherschutz

nachwachsende-rohstoffe.de



Please don't hesitate to
ask FNR for collaboration!

Fachagentur Nachwachsende Rohstoffe e.V.
Hofplatz 1
D-18276 Gülzow

Phone: +49 (0) 3843/6930-100
Fax: +49 (0) 3843/6930-102
E-Mail: info@fnr.de
Web: www.fnr.de