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Biofuels policy in Germany and trade opportunities for Brazil

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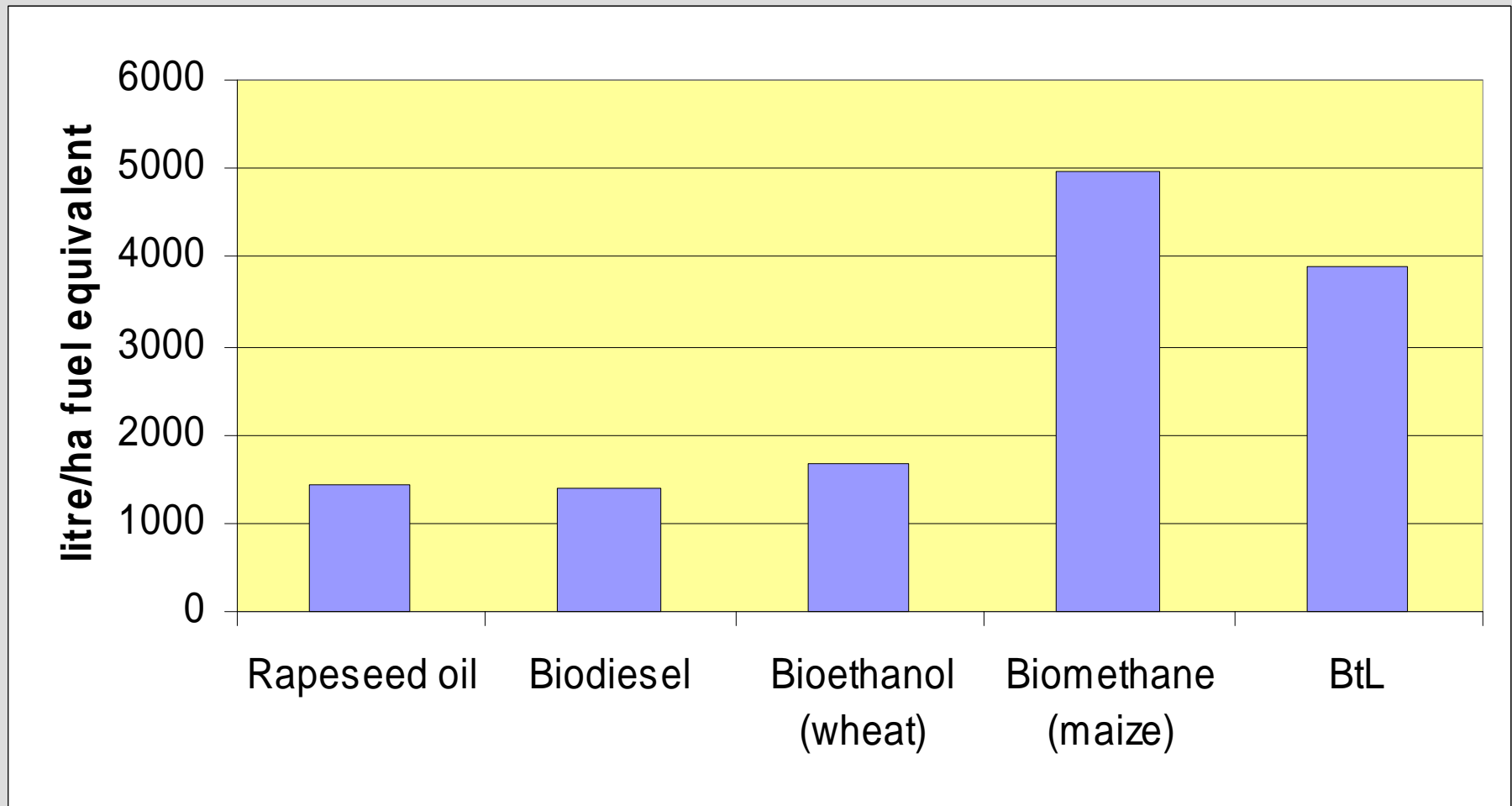
Rationale for biofuel support policies in Europe

- Increased security of energy supply by reducing petroleum imports (in Germany currently 97% dependence) and diversifying sources of origin
- Reduction of CO₂-emissions in the transport sector
- Strengthening of national agriculture and local economy (e.g. sugar production not competitive on a global scale)

Biofuels suitable for the transport sector

- **Vegetable oil**, e.g. from rapeseed and sunflowers (in Germany) or from soybeans and oil palms in tropical countries; can be used in diesel engines after modification; interesting for agricultural and transport sector with high annual mileage
- **Biodiesel**, made from vegetable oil, can be used in blendings with mineral diesel (up to 5%) in standard engines or up to 100% in special modified engines
- **Bioethanol**, made from sugar or starch, feedstock e.g. sugar beet and grain (wheat, rye, maize) in Germany and sugar cane in Brazil, can be used in standard gasoline engines (up to 5%) or in special engines with up to 100%; can be transferred into ETBE as octane enhancer (max. content 15%); use of cellulosis as feedstock (e.g. straw) is in development
- **Methane from biogas**, can be used in engines suitable for natural gas
- **Synthetic fuels** (e.g. Biomass-to-Liquid, BtL), all types of plant material can be used, so far only pilot production plants, can substitute gasoline or diesel, not available on a larger scale before 2010-2015

Annual yield per hectare (Germany)



General problems and questions

- Should more efficient cars and a change of the transport mode have priority before using biofuels ? (e.g. targets for CO₂ emissions of new cars will probably not be achieved in the EU; goods transport on rails is overtaken by roads,...)
- Use of energy plants for transport fuels is competing against use for electricity and heat purposes (partially more efficient in terms of CO₂ reduction); mineral oil use for transport in Germany is less than half of total mineral oil consumption
- Even with high-yielding BtL only 25% of today's German transport fuel consumption can be replaced by harvesting from 4m hectares (one third of the agricultural area, not including pastures)
- Can national biofuels production withstand low-cost imports from developing countries (as vegetable oils and bioethanol) ?

Incentives for market development of biofuels

- Production incentives for energy plants
(in the EU partially for set-aside agricultural land)
- Fuel tax reduction or exemption
(as e.g. in place in Germany for diesel fuel and fuel used for agricultural or public transport since decades)
- Quota systems
(obligation to provide a certain percentage of biofuels annually)

Incentives are often combined for integrated support policy

Main incentives for biofuels in Germany in the past

- Mineral oil tax exemption for pure biofuels in place since the 1990s
- Full mineral oil tax exemption for biofuel blends since Jan. 1, 2004 (in proportion to biofuel content)

First monitoring report in June 2005: “Over-compensation for some biofuels due to petroleum price increases”

Government coalition agreement in Nov. 2005: “General tax exemption should be substituted by quota system”

New biofuels policy in Germany (2006)

- Degressive tax reduction since Aug. 1, 2006 for biodiesel, pure vegetable oils and blends; full taxation by 2012
- Quota for diesel and gasoline as of Jan. 1, 2007 (→ next page)
- Tax exemption for pure biofuels in agriculture
- Degressive tax reduction for 2nd generation biofuels until 2015
- Tax reduction for biogas and E85 until 2015
- Effects: additional fuel taxes of about € 1 billion per year; consumer price increase expected

Biofuels quota system in Germany (starting 2007)

- 4.4% for diesel and 2% for gasoline; as of 2009 5.7% for total fuel consumption, 6% as of 2010 (for comparison: EU-directive 5.75% until end of 2010)
- % related to energy content
- Quota statutory for any fuel delivering company
- Quota can be fulfilled by blends or pure biofuels
- Obligation can be transferred to third parties
- Penalty in case of non-compliance (50 ct/l for biodiesel; 80 ct/l for bioethanol)
- Effects: additional fuel taxes of about € 1 billion per year; consumer price increase expected

Biofuels in Germany, 2005

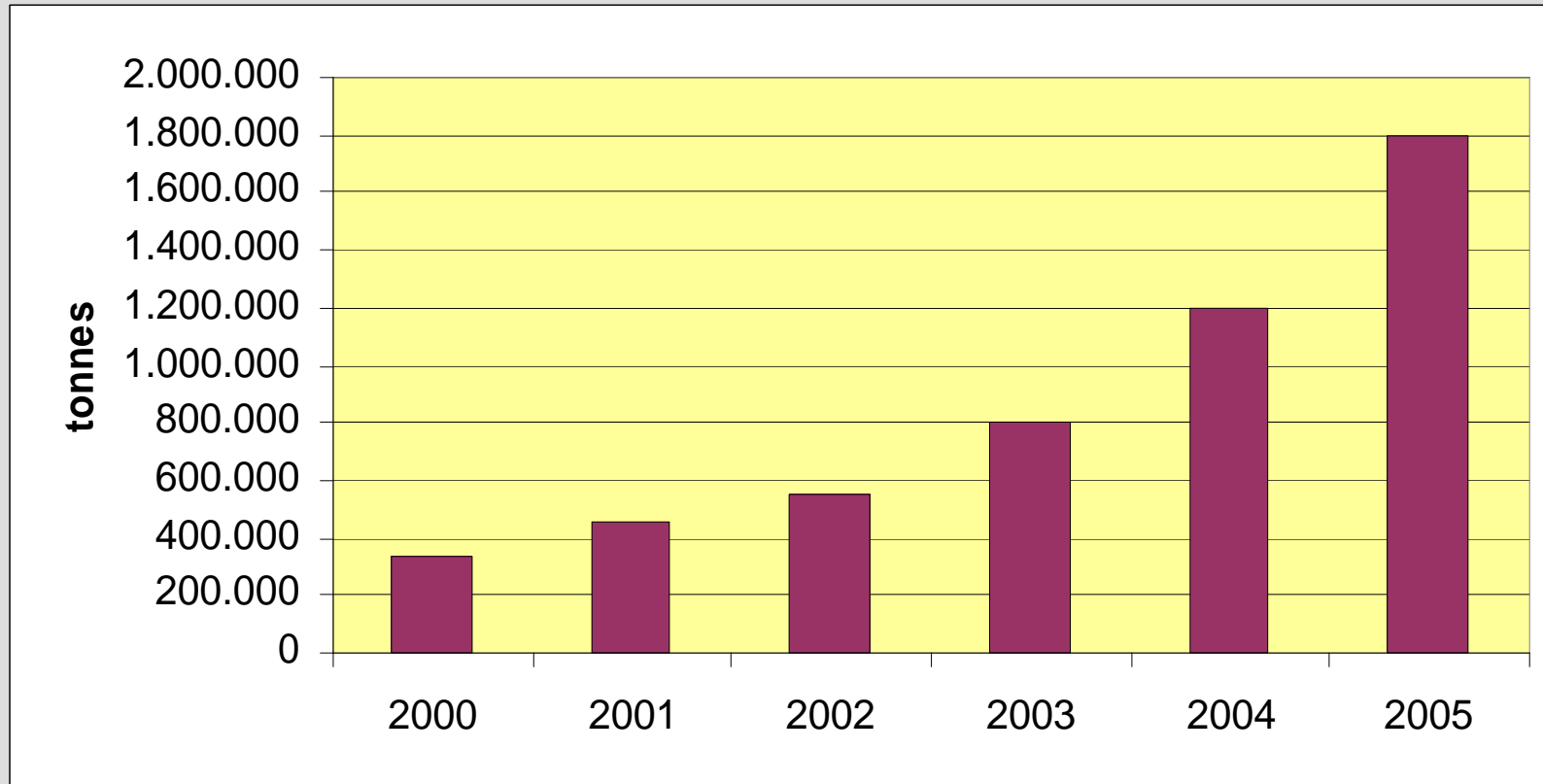
- Biodiesel 1.8m tonnes
- Plant oils 200,000 tonnes
- Bioethanol 230,000 tonnes

Total share: about 3.6 % (in Brazil 22%); Germany is one of the few countries to accomplish EU goal of 2% for 2005; Biofuels share within diesel market 5.5%

Germany is by far largest **biodiesel** producer world-wide; 60% sold as pure biodiesel (B100)

Bioethanol use for fuel is still marginal; first factories started in 2004 with grain (rye) as feedstock; bioethanol mainly transformed into ETBE; since 2005 E85 and E50 on the market ; no regular blending with gasoline so far; only few flex-fuel-vehicles available on the German market since 2005 (in Brasil market share > 70%)

Biodiesel market in Germany



About 1.5m tonnes national production plus 300,000 tonnes imports
Production capacity about 2.3 – 2.6m tonnes by end of 2006

Consumption of biodiesel in Germany by user groups 2005 (estimated)

Transport vehicles (own fuel stations)	680,000 t
Transport vehicles (public fuel stations)	276,000 t
Private vehicles (public fuel stations)	244,000 t
Blending with mineral diesel oil at the refinery	600,000 t

Production of biodiesel in Germany

- About 1m hectare of land used (2005)
- Annual yield: 1,550 litre/hectare
- Potential: about 1.4m hectare with rapeseed (for comparison: total agricultural area – excluding pastures - is 11.9m hectare)
- Enough to fulfill EU directive requirements for 2010 (about 2m tonnes biodiesel)
- Not enough local resources for share of 10% and more biodiesel

Import of plant oils for biodiesel ?

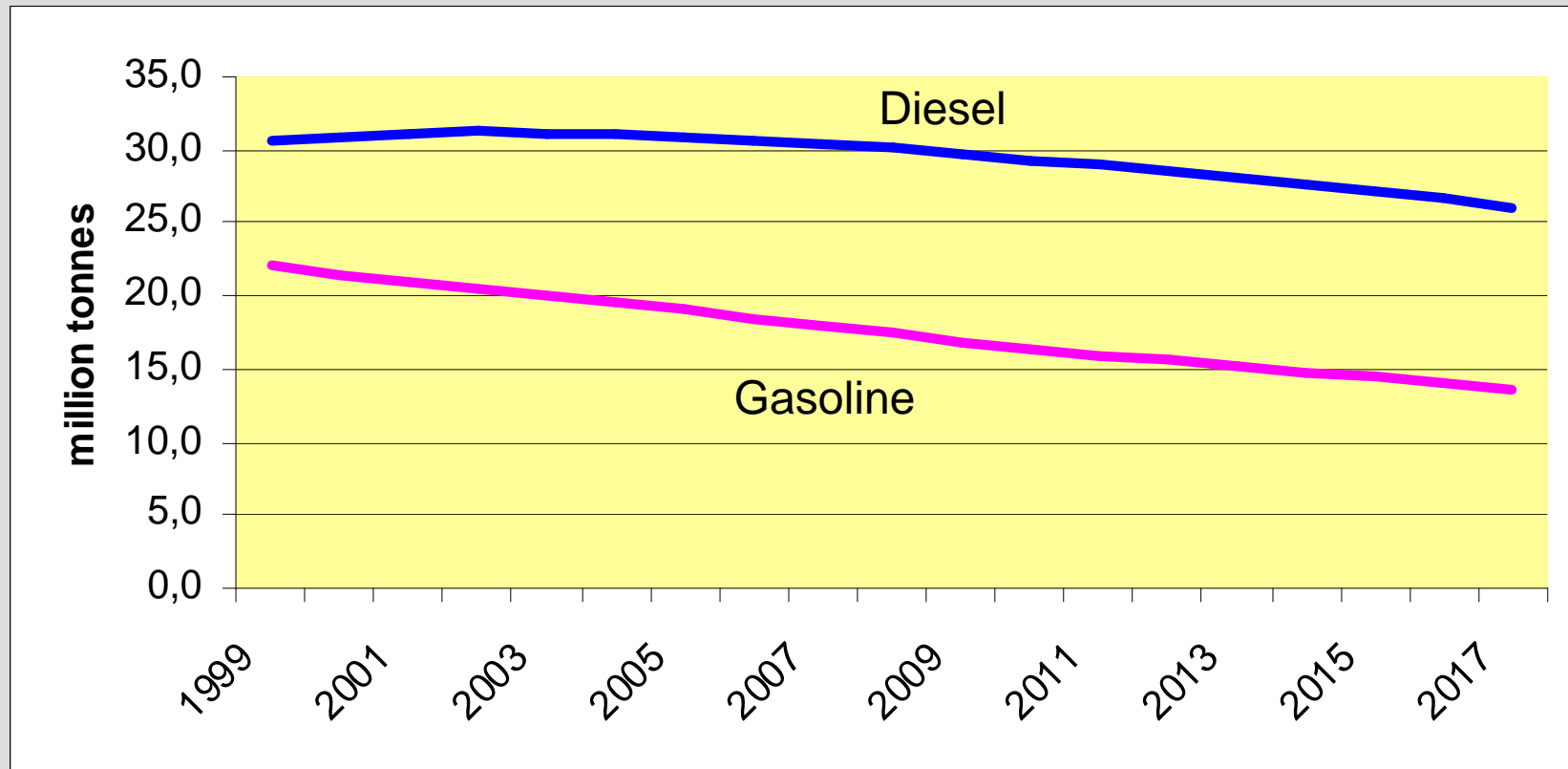
Average prices for pure vegetable oils in 2005:

- Rapeseed: 540 €/t
- Soybeans: 450 €/t
- Palm oil: 340 €/t

Use of soy and palm oil is technically limited.

At least import of palm oil is economically attractive against national oil production ! (First trade about to start with palm oil from Indonesia – critical issue due to extension of plantations into tropical forests)

Transport fuel market development in Germany



Assumption: For 30m tonnes Diesel and 10% (energ.) biodiesel in 2015
→ About 3.3m tonnes biodiesel needed
→ 1.3m tonnes would have to be imported

German and EU biofuels market from the point of Brazil

- Ethanol production very competitive (0.20-0.25 €-ct/l against 0.40-0.65 in EU), if import tax barrier is removed and sugar price can be kept low
- Interesting market for palm and soy oil if sustainability can be guaranteed
- Brazil has large own demand for biodiesel in substitution of fossil diesel
- Easier market access in other world regions ?
- Large-scale deployment of BtL in the EU in the future could compete against first generation biofuels

Criteria for sustainable biomass production

- Greenhouse gas balance
- Competition with food, local energy supply, medicines and building materials
- Biodiversity
- Economic prosperity
- Well-being
- Environment

Development of indicators and certification systems

- Certification of sustainable products is nothing new: e.g. organic food, wood, green electricity...
- Reference to existing conventions and certifications:
 - FSC: Forest Stewardship Council (www.fsc.org)
 - Roundtable on Sustainable Palm Oil (www.rspo.org)
 - Round Table on Responsible Soy (www.responsiblesoy.org)
- First approach made by Dutch project group “Sustainable production of biomass” (2006) and by IEA Task 40 (includes Brazil)
- Standards have to be integrated into national, EU and WTO policy
- Exporting countries should actively participate in the definition of performance indicators and the setting up of certification systems