RECENT DEVELOPMENTS AND PROSPECTS FOR THE PRODUCTION OF BIOFUELS IN THE EU : CAN THEY REALLY BE "PART OF THE SOLUTION"?

Florence Jacquet, Laure Bamière, Jean-Christophe Bureau, Loïc Guindé, Hervé Guyomard, David Treguer

INRA-France

Presentation Outline

- **The EU biofuels policy**
- **Demand and supply of biofuels in the EU, and impacts on agriculture**
- **The prospects for EU production of biofuels**
- **Conclusion**

The motivations of the EU policy for biofuels

- Climate change (GHG emissions from transport)
  - Biofuels is presented as a significant strategy to reach the Kyoto objectives
- Energy dependence reduction
- Farm sector support

The EU biofuels policy

- **Measures at the farm sector level (CAP)**
- **The EU directive on biofuels**
- **The EU trade policy on biofuels**

Measures at the farm level (CAP)

- **Energy crops allowed on mandatory set-aside land (**Since 1992 CAP Reform):
  - Normal mandatory set-aside rate: 10 %
- **Energy crop payments on non set-aside land (since 2004)** 45 euros/ha, maximum of 1.5 millions ha (2 millions in 2007)

The EU directives on biofuels

•**Current EU Legislation**

– The 2003 biofuels use directive

- **Incorporation targets: 2% in 2005, 5.75 % in 2010**
- **Not mandatory, no penalty for noncompliance**
- **The member states have to report on their policies**

–The 2003 energy taxation directive allows MS to grant tax reductions or even exemptions on biofuels

The EU trade policy on biofuels

•**Tariffs**

– Biodiesel: 6.5 %

– Vegetable oils: 0 %

– No specific customs classification for bioethanol for biofuels production

- Most of the imports (US and Brazil) faced the MFN tariff 19.2 euros/hl for undenatured alcohol, 10 euros/hl for denatured alcohol
- Preferential trade arrangements for developing countries

– Protection on cereals, sugar

Demand and Supply of biofuel

•MS incorporation rates don't reach the EU target

•Biodiesel is the main biofuel in Europe

•Produced mainly domestically

Implementation of the 2003 directive in EU Member States

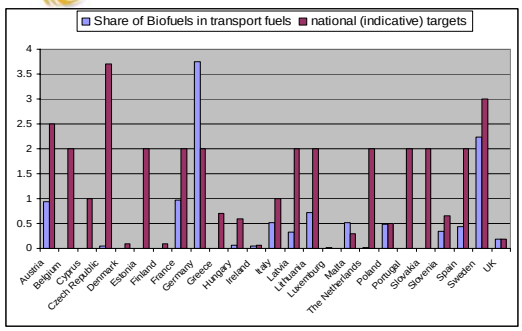
•**Each member state sets its own:**

–**Indicative target**

– **Specific policy :**

- **Tax exemption / reduction in most MS:**
  - –Unlimited quantities (Germany) or for predetermine quantities (France)
- **Or mandatory incorporation**

Share of biofuels in transportation fuel (left-hand bar) and national indicative targets (right-hand bar), 2005



The EU trade on biofuels

•**Current trade : very few imports**

– No imports of biodiesel

– Slight increases in imports of palm oil as well as soybean oil (150,000 tons in 2005, i.e., 4.7% of consumption)

– 200,000 metric tons import of ethanol (2005)

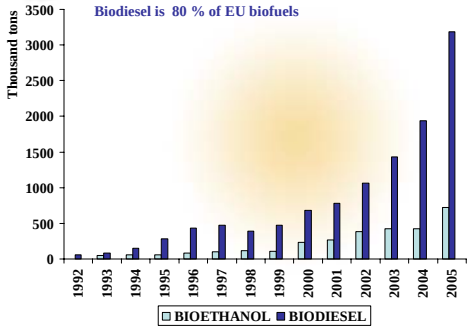
•**Reduced tariffs on imports? Controversial issue within the EU**

–Some MS (Portugal, Sweden) are rather favorable

–Some MS (France, Germany) strongly oppose the idea (support to domestic farmers)

The production of biofuels in the EU

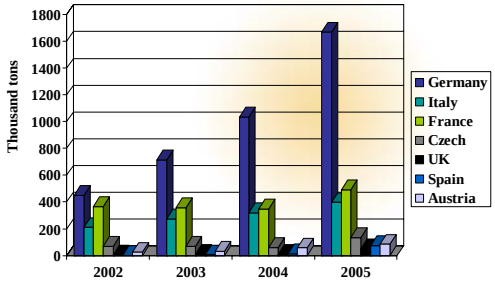
Biodiesel is 80 % of EU biofuels



Source: Eur'Observer, Biofuel Barometer

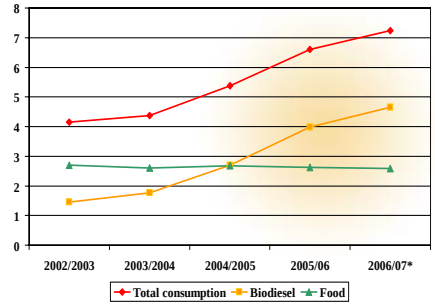
The production of biodiesel in the EU

95 % of EU biodiesel: from EU rapeseed oil



Source: Eur'Observer, Biofuel Barometer

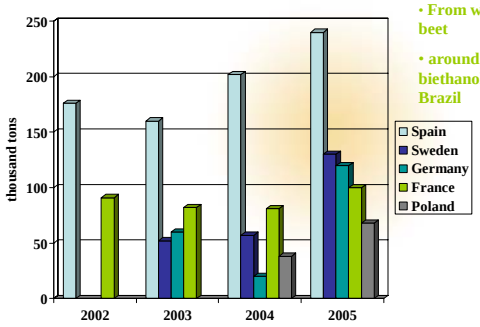
Utilization of rapeseed oil in the EU-25 (million metric tons)



- For the first time in 2004/05, non-food uses have exceeded food uses
- The EU is now an importer of rapeseed oil (0.6 million tons in 2006/07)

Source: Oil World 2006

The production of bioethanol in the EU



- From wheat and sug beet
- around 200,000 tons biethanol imports fro Brazil

Source: Eur'Observer, Biofuel Barometer

Impacts of Biofuels on EU Agriculture

- Current situation :
  - –about 4% of the EU-25 arable crops area
  - – Production shares:
    - •oilseeds (mainly rapeseed) :40%,
    - • sugar beet :5%,
    - •cereals : 1%
  - – in 2006 more than 50% of energy crops is produced without specific CAP incentives (set-aside , or energy crops premium)

Impacts of Biofuels on EU Agriculture

- Production and acreage needed to meet the 5.75% target : 18% of the total crops area (assuming no imports, and assuming a 55%/45% ratio biodiesel/bioethanol):
  - -6.6 millions hectares of rapeseed (/ total area 5.1 in 2006)
  - -4.6 millions hectares of wheat (/ total area 18.6 in 2006)
  - -0.5 millions hectares of sugarbeet (/total area 3 in 2006)

Impacts on trade

• **What models say ?**

For the 5.75% target :

– Around half of the EU biofuel demand met by imports (EC impact study (SEC (2006) 142)

–EU exports of wheat would decrease by 41 % and EU imports of vegetable oil would increase by 300 % (OECD, 2006)

–Imports of rapeseed oil +500%, Exports of wheat -60% (Gohin 2007)

What legitimacy for further public support?

–**Three related issues:**

- **energy efficiency**
- **environmental benefits**
- **competitiveness**

Energy efficiency

–Different evaluations :

–Limited energy balance for EU wheat and sugar beet bioethanol **(1.2 to 1.4)**

–More positive energy balance for rapeseed biodiesel **(ratio in the range 2.2 / 3)**, but rapeseed biodiesel needs more land than wheat or sugar beet bioethanol

Environmental benefits

–**GHG emission reduction**

- **Significant differences between studies**
- **Most recent studies : GHG emissions reduction is rather modest: 25/30 % range**
- **Very Limited GHG emission reduction for bioethanol from grain**
- **More positive GHG emission reduction for Biodiesel from rapeseed and Bioethanol from sugar beet**

–**Other environmental effects**

- **Negative :Water resources, Fertilizers and pesticides , Pasture moving to arable crops.**
- **Possibly some positive impacts (erosion, maintaining agriculture..)**
- **Environmental impacts of imported biofuels (Brazil, Indonesia)**

Competitiveness of EU biofuels -1

–Currently, rapeseed biodiesel is competitive for an oil price around 60-70 $/br., whereas wheat / sugar beet bioethanol is competitive for an oil price above 90 -100 $/br. (within a large range)

–In several Member States, last years, tax exemptions lead to an overcompensation given current oil prices

Competitiveness of EU biofuels -2

–At the 5.75% incorporation level, the competitiveness of biofuels decrease. (see for the French case the INRA- OSCAR model results)

– ++ Uncertainty regarding oil prices and raw material prices.

–Even with a biofuels market share of only 1% (2005), already a significant impact on some markets / prices within the EU (rapeseed)

– This means that the break-even point of biofuels, compared to fossil fuel, could increase. The farm prices will go up, which would drive biofuels further away from being competitive with fossil fuels.

–It thus posed the risk to artificially support investments which will not find any more raw material competitive

Second Generation Biofuels

– **Second generation biofuels are still at the experimental or demonstration stage**

- •Cellulosic ethanol from agricultural residues (straw) and wood residues

  (Abengoa/ Spain, ETEK/Sweden)
- • Second generation Biodiesel : Biomass to Liquid (Choren/Germany)

– **But, some optimistic forecasts .**

- •EU commission (2007) says the increase in biomass potential could be 300% by 2030 from now,
- •mainly from energy crops from agriculture : annual crops (full plant), dedicated perennial crops (miscanthus, short rotation coppice, etc.) and straw.

CONCLUSIONS

•Even with a share of 10% in fossil fuels contribution in GHG reduction will be small (less than 1% of total EU GHG emissions).

•The biofuels policy legitimacy is in debate. Major organizations have become critical of biofuel promotion policies (environmental and consumers Organizations)

•For political reasons and budget costs, in several Member States, current biofuels policies are shifting from tax cuts towards mandatory incorporation rates.

•The EU Council (March 8 and 9, 2007) sets a new binding commitment of 10 % of biofuels in transport fuels in 2020 , but subject to "production being sustainable", and "second-generation biofuels becoming commercially available"…