EU BIOFUELS POLICY AND EFFECTS ON PRODUCTION, CONSUMPTION AND LAND USE FOR ENERGY CROPS

Hilkka Summa
Head of Unit for Bioenergy, Biomass, Forestry and Climate Change
Directorate-General for Agriculture and Rural Development, European Commission

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Breakdown of EU-25 gross energy consumption

- Gas: 24%
- Oil: 37%
- Coal: 18%
- RES: 6%
- Nuclear: 15%
- Biomass: 65%
- Hydro: 27%
- Wind: 5%
- Geotherm: 2%
- Solar: 1%

0% 20% 40% 60% 80%

4% total energy
EU Policy for renewable energy

**EU legislation in place**

- Directive on the promotion of biofuels: *reference target* 5.75% by 2010
- Directive on energy taxation: *possibility* for tax exemptions
- Directive on green electricity: *reference target* 21% by 2010


- 20% of total energy consumption based on renewable energy sources – a legally binding target
- 10% of consumption of petrol and diesel in road transport replaced by biofuels in 2020 – a legally binding target
- New European legislation on the use of renewable energy sources in heating and cooling
- National Action Plans on how to achieve the targets
Why a specific policy for biofuels?

- Dependency on oil highest in transport
- Biofuels the only direct substitute available *now* on large scale
- Fastest *increase* of CO2 emissions in transport

Benefits from biofuels

- Security of supply – diversification on energy sources
- Reduction of CO2 emissions
- Stimulate technological development
- Rural development and employment

Measures

- EU-wide common target
- Member States choose their mix of policy instruments
- Reporting on progress
- EU support: research, energy crops, bioenergy measures in rural development programmes
A range of measures:

- Tax reductions or exemptions for biofuels
- Tax reductions or exemptions linked to a quota system
- Biofuels obligations for fuel suppliers or filling stations
- Subsidies for energy crop cultivation (45 €/ha EU subsidy)
- Investment support or loans for biofuel production facilities
- Standards for distribution of biofuels
- Flexi-fuel vehicles as part of green public procurement
- Demonstration projects and marketing
- Consumer incentives including free parking, no congestion charge
Biofuels in EU Member States
% of road transport fuels 2003-2005
Production of biofuels in the EU

- **Biodiesel**
- **Bioethanol**

Graph showing the production of biofuels in the EU from 2002 to 2005, with a significant increase from 2004 to 2005 for biodiesel.
Biodiesel production in the EU

- 2005: biodiesel 80% of EU biofuels use
- 55% of the car fleet runs on diesel
- Rapeseed the main feedstock

**EU-25 biodiesel production and production capacity**

**EU-25 rapeseed oil consumption**

- Total consumption
- Food sector
- Non-food (mainly RME biodiesel)
Bioethanol production capacity in the EU

**Number of production plants**

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007*</th>
<th>2008*</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU-25</td>
<td>13</td>
<td>17</td>
<td>23</td>
<td>38-49</td>
<td>47-63</td>
</tr>
<tr>
<td>Spain</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>France</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>9-10</td>
<td>11-12</td>
</tr>
<tr>
<td>Germany</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>5-6</td>
<td>5-8</td>
</tr>
<tr>
<td>Sweden</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Poland</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>4</td>
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</tbody>
</table>

*estimates

**Average capacity utilisation rate:**

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>89%</td>
<td>65%</td>
<td>68%</td>
</tr>
</tbody>
</table>
Feedstocks for EU biofuels

Bioethanol:

- EU grown cereals the main feedstock
- Limited quantities of EU grown sugar beet
- Imported ethanol produced from sugar cane
- In the future: cellulosic ethanol from straw and wastes

Biodiesel:

- Domestically grown rapeseed the main feedstock
- Smaller quantities of imported soy and palm oil
- In the future: second generation diesel mainly from farmed wood
### Feedstocks for biofuels: current land use

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>On set-aside area, of which</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Rapeseed</td>
<td>0.9</td>
<td>0.6</td>
<td>0.9</td>
</tr>
<tr>
<td>With energy crop premium, of which</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Rapeseed</td>
<td>0.5</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>Without specific support (estimated)</td>
<td>0.3</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td>Total area</td>
<td>1.2</td>
<td>1.4</td>
<td>2.6-2.8</td>
</tr>
</tbody>
</table>

▶ Energy crops: about 3% of the EU-25 arable area
Feedstocks for biofuels: share of different crops

- **Rapeseed**: 58% (2006 estimation), 38% (2004), 41% (2005)
- **Cereals**: 1.5% (2004), 0.4% (2005), 5% (2006 estimation)
- **Sugarbeet**: 0.8% (2004), 1.5% (2005), 5% (2006 estimation)
- **Wine alcohol**: 0% (2004, 2005), 5% (2006 estimation)
If the 5.75% target reached by 2010

- **Biofuels production:** 24 million t replacing 18.6 million t of fossil fuels
- **16-18 million ha of agricultural land needed**

Total agricultural area (EU-25): 103.6 million ha

- **About 18% for biofuels if all crops produced in the EU**

Possibilities for increasing supply:

- Cereals stocks
- **Obligatory set-aside:** about 4 million ha
- **Not cultivated land:** 3.2 million ha
- **Export diversion**
- **Productivity increases**
The EU pursues a **balanced approach to domestic production and imports**

- **Overall level of imports still limited**
  - Ethanol (ethyl alcohol, mainly from Brazil): about 6-fold increase 2001 → 2005
  - Biodiesel: trade very limited until now

- **2020 vision (10% target):**
  - biomass/biofuels imports likely to be an important part of EU consumption (possibly up to 30%)
  - significant capacity to increase ethanol production, but limited possibilities to add biodiesel production
  - imports of biodiesel and/or biodiesel feedstocks bound to increase with large-scale consumption
2020 scenarios: mix of biofuels (Mtoe)

- Ethanol from sugar cane
- Soy for biodiesel
- Palm for biodiesel
- Rape for biodiesel
- Palm for biodiesel
- Biodiesel from rape
- Ethanol from maize
- Ethanol from wheat
- Ethanol from sugar beet
- BTL from farmed wood

Imports

EU product.

7% share of biofuels

14% share of biofuels
### 2020 scenarios: EU-25 arable land use (million ha)

<table>
<thead>
<tr>
<th></th>
<th>7% share of biofuels</th>
<th>14% share of biofuels</th>
</tr>
</thead>
<tbody>
<tr>
<td>rape for biodiesel</td>
<td>2.7</td>
<td>2.6</td>
</tr>
<tr>
<td>cereals for bioethanol</td>
<td>4.6</td>
<td>8.3</td>
</tr>
<tr>
<td>sugar beet for bioethanol</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>farmed wood or straw (BTL)</td>
<td>0</td>
<td>6.9</td>
</tr>
<tr>
<td>TOTAL LAND FOR BIOFUEL PRODUCTION</td>
<td>7.6</td>
<td>18.3</td>
</tr>
<tr>
<td>non-biofuel arable production</td>
<td>84.8</td>
<td>80.8</td>
</tr>
<tr>
<td>idle arable land (set-aside)</td>
<td>7.7</td>
<td>3.4</td>
</tr>
<tr>
<td>TOTAL ARABLE LAND</td>
<td>100.1</td>
<td>102.5</td>
</tr>
</tbody>
</table>
## 2020 scenarios: Price effects of biofuel promotion

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Average price 2006 (€/t)</th>
<th>Price change relative to 2006 average</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td>7% scenario</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14% scenario</td>
</tr>
<tr>
<td>common wheat</td>
<td>124</td>
<td>123 (-1%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>131 (+6%)</td>
</tr>
<tr>
<td>rape meal</td>
<td>109</td>
<td>69 (-37%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>63 (-42%)</td>
</tr>
<tr>
<td>rape oil</td>
<td>654</td>
<td>672 (+3%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>737 (+13%)</td>
</tr>
<tr>
<td>soy meal</td>
<td>170</td>
<td>119 (-30%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>104 (-39%)</td>
</tr>
<tr>
<td>soy oil</td>
<td>484</td>
<td>693 (+43%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>745 (+54%)</td>
</tr>
<tr>
<td>wood oil</td>
<td>change relative to no biofuel</td>
<td>-1.5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-3%</td>
</tr>
<tr>
<td>glycerine</td>
<td></td>
<td>No expected price effect</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No expected price effect</td>
</tr>
</tbody>
</table>

Source for 2006: Oil World (for rape and soy); European Commission (for wheat)
Source for 2020: ESIM results except oil price effect estimated by Commission services on the basis of elasticities from Cooper (2003).
Challenges for biofuels policy

- Ensuring that the *field-to-wheels* environmental impact of biofuels is globally positive
- Impact on food and feed markets
- R&D to encourage development of 2\textsuperscript{nd} generation biofuels
  - Diversification of feedstocks
  - Improve cost-efficiency
- Stable policy environment for the industry to develop
Thank you for your attention