ESSP Workshop
Bioenergy and Earth Sustainability

European Biofuel market

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key messages

Biofuel market development

- Increasing biofuel production in Europe due to the favorable political frame conditions
  → strong influence of tax exemptions and reductions

Economic aspects

- Biofuel production costs are dominated by feedstock costs as well as capital related costs
  (efficiency and availability of high importance) → in future feedstock costs/prices are expected to increase, also due to an increasing trade of biomass and higher demand for bioenergy → resulting in increasing fuel market prices

Environmental aspects

- The Environmental and social aspects of biofuels are strongly discussed in the EU
  → Sustainability criteria for biofuels will be implemented in future directives in Europe esp.
    with focus on:
    • a the sustainable biomass production,
    • GHG mitigation potentials of biofuel pathways
Introduction

Projections on transportation fuel demand

Source: IE Leipzig, 2007, data base e.g. IEA, 2006
Introduction

Targets for biofuels

Energy policy targets

General targets on biofuels

- Superior targets within the framework of sustainability
- Production of biofuels that are (i) technical efficient at achieving emission standards, (ii) economic efficient with (iii) high GHG mitigation potential
- Integration of biofuels production system into regional existing technical biomass potentials
- Implementation of a reasonable mix of promising biofuels into the energy system under consideration of the defined sustainability criteria and the existing infrastructure (fuel distribution and use)
Bioethanol and biodiesel market

Bioethanol production worldwide

North-/Central America
19.97 mn t (45.5%)

South America
20.28 mn t (46.2%)

Europe
1.45 mn t
(3.4%)

Asia
1.52 mn t
(3.6%)

Afrika
0.51 mn t (1%)

Oceania
0.14 mn. t
(0.3%)

Data sources: Ethanol industry outlook RFA, 2008
Bioethanol and biodiesel market

Biodiesel production worldwide

North / Central America
1.8 mn t (21%)

South America
0.9 mn t (11%)

Europe
4.9 mn t (58%)

Africa
0.05 mn t (0.6%)

Asia / Pacific
0.8 mn t (9.4%)

Bioethanol and biodiesel market

Biofuels production in the EU

Biofuel production EU [mn t/a]

## Policy instruments for promoting biofuels

### Overview Europe

<table>
<thead>
<tr>
<th>TAX REDUCTION MEASURES</th>
<th>OBLIGATIONS</th>
<th>BOTH</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Base</strong></td>
<td></td>
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<tr>
<td>Directive EC 2003/96 on Energy Taxation</td>
<td>Directive EC 2003/30 Some member states: obligation to blend biofuels with petroleum fuels, while others have passed legislation to do so in the coming years</td>
<td></td>
</tr>
<tr>
<td>In 07/2007 16 member states notified tax system to EC; exemptions and reductions limited to a max. of six years, but may be renewed</td>
<td>Some member states: obligation to blend biofuels with petroleum fuels, while others have passed legislation to do so in the coming years</td>
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<tr>
<td><strong>Current</strong></td>
<td></td>
<td></td>
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<tr>
<td>UK, Italy, Sweden, Belgium, Spain, Denmark, Poland, Cyprus, Estonia, Hungary, Ireland, Latvia, Malta, Portugal, Slovakia, Slovenia</td>
<td>Austria, Lithuania, Netherland</td>
<td>France, Germany</td>
</tr>
<tr>
<td><strong>Future</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweden, Cyprus, Estonia, Hungary, Ireland, Latvia</td>
<td>UK, Netherlands, Italy, Czech Rep., Slovakia, Austria, Lithuania, Hungary, Slovenia</td>
<td>Germany, Belgium, Poland, France, Portugal, Spain</td>
</tr>
</tbody>
</table>

Sources: EU Member States Reports, Crop Energies, 2008, IISD, 2007
Policy instruments for promoting biofuels

Overview Europe


- Roadmap for the future development of renewable energy within the EU
- Commitment on obligatory targets for the use of renewable energy (10% in the transport sector)
- Development of criteria to ensure the sustainability of biofuels


- Target: reduction of air pollution and GHG-Emissions in the transport sector
- Fuel producers have to monitor the GHG-Emissions along the whole production chain (from 2009)
- Annually GHG-Reduction by 1% (from 2011)

→ This could lead to price benefits for biofuels with a high GHG-mitigation potential
Biodiesel feedstock – market projections

Economic aspects

Biodiesel feedstocks – price development

Source: ZMP, 2008
Economic aspects

Bioethanol feedstocks – wheat market

Data sources: TOEPFER INTERNATIONAL, 2007
Economic aspects

Bioethanol feedstocks – wheat prices

Development of wheat prices, CBOT
[USD/cwt] (27.22 kg/bu)

Since sustainability has become a major issue in the field of bioenergy (esp. in biofuels policy) the sustainable production of biomass for energetic use is planned to be implemented in legal regulations, e.g.:

- EU Directive (proposal) on the promotion of the use of energy from renewable sources,
- German biomass sustainability decree (proposal).

Both directives define requirements for the production of biomass and the production of biofuels (as one aspect of energetic biomass use)
**Policy instruments**

**Requirements on biomass for bioenergy production**

<table>
<thead>
<tr>
<th>Requirements on the production of the biomass used</th>
<th>EU DIRECTIVE (PROPOSAL)</th>
<th>BIOMASS SUSTAINABILITY DECREE (PROPOSAL), (GER)</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Biofuels shall not be made from raw material obtained from land that had one of the following statuses in January 2008:</td>
<td>▪ Sustainable cultivation of agricultural areas (e.g. cross compliance)</td>
<td>▪ Requirements to safeguard natural habitats</td>
</tr>
<tr>
<td>▪ a) Wetlands including peatland;</td>
<td>▪ b) forest,</td>
<td>▪ c) permanent grassland</td>
</tr>
<tr>
<td>Requirements on the minimum GHG mitigation potential</td>
<td>35% from 2009</td>
<td>30% from 2009, 40% from 2011</td>
</tr>
</tbody>
</table>
Environmental aspects

GHG emissions – default values under discussion

Default values for GHG mitigation potentials in kgGHG/GJ_fuel
Thank you for your attention

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