European Union Policy Promoting Bioenergy

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Overview of Presentation

• EU Bioenergy policy and legislation: the new renewable energy directive

• Addressing needs for technology development

• The SET-Plan and the European Industrial Bioenergy Initiative

DIRECTIVE 2009/28/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 23 April 2009

on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC

(Text with EEA relevance)

• Binding national targets 20 % share of RES in final energy consumption, 20 % increase in energy efficiency
• 10% renewable energy target in transport
• Sustainability criteria and monitoring for biofuels; harmonised approach with Fuel Quality Directive

The Timetable:

- **25 June 2009**: Entry into Force
- **June 2010**: National Action Plans Ready
- **December 2010**: National Legislation implemented
- **2020**: 20% targets achieved - 10% for renewables in transport (per country)

(January 2017): Step increase in CO$_2$ savings for biofuels)
Biofuels sustainability scheme & monitoring

- Applies to single consignments of biofuel
- Single EU scheme (not national)
- Applies to both EU production and imports
- System for biofuels and bio-liquids included in directive, review for other forms of bioenergy by end of 2009
- Accompanied by monitoring rules in the EU and third countries
Greenhouse gas impact - biofuels

- **Sustainability criterion:**
  - Minimum requirement for GHG saving, relative to fossil fuel, of at least 35%*; rising to 50% in January 2017; and 60% in January 2018 for new installations commissioned after start of 2017.

  - *For plants operating in Jan 2008, start in April 2013.

- Rules for calculation of GHG saving (Article 19)

- Use of default values to reduce administrative burden
## GHG savings for biofuels in the RED

<table>
<thead>
<tr>
<th>Biofuel Type</th>
<th>Typical saving</th>
<th>Default saving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugar beet ethanol</td>
<td>61%</td>
<td>52%</td>
</tr>
<tr>
<td>Wheat ethanol</td>
<td>45%</td>
<td>34%</td>
</tr>
<tr>
<td>Sugar cane ethanol</td>
<td>71%</td>
<td>71%</td>
</tr>
<tr>
<td>Rape seed biodiesel</td>
<td>45%</td>
<td>38%</td>
</tr>
<tr>
<td>Palm oil biodiesel*</td>
<td>62%</td>
<td>56%</td>
</tr>
<tr>
<td>Biogas from waste</td>
<td>80%</td>
<td>73%</td>
</tr>
<tr>
<td>Biogas from wet manure</td>
<td>84%</td>
<td>81%</td>
</tr>
<tr>
<td>Wheat straw ethanol</td>
<td>87%</td>
<td>85%</td>
</tr>
<tr>
<td>Farmed wood ethanol</td>
<td>76%</td>
<td>70%</td>
</tr>
<tr>
<td>Waste wood F-T diesel</td>
<td>95%</td>
<td>95%</td>
</tr>
<tr>
<td>Farmed wood F-T diesel</td>
<td>93%</td>
<td>93%</td>
</tr>
</tbody>
</table>

* Calculation based on emissions for cultivation/harvesting, transport and the conversion process, but excluding land use change: comparison is fossil fuel
2nd Generation Biofuels under the RED

(Art. 21.2): Biofuels from wastes, residues, non-food cellulosic material and ligno-cellulosic materials will count double towards national renewable energy obligations placed on operators, and the target for energy from renewable sources in all forms of transport.
Grid Access for Electricity/Gas/Heat

(Art. 16.1): requirement to develop transmission and distribution grid infrastructure, intelligent networks, storage facilities and the electrical system, to accommodate the growing production of renewable electricity (i.e. facilitating grid connections)

(Art. 16.10): common rules for the natural gas grid - gas quality, odorisation and pressure - published connection tariffs for injection of renewable gas sources

(art. 16.11): requirement to assess need for infrastructure for district heating and cooling from renewable sources
## Reaching the Bioenergy targets in the EU

<table>
<thead>
<tr>
<th>Category</th>
<th>2006</th>
<th>2010 target</th>
<th>2020 target</th>
</tr>
</thead>
<tbody>
<tr>
<td>All renewables:</td>
<td>7%</td>
<td>12%</td>
<td>20%</td>
</tr>
<tr>
<td>Biofuels:</td>
<td>1%</td>
<td>5.75%</td>
<td>up to 10%</td>
</tr>
<tr>
<td>Green electricity:</td>
<td>15%</td>
<td>21%</td>
<td>(no sectoral target)</td>
</tr>
<tr>
<td>Heating/cooling:</td>
<td>9%</td>
<td>none</td>
<td></td>
</tr>
<tr>
<td><strong>Biomass:</strong></td>
<td>71 Mtoe</td>
<td>150 Mtoe</td>
<td>195 Mtoe</td>
</tr>
<tr>
<td><strong>Green electricity:</strong></td>
<td>18 Mtoe</td>
<td></td>
<td>62 Mtoe +44</td>
</tr>
<tr>
<td><strong>Biofuels:</strong></td>
<td>3 Mtoe</td>
<td></td>
<td>43 Mtoe +40</td>
</tr>
<tr>
<td><strong>Heating:</strong></td>
<td>50 Mtoe</td>
<td></td>
<td>90 Mtoe +40</td>
</tr>
</tbody>
</table>
What is the role of technology innovation?

Do we have reliable technologies to address the demands posed by legislation on the Bioenergy industry?

Do we have the appropriate technologies to develop new energy crops?

Which conversion technologies need financial support?
Status of Processes

Market Potential
- Low
- Medium
- High

Technology Strength
- Strong
- Average
- Weak

Processes:
- MSW Landfill
- MSW Incineration
- Biofuels 1G
- Anaerobic D.
- Cofiring
- Combustion CHP
- Adv Steam C
- Biorefineries
- BIGCC
- Flash Pyrolysis
- Biomethanol
- Gasification
- Ligno-c. ethanol
- Synthetic Fuels
- Biohydrogen
- Adv. Biofuels
- Synthetic Fuels

Should we pick the winners?
Do we have the necessary funds between industry & government for the development needs?
Support to Research:
FP7 Calls: Strategy for Biofuels: 2007-2010

1G Biofuels
2G Synthetic Biofuels
2G Hydrogenated oils

1G Biomethane
2G Ligno-Cel. Ethanol

Biorefineries

Biofuels from Algae

EC Support 22 M€
EC Support 35 M€
EC Support 57 M€; TREN 15 M€

Total DG TREN support in first 3 calls = 72 M€
Implementation Measures: The SET-Plan

• Joint strategic planning
  - Steering group + Information System

• Effective implementation:
  - European Industrial Initiatives: strategic technology alliances.
  - European Energy Research Alliance
  - Trans-European Energy Networks and Systems of the Future
  - Transition planning

• Increase in resources, both financial and human.
• International cooperation
The European Industrial Bioenergy Initiative

- Under preparation in coordination with the Biofuels Technology Platform and other Biomass Associations

- Expected total recommended budget in the range of 6-8 billion €

- EC estimation at about 8 billion €

- Value chain cost 300 M€, 2nd & 3rd plant 15% less

- Development of bio-resources (crops & waste) 1 billion €
European Industrial Bioenergy Initiative (EIBI)

Value Chains:

1. Synthetic fuels/hydrocarbons via gasification
2. Synthetic natural gas via gasification
3. Higher efficiency power generation via gasification
4. Intermediate bioenergy carriers via thermochemical processes
5. Ethanol and higher alcohols from carbohydrates
6. Renewable hydrocarbons from carbohydrates via biological and/or chemical processes
7. Bioenergy carriers from CO₂ and sunlight through micro-organisms and up-grading to transport fuels and valuable bio-products
FP7 Ongoing Project - EC Support 7.8 M€

OPTFUEL Contract Consortium led by VW

The CHOREN pilot plant
FP7 Ongoing Project - EC Support 8.2 M€

BIO DME Contract Consortium led by VOLVO

Chemrec’s DP-1 Development Plant

SmurfitKappa kraft mill
FP6 Ongoing Project – 3.2 M€
Synthetic Bio Methane

Based on the Güssing ICFB technology

Biomethane will be used in transport (buses) and fed into a NG pipeline.

Co-processing biomethane with natural gas
The BIOMAP project, financed by the EC FP7, has been designed as a visual navigable dissemination and mapping tool for Biofuels production and use in Europe and beyond. BIOMAP tool is based on the use of electronic maps (such as Google Maps) and combined with a navigational structure linking interrelated entities. It maps activities on biofuels projects across different sectors and programmes, for example: Bioethanol, Biodiesel, European Commission Framework Programmes, National Programmes. It also incorporate mechanisms to enable a synthesis of information displayed on selected maps, for example a calculation of total funding across the projects located in a particular geographical region or a specified timeframe (e.g. period 2003-2005, or duration of FP6).
Summary

The Commission considers that the project portfolio under FP7 forms a good basis of the European Industrial Bioenergy Initiative.

The support provided by:

• the political framework of the RES Directive, and
• the implementation of the European Industrial Bioenergy Initiative

will ensure market deployment of all bioenergy technologies, including 2nd generation biofuels technologies.
Thank you for your attention