Big East Mobilization Campaign

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Riga - Latvia

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Report on the current situation and prospects of frame conditions for biogas technology in Germany and Europe

GERBIO ...

... is a German non-profit association
... was founded in 2001
... promotes sustainable closed-loop approaches as well as sustainable crop rotation systems
... opposes mono-cultures and GMO crops
... supports practitioners with its knowledge and its worldwide network

Focus points

- BIOGAS
- Plant oil utilisation
- Woodgas utilisation
- Manure management
- Decentralised wastewater treatment (ecosan)

GERBIOs activities

- Knowledge transfer (seminars and trainings)
- Individual consultation
- Contacts to experts in planning, design and construction
- Contacts to companies
- Contact and networking to members in the different regions

Technological Overview

Gaseous biofuels options:
- Fuel gas (CH₄, CO, H₂, ...)
- Gasification
- Biogas (CH₄)
- Waste water treatment
- Landfill gas
- Livestock husbandry
- Energy crops
- Biowaste
**Potentials of Biogas Technology**

1. Biomethane is like natural gas - but home produced
   - like natural gas - but supply secure
   - like natural gas - but permanently economical

2. Potential:
   - 10 Bl. cubic meter from 10% of the agricultural area
     - through optimisation possibly: 100.000 kWh / ha
   - 16 Bl. Cubic meter Biomethane (half of the imports from Russia)
   - up to 17% of the German Power Production
   - up to 28% of the German Natural Gas Consumption
   - up to 35 % of the German Traffic Fuel Consumption

3. Energy Crops have the largest Fraction in the Potential

4. First Successes in biogas specific Energy Crop production

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**Key Figures in the Development of the German Biogas Industry**

<table>
<thead>
<tr>
<th>Year</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of Plants</td>
<td>2000</td>
<td>3500</td>
<td>5710</td>
<td>3000</td>
<td>4100</td>
</tr>
<tr>
<td>Installed capacity</td>
<td>650</td>
<td>1100</td>
<td>1270</td>
<td>1400</td>
<td>1600</td>
</tr>
<tr>
<td>Electrical energy (TW h/a)</td>
<td>2.8</td>
<td>&gt; 5</td>
<td>7.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fractions in German electricity production</td>
<td>0.8%</td>
<td>&gt; 1%</td>
<td>1.4%</td>
<td>1.60%</td>
<td>1.70%</td>
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<tr>
<td>Turnover of Industry (Mio €)</td>
<td>0.6</td>
<td>1.65</td>
<td>0.5</td>
<td>1.05</td>
<td></td>
</tr>
<tr>
<td>Turnover of Operators (Mio €)</td>
<td>330</td>
<td>650</td>
<td>700</td>
<td>950</td>
<td></td>
</tr>
<tr>
<td>Fractions in export</td>
<td>8%</td>
<td>12%</td>
<td>&gt; 15%</td>
<td>&gt;20%</td>
<td>25%</td>
</tr>
<tr>
<td>Employment</td>
<td>5000</td>
<td>10000</td>
<td>10000</td>
<td>10000</td>
<td></td>
</tr>
<tr>
<td>CO2 Reduction Min. t/a</td>
<td>6.4</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Source: Fachverband Biogas e.V. and own data

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**Energy Crops have the largest Fraction in the Potential**
Example Process chain for the digestion of biowaste

- Reception of biowastes → closed chamber with odour treatment
- Preparation → Chopping and sorting of disturbing materials
- Fermentation with post treatment
- Hygienising, separation
- Compost, liquid fertilizer

Biogas from Food Waste and Agricultural Slurry

- Fermentation
- Compost, liquid fertilizer

Economy of biowaste treatment plants:
- Income of gate fees and energy sales
- Higher technological standard → high investment costs
- Higher approval conditions → higher costs
- Examination and testing costs
- No agricultural subsidies
- Restricted spreading possibilities

Digester Systems

- Wet Fermentation
  - Completely mixed digester
  - Plug flow digester

- Dry Fermentation
  - Plug flow digester
  - Garage type batch digester

Concrete digester with double membrane cover

Advantages:
- Simple digester repair
- Integrated gas holder
- Well weather proofed
- Easy indication of gas yield

Disadvantages:
- More expensive than one cover
- Not 100% gastight
- Permanent energy consumption through air fan
**Stainless steel digester**

Lipp Fermenter  Ligavator Biomassanspeicher

**Horizontal digester with paddle stirrer**

**Advantages:**
- Digesting high solids content
- High loading rate possible
- Little short cut flow
- Automatic sand drain
- Complete mixing
- High digester productivity
- Suitable for dry digestion

**Disadvantages:**
- High price
- Only possible with after digester
- Limited in size

**Horizontal digester with paddle stirrer**

Steel or Concrete

**“garage type” digester**

Dry Fermentation System for Biomass over 20% DS

**Principal Function**

- New EEG is in place with focus on efficiency, ecology and emission reduction
- New biogas grid feed in regulations are in place since March 2008
- More incentives for on farm biogas plants and waste treatment
- 20 projects for grid injection in the planning phase, 13 are in place
- Aim of Federal Government of 10% Biogas in the natural gas grid by 2030
### New EEG and compensation for Energy utilisation from biogas

<table>
<thead>
<tr>
<th>Installation location</th>
<th>EEG (2007) (€/kWh)</th>
<th>EEG (2010) (€/kWh)</th>
<th>Difference (€/kWh)</th>
<th>Eligibility for EEG compensation</th>
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<tbody>
<tr>
<td>Grundvorganlage</td>
<td>10.87</td>
<td>11.87</td>
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<td>ja</td>
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<tr>
<td>100/750 kW</td>
<td>0.50</td>
<td>1.00</td>
<td>1.00</td>
<td>ja</td>
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<tr>
<td>Wassertisch-Block</td>
<td>0.25</td>
<td>0.25</td>
<td>0.50</td>
<td>ja</td>
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<tr>
<td>Silo-Block</td>
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<td>0.00</td>
<td>0.00</td>
<td>ja</td>
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<tr>
<td>KWK-Block</td>
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<td>0.00</td>
<td>ja</td>
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<tr>
<td>Technologie Block</td>
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<td>0.00</td>
<td>ja</td>
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<tr>
<td>Landwirtschaft-Block</td>
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<td>0.00</td>
<td>0.00</td>
<td>ja</td>
</tr>
<tr>
<td>Total</td>
<td>169.30</td>
<td>169.30</td>
<td>0.00</td>
<td>ja</td>
</tr>
</tbody>
</table>

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### Thank you for your Attention!

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