Markets for the commercial use of biomass for heat and power generation – the cases of Bulgaria, Rumania and Turkey

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AGENDA

- Turkey
- Romania
- Bulgaria
Forests in Turkey

Forest holdings mainly state forests. Areas in East and South where deforestation took place – Sometimes soils are degraded

Forests cover 21.2 Mha in Turkey

source: GDF
Forst-based Biomass in Turkey

Annual Volumes of harvested wood is growing but the potential is higher. Private investors are needed!

source: Pöyry

source: GDF
Agriculture in Turkey

The Agricultural Sector is in a professionalization process. Smaller Holdings get in the Eastern regions transferred into bigger combines.

- Typically small farm
- privately owned
- approximately 3 million agricultural holdings
- agricultural holdings (67 %) are mixed farms with crop production & livestock production

Source: GLC2000
Agricultural commodities in Turkey

Crops volumes are declining the last years but Turkey is still a big producer for Agricultural Commodities - Turkey was the 11th largest producer of wheat worldwide. The Residues are big potential for Bioenergy usage.

Other Agri-commodities:
- hazelnut, cherry, fig, apricot, quince and pomegranate
- watermelon, cucumber
- chick peas, tomatoes, eggplants, green pepper, lentil, pistachio
- onions, olives (rank 4)
- sugar beet (rank 5)
- cott seed, grapes, tobacco, tea, apples (rank 6)
- barley (rank 7)
- sunflower seed (rank 10)

Source: FAOSTAT
Overview of Developments in Turkey

Bioenergy is under development in Turkey. Investment opportunities in the Raw Material Sourcing and in the technology

<table>
<thead>
<tr>
<th>Raw Material</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Forestry</td>
<td>• CHP</td>
</tr>
<tr>
<td>• Infrastructure</td>
<td>• Green Field Investments</td>
</tr>
<tr>
<td>• Forestation of unused and degraded lands</td>
<td>• Co-firing of Biomass in Coal Plants</td>
</tr>
<tr>
<td>• Agriculture</td>
<td>• Pellets</td>
</tr>
<tr>
<td>• Restructuring of small Farm holdings -&gt; combines</td>
<td>• Plants based on short Rotation</td>
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<td>• Short Rotation on unused land</td>
<td>• Biogas</td>
</tr>
<tr>
<td>• Development of Business of Residues</td>
<td>• Cities - based on Biowaste</td>
</tr>
<tr>
<td>• Waste</td>
<td>• Rural Areas – based on Manure</td>
</tr>
<tr>
<td>• Waste Management systems – Seperation in Biowaste Collection</td>
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</tbody>
</table>

Collection
Land use in Bulgaria and Romania

Agriculture and Forestry in Bulgaria and Romania are developed but need improvements along the Supply chain.
### Status quo and Development in Biomass Sourcing in Bulgaria and Romania

Agriculture and Forestry in Bulgaria and Romania are developed but need improvements along the Supply chain.

#### Forestry
- Infrastructure in the Supply Chain (Lack of technical equipment for the collection and transportation of Forest Residues - collection manually)
- The prices for wood vary widely
- The organisation of wood yield and transportation is under the supervision of the State Forest Department
- No synergy between the Ministries to develop Forestry Infrastructure
- No Unified Approach of energy utilisation of wood in the Forestry Law
- Unregulated logging is a serious problem and state authorities are struggling to regulate the situation
  - No training/educational courses exist for this sector to develop

#### Agriculture
- Difficulty to provide a stable mid to long term price of Solid Agricultural Waste (SAW)
- Mid to long term risk for changes in the agricultural production to occur
- Over 80% of farm land is privately owned
- Lack of know how and expertise in Biomass from Agricultural
- Short Rotation (Popular and Salix) under Development

#### Waste
- Currently constructing new landfills with funds provided by EU on municipally owned land
- Lack of legal commitment to reduce the country’s physical waste and emissions from landfill gas
- Separate municipal waste collection has only recently been established.
- Due to the delayed construction of new landfill sites and lacking funds there is a lack in the development of project for waste utilisation
- Lack in expertise and know how in the energy utilisation of domestic wastes
# Development in Biomass Technology in Bulgaria and Romania

## Technology

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<th>CHP</th>
<th>Pellets</th>
<th>Biogas</th>
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<tr>
<td>• No specialised biomass boilers are currently in use for the</td>
<td>• Due to cross subsidising of the energy sector the cost of pellets</td>
<td>• No major investments into biogas plants has been made in last years</td>
</tr>
<tr>
<td>combustion of wood, resulting in a low energy efficiency factor of</td>
<td>and briquettes are very high and are therefore mostly exported</td>
<td>• Imported components from the EU-15 for biogas plants are expensive</td>
</tr>
<tr>
<td>energy conversion</td>
<td>• Usage of Pellets from Agricultural Residues (Sunflower Hulisk)</td>
<td>• The current stimulus in place for the selling of electricity from</td>
</tr>
<tr>
<td>• No specialised boilers for the combustion of agricultural</td>
<td>• Imported equipment (e.g. from Denmark) is expensive and thus not</td>
<td>biogas and green certificates is not strong enough</td>
</tr>
<tr>
<td>residues – Investments in this field running</td>
<td>not attractive to investors</td>
<td>• Investments in the combustion of Landfill gas are running – More</td>
</tr>
<tr>
<td>• The National Long-Term Program to Encourage the Use of Biomass</td>
<td>• The seasonal yield requires the construction of storage/warehouses</td>
<td>investments could be applied with the attraction of Private Investors</td>
</tr>
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<td>has made efforts to set prices for biomass (including wood),</td>
<td>(creating costs)</td>
<td>• Biogas based on Biowaste will be increasing with the investments</td>
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<td>however does not have the necessary instruments at hand to</td>
<td></td>
<td>in the Waste Management (incl. Collection and Separation)</td>
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<td>implement its targets.</td>
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Overview of Developments in Bulgaria and Romania

Bioenergy in Bulgaria and Romania developed but still opportunities in Supply Chain and New Economy of Scale Technology

Raw Material

- Forestry
  - Infrastructure
  - Investment along the Supply Chain

- Agriculture
  - Short Rotation
  - Development of Agricultural Residues Usage

- Waste
  - Waste Management systems – Separation in Biowaste Collection

Technology

- CHP
  - Plants in Economy of Scales based on Agricultural residues

- Pellets
  - Agricultural Residues (Sunflower Hulsk etc.)

- Biogas
  - based on Biowaste and Landfill Gas