The Technical Overview of Biomass Energy Production in Serbia

Vojislav Milijić
National Biomass Association
SERBIO

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Content

1. Potential vs. realized projects
2. Investments in Biomass energy in Serbia
3. Biomass supply and logistics
4. Conclusions
1. Potential vs. realization

wood biomass

2. Biomass utilization in Serbia

<table>
<thead>
<tr>
<th>Potential vs. realization</th>
<th>Realization (2015):</th>
</tr>
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<tbody>
<tr>
<td><strong>Potentials:</strong></td>
<td>Operational CHPs – 0</td>
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<td>Financing possibilities – exist</td>
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### Wood biomass 1.53Mtoe
### Agriculture biomass 1.7Mtoe
### Total – 3.3Mtoe

**Biomass 64% of all renewables**

**Realization (2015):**

- Operational CHPs – 0
- CHPs with energy permit – 1
- Operational wb based DH – 0
- Operational power plants
- Industrial users – several
- Pellet factories – over 50
- Biomass users – several millions
- Using firewood inefficiently
- Projects supporting biomass market development – plenty
- Feasibility studies – plenty
- Financing possibilities – exist

### Action plan for renewable energy 2012

### Strategy for energy development of Serbia until 2025 (draft)

### Feed in tariffs:

- **Biomass CHP lower than 1MW = 0.1326 EUR/kWh**
- **Biomass CHP 1-10MW = 0.1382 EUR/kWh**
- **Biomass CHP over 10MW = 0.0822 EUR/kWh**
- **Biogas CHP up to 0.2MW = 0.1566 EUR/kWh**
- **Biogas CHP 0.2-1MW = 0.1649 EUR/kWh**
- **Biogas CHP over 1 MW = 0.1231 EUR/kWh**

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1. Potential vs. realization: Agriculture biomass

Potentials:

1. Biomass Resources & Availability - agriculture

<table>
<thead>
<tr>
<th>Agricultural land area (ha)</th>
<th>5.10</th>
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<tbody>
<tr>
<td>Agr. Land area in total area (%)</td>
<td>58</td>
</tr>
<tr>
<td>Arable land (%)</td>
<td>65</td>
</tr>
<tr>
<td>State/Private (%)</td>
<td>17/83</td>
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<tr>
<td>Corn area/yield (M ha/M tons)</td>
<td>1.26/6.48</td>
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<tr>
<td>Wheat area/yield (M ha/M tons)</td>
<td>0.49/2.01</td>
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<tr>
<td>Sunflower area/yield (M ha/M tons)</td>
<td>0.17/0.43</td>
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<tr>
<td>Soybean area/yield (M ha/M tons)</td>
<td>0.17/0.44</td>
</tr>
<tr>
<td>Sugar bit area/yield (bit M ha/M tons)</td>
<td>0.06/2.82</td>
</tr>
</tbody>
</table>

Estimated agricultural biomass: 1.7 Mtoe

Biomass in total cca. 3.3 Mtoe – 64% of all renewables!

Realization (2015):
Operational CHPs – 0
CHPs with energy permit – 0
Operational wb based DH – 1
Operational power plants industrial users – several
Pellet factories – over 10
Projects supporting biomass market development – some
Feasibility studies – some
Financing possibilities – exist
2. Investing in Biomass Energy in Serbia

Public:
• Public companies
• Cities, municipalities DH – none
• Cities, municipalities – public building heating – several

Private:
• CHPs – several (Serbia, Slovenia, Austria, Italy, etc.)
• DH - PPPs with cities/municipalities, several (Slovenia, Austria, Serbia, etc.)
• Energy production for industry – several (domestic SMEs)

Why to invest (or support investors) - State perspective:
• Increase of RES share - Obligation toward Energy Community
• Competitive feed in tariffs
• Reduction of costs for energy
• Energy independence
• Good biomass utilization potentials

Investors needs:
• Energy uptake – own, guarantied or pre-contracted
• Permissions
• Financing
• Biomass supply:
  • Sufficient biomass quantities and adequate quality
  • Long term biomass supply contract
  • Biomass at competitive price
  • Low costs of biomass delivery

Private companies perspective: PROFIT!

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3. Biomass supply and logistics

Wood biomass

Quantities/quality and contracting wood biomass:

- Wood production in Serbia 4.5-5Mcbm per year + wood industry residues
- State forests:
  - most of wood contracted (pellet, chipboard, firewood, etc.)
  - contract possibility for low quality forest residues
  - Long term contract – possible after several annual contracts or not possible
- Private forests:
  - in some regions over utilized in some underutilized
  - Large scale forest owners – most of wood contracted
  - Small scale unorganized forest owners – hard to contract the wood from individual owners, no forest owners cooperatives, several week associations
- Wood industry:
  - Most of residues utilized by wood processors (energy, production of pellet) or contracted (pellet, chipboard)
- Energy plantations
  - Starting slowly
  - Profitability compared to agricultural production?
  - Inadequately regulated lease of non used state owned agricultural land

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Scandinavian concepts can not be applied in most situations – parts of the concepts can be adapted to certain extent.
3. Biomass supply and logistics
wood biomass

Biomass logistics:

• Very feasible in flat terrains and after regenerative harvest
• High delivery and logistic costs on mountain terrains
• Low quantities of biomass in selective harvest
• Poor forest infrastructure (especially in private forests)
• State and private forests: owners or subcontractors unequipped and skilled for biomass supply
• Inadequate machinery and harvest concept
• Biomass supply is feasible from State forests in some areas of Serbia – southwest, east and southeast and southern part of Vojvodina province – but system of harvest and biomass logistics should be organized adequately and expectation of quantities should be lowered!
• Biomass supply is feasible from private forests in eastern, western and southern parts of Serbia, but owners have to be organized (joint contracts with owners, cooperative or associations) or local operational logistic centers should be organized as link between large number of small scale producers or forest owners and energy producers.

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3. Biomass supply and logistics – BioRES project

- BIORES – Sustainable Regional Supply Chains for Woody Bioenergy”
- Coordinator: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- Partners: European Biomass Association (AEBIOM), Austrian Landeskammer für Land und Forstwirtschaft in Steiermark (LWK Steiermark), German Centrales Agrar-Rohstoff Marketing-und Energie-Netzwerk e.V. (CARMEN), Finnish Luonnonvarakeskus (Luke), Slovenia Energy Agency of Savinjska, Šaleška and Koroška Region (KSSENA), North-west Croatia Regional Energy Agency (REGEA), Bulgarian National Biomass Association (BGBIOM) and Serbian National Biomass Association (SERBIO)
- BioRES project plan is to support establishment of 6-8 BLTCs in Croatia, Bulgaria and Serbia
- Project officially started on 1st of January 2015 and lasts 30 months
- BLTC - regionally or locally organized intermediary between supply and demand
- BLTC existence overcomes market barriers and reduces start up financial risks in wood biomass utilization.

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 645994
3. Biomass supply and logistics
Agriculture biomass
3. Biomass supply and logistics
Agriculture biomass

Biomass logistics:

- Feasible in flat terrains on large agricultural holdings – Vojvodina – private companies and large scale owners
- Potential for CHPs, DHs or especially for energy production in agricultural products processing industry
- Logistic concepts and adequate machinery procurement in development
- Balance between biomass quantities and maintenance of quality of soil!
- Dynamics of agro biomass mobilization – harvest in short period of time, storage throughout whole year!
- Heat value lower than wood, ash content higher, share of Cl exists – new technologies covered the issue but burning technologies are more expensive then for wood biomass
4. Conclusions

- Potentials yes – realization slow
- There is technical and financial support for projects
- Most of issues in wood biomass supply – quantities, contracting and logistics
- Scandinavian concepts for biomass logistic can be applied if amended and adapted to Serbian forest condition
- Wood biomass supply feasible in some areas of Serbia from state and private forests, but adequate model of contracting, harvesting and logistics have to be developed
- Support for BLTCs development in Serbia – BioRES project
- Issues in agro biomass supply – logistics and storage
- Agro biomass supply feasible in most of Vojvodina and parts of northern Serbia
Thank you for your attention!

Contact:
Vojislav Milijić
vojislav.milijic@serbio.rs
+381 62 553 089