Waste Management in Serbia

Doc. Dr Goran Vujic
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• 2. Current waste management in Serbia
• 3. Main EU demands
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1. introduction
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2. Current waste management in Serbia

- 3209 landfills site
- 195,402 citizens are covered by collecting company in Vojvodine + 168,167 no data 17.9% from 2,031,992
- Novi Sad 631 employed cover 400,000 citizen 11.6 miliona EUR tournouver
- Less than 3 euro per house about 30 euro per house per year
<table>
<thead>
<tr>
<th>Volume</th>
<th>Number of Landfills</th>
<th>Total Volume (x 10000 m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1000 m³</td>
<td>2699</td>
<td>60,338178</td>
</tr>
<tr>
<td>1000 - 10,000 m³</td>
<td>697</td>
<td>223,954936</td>
</tr>
<tr>
<td>10,000 - 100,000 m³</td>
<td>137</td>
<td>518,08052</td>
</tr>
<tr>
<td>&gt; 100,000 m³</td>
<td>49</td>
<td>3516,8341</td>
</tr>
</tbody>
</table>
Waste Management in Serbia

Global Methane initiative,

Number of Landfills

Total Volume (x 10000 m³)

- < 1000 m³
- 1000 - 10,000 m³
- 10,000 - 100,000 m³
- > 100,000 m³
# 2. Current waste management in Serbia

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Generated waste (t/week)</th>
<th>Generated waste (kg/inhabitant/daily)</th>
<th>Generated waste (kg/inhabitant/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inđija 49,258</td>
<td>363 t</td>
<td>1.05 kg</td>
<td>383 kg</td>
</tr>
<tr>
<td>Sombor 56,734</td>
<td>269 t</td>
<td>0.67 kg</td>
<td>246 kg</td>
</tr>
<tr>
<td>Novi Kneževac 9,648</td>
<td>40 t</td>
<td>0.59 kg</td>
<td>214 kg</td>
</tr>
<tr>
<td>Šabac 123,155</td>
<td>463 t</td>
<td>0.59 kg</td>
<td>209 kg</td>
</tr>
<tr>
<td>Topola 25,292</td>
<td>51 t</td>
<td>0.29 kg</td>
<td>105 kg</td>
</tr>
<tr>
<td>Kragujevac 185,000</td>
<td>897 t</td>
<td>0.70 kg</td>
<td>252 kg</td>
</tr>
<tr>
<td>Bor 55,817</td>
<td>125 t</td>
<td>0.32 kg</td>
<td>116 kg</td>
</tr>
<tr>
<td>Niš 239,596</td>
<td>1230 t</td>
<td>0.73 kg</td>
<td>266 kg</td>
</tr>
<tr>
<td>Novi Sad 314,192</td>
<td>2560 t</td>
<td>1.16 kg</td>
<td>424 kg</td>
</tr>
<tr>
<td>Beograd 1,392,691</td>
<td>10,382 t</td>
<td>1.08 kg</td>
<td>394 kg</td>
</tr>
</tbody>
</table>
### Republic of Serbia

<table>
<thead>
<tr>
<th>Season</th>
<th>Summer analysis</th>
<th>Winter analysis</th>
<th>Spring analysis</th>
<th>Average</th>
<th>Generated waste (kg/inhabitant/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.226.427 t/year</td>
<td>1.857.598 t/year</td>
<td>2.086.212 t/year</td>
<td>2.056.746 t/year</td>
<td>0.76 kg</td>
</tr>
</tbody>
</table>

#### Generated waste (kg/inhabitant/day)

- Indija: 1.05
- Sombor: 0.67
- Novi Kneževac: 0.59
- Šabac: 0.59
- Topola: 0.29
- Kragujevac: 0.70
- Bor: 0.32
- Niš: 0.73
- Novi Sad: 1.16
- Beograd: 1.08
2. Current waste management in Serbia

- Garden waste: 11.88%
- Other biodegradable waste: 30.96%
- Paper: 7.33%
- Glass: 5.26%
- Cardboard: 7.52%
- Waxed cardboard: 0.98%
- Aluminium-coated cardboard: 0.9%
- Metal – packaging and other: 1.45%
- Metal – aluminium cans: 0.36%
- Plastic packaging waste: 3.99%
- Plastic bags: 6.65%
- Hard plastics: 4.37%
- Nappies: 4%
- Textiles: 5.04%
- Leather: 0.6%
3. Main EU demands

![Landfill directive targets graph]

- Target 1 — 2006
- Target 2 — 2009
- Target 3 — 2016

% of BWMM produced in 1995 that can be consigned to landfill vs. Year

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Global Methane initiative,
3. Main EU demands

- Reduction
- Re-use
- Recycling & Composting
- Energy Recovery
- Disposal
4. Solution

- 12 regional landfill with separation facility or MBT
- Improve system for medical waste collection and sterilization (autoclave)
- **Make system for special streams, Animal, waste oils ...**
- Between 2015 and 2019
- Build more 12 regional landfill
- Increase recycling to 25%
- Cover 100 %
- ---
4. Solution

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Global Methane initiative,
4. Solution

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Global Methane initiative,
4. Solution

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4. Solution

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Global Methane initiative,
4. Solution

Waste Management in Serbia

Global Methane initiative,
4. Solution

Waste Management in Serbia
Global Methane initiative,
4. Waste to Energy as one solution

Processing costs (per 1000 kg, taxes not included)
Erik de Baedts NVRD, ISWA ...

• Landfilling € 20
• Composting € 20
• Digestate € 30
• Incineration € 60-130 → down to....
• Recycling € 80 → market value secondary product
Conclusion

Landfill and Landfill Gas is certain future