The strategic importance of the Southeast US in global biomass trade

The Transatlantic Trade in Wood for Energy: A Dialogue on Sustainability Standards and Greenhouse Gas Emissions
Wednesday 23 October 2013, Savannah, GA, USA

Dr. Martin Junginger
Global woody biomass trade for energy

Trade flows in PJ

Source: Patrick Lamers, 2013, chapter 3, to be published in Junginger, Goh & Faaij
Global wood pellet trade flows 2010-2012

Trade flows in 1000 tonnes

Source: Patrick Lamers, 2013, chapter 3, to be published in Junginger, Goh & Faaij
BaU scenario for wood pellet exports to the EU
(update October 2013)

Source: Junginger, 2013, unpublished

Annual wood pellet production for export to EU (PJ)

- South Africa, industry residues
- Ukraine, industry residues
- Belarus, industry residues
- NW Russia, mix Birch, Spruce, Pine, Aspen and others
- NW Russia, industry residues
- SE USA, plantation thinnings & residues
- SE USA, industry residues
- W Canada, MBP residues
- W Canada, industry residues
- E Canada, industry residues

225 PJ = 13 million tonnes
Three main streams till 2020 which originate directly from the forest

- South East US: Wood pellets from wood from pre-commercial and commercial (i.e. pulp-grade wood) thinnings, as part of thinning operations or as a fraction of a clearcut
- British Columbia, Canada: diseased mountain pine beetle wood
- NW Russia: unmerchantable & pulp-grade aspen, spruce, birch and pine (Vyborgskaya plant)
## Use of woody biomass for energy in the EU

### Solid biomass use in the EU-24+Norway in 2006

<table>
<thead>
<tr>
<th>Source of Biomass</th>
<th>Percentage</th>
<th>PJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest residues (mainly slash, some thinnings)</td>
<td>11%</td>
<td>350 PJ</td>
</tr>
<tr>
<td>Firewood</td>
<td>30%</td>
<td>953 PJ</td>
</tr>
<tr>
<td>Solid industrial wood residues</td>
<td>20%</td>
<td>636 PJ</td>
</tr>
<tr>
<td>Use of refined biomass (e.g. pellets)</td>
<td>5%</td>
<td>159 PJ</td>
</tr>
<tr>
<td>Spent liquors (mainly black liquor)</td>
<td>15%</td>
<td>477 PJ</td>
</tr>
<tr>
<td>Used wood</td>
<td>6%</td>
<td>191 PJ</td>
</tr>
<tr>
<td>Herb. &amp; fruit biomass</td>
<td>7%</td>
<td>222 PJ</td>
</tr>
<tr>
<td>Other solid biomass</td>
<td>6%</td>
<td>191 PJ</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
<td><strong>3178 PJ</strong></td>
</tr>
</tbody>
</table>

For comparison: Total extra EU imports in 2012: 75 PJ

Current use of wood pellets in the EU: examples of 5 different markets

Wood pellet production, import/export and consumption in 2010

- Heat Other
- Heat Domestic
- Heat District heating
- Heat Industrial
- Electricity CHP
- Electricity Co-firing
- Electricity Dedicated
- Domestic production
- Net imported

Based on IEA Bioenergy Trade Task 40 Cocchi et al. 2011

*) assumed 100% for co-firing
## Expected biomass demand by 2020 in NW EU for large-scale industrial use

*Source: Lamers et al, submitted to GCB-Bioenergy 2013*

<table>
<thead>
<tr>
<th></th>
<th>Solid biomass installations*</th>
<th>Co-firing capacity</th>
<th>NPOL scenario (2020)</th>
<th>NREAP projections (2020)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MW&lt;sub&gt;e&lt;/sub&gt; (by 2010)</td>
<td>MW&lt;sub&gt;e&lt;/sub&gt; (by 2012)</td>
<td>MW&lt;sub&gt;e&lt;/sub&gt;</td>
<td>Mtonnes WP&lt;sub&gt;eq&lt;/sub&gt;&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>BE</td>
<td>727</td>
<td>280</td>
<td>910</td>
<td>2.6</td>
</tr>
<tr>
<td>DE&lt;sup&gt;c&lt;/sup&gt;</td>
<td>3,179 -3,650</td>
<td>(n/a)</td>
<td>4,313</td>
<td>13.3</td>
</tr>
<tr>
<td>DK&lt;sup&gt;c&lt;/sup&gt;</td>
<td>1,168</td>
<td>(996)&lt;sup&gt;d&lt;/sup&gt;</td>
<td>1,814</td>
<td>2.9</td>
</tr>
<tr>
<td>NL</td>
<td>992</td>
<td>413-551&lt;sup&gt;e&lt;/sup&gt;</td>
<td>1,306</td>
<td>3.7</td>
</tr>
<tr>
<td>UK</td>
<td>2,097</td>
<td>208-338&lt;sup&gt;f&lt;/sup&gt;</td>
<td>3,895</td>
<td>15.4</td>
</tr>
<tr>
<td><strong>Sum</strong></td>
<td><strong>8,163-8,634</strong></td>
<td><strong>1,897-2,165</strong></td>
<td><strong>12,238</strong></td>
<td><strong>38</strong></td>
</tr>
</tbody>
</table>

* Data provided by MS in their 2010 status reports to the EC for all solid biomass power installations (excluding biogas and bioliquid installations)

b: primary biomass demand in wood pellet equivalent (17.6 GJ / tonne)

c: total installed capacity for solid biomass of all sizes (excluding biogas and bioliquid installations)

d: (DEA, 2012), total installed capacity for solid biomass of all sizes

e: (Agentschap-NL, 2013); the lower value is large-scale installations only, the higher value represents the total installed capacity (i.e. installations of all sizes)

f: (DECC, 2013a); variation between 2011 and 2012 due to partial closure of Tilbury power station (RWE/Essent/npower) after a fire
Shortage of solid biomass? No

- Biomass potentials within the EU are far from depleted. In principle, the entire demand by 2020 could still be met using domestic resources – but at a higher cost
- Agricultural residues (palm kernel shells, corn stover, bagasse, others) could also be imported by the EU, and could provide another significant supply (but these supply chains would largely still have to be developed)
But...

• Sustainability frameworks are under development in a.o. the UK, Belgium, the Netherlands and Denmark and by the EC, which will limit the eligibility of especially non SFM-compliant feedstocks

• Additional demand by 2020 due to 2\textsuperscript{nd} generation biofuel production could be another limiting factor
In summary

• The US SE has become the most important exporter of wood pellets to the EU, and is bound to increase exports further until 2020
• The main importing countries are expected to be the UK, Belgium, the Netherlands and Denmark
• All these countries currently develop sustainability frameworks for solid biomass – of which the impacts on trade flows remain to be seen -> first analysis by Lamers et al. 2013, GCB Bioenergy (forthcoming)
Thank you for your attention!

More information?  
**h.m.junginger@uu.nl**

**IEA Bioenergy Task 40 on sustainable international bioenergy trade:**
**www.bioenergytrade.org**
Draft EC sustainability criteria leaked

Full link: www.endseurope.com/docs/130819a.pdf

Summary (1/2):

• Minimum GHG emission reduction of 60%
• Definition of an harmonized GHG accounting methodology & comprehensive set of default values
• Avoidance of raw material production in areas of high biodiversity / undesirable land use change - > process residues to be excluded (including wood chips form pulp mills?)
Draft EC sustainability criteria

Summary (2/2):

• Building on existing national and international sustainable forest management (SFM) policies, regulations and private initiatives, the establishment of a requirement that forestry biomass is sourced from sustainable forests, including that carbon stocks are maintained or increased

• Criteria only applicable to large biomass installations with capacity of 1 MW$_{e}$/2.5 MW$_{th}$
Some additional observations:

(7) appropriate to follow a differentiated approach for primary, secondary & tertiary resources

(20) Only new biogas plants will have to meet the 60% GHG emission reduction criterion

(17) mass balance method required -> physical link between biomass produced & consumed

(18) encourage voluntary international schemes to provide reliable evidence that criteria are met
Some additional observations:

• (16) and article 4.2: to ensure competitiveness of bio-based economy, MS may apply means to avoid the use of high-quality forest biomass feedstock for energy. Also EC itself may take ‘corrective action’ later-on, ‘including the possibility to restrict the use of high value roundwood as feedstock for electricity & heat’ (only local, or also imported??)

• Article 3.4(a): exception for primary forest when ‘felling or decay of trees is the result of a natural disturbance such as a significant storm, fire or disease’..

• Article 3.5(1): Biomass from Forest wetlands will be excluded
What does that imply? (1/2)

- Proposal largely consistent/complementary to liquid biofuels criteria
- Target of 60% GHG emission reduction against average EU electricity mix/heat should be achievable – also with long-distance supply chains from oversea. Key factors: efficient logistics, no use of fossil fuel for drying & the electricity mix in the producing country
- Clear exceptions possible to use e.g. mountain pine beetle wood from British Columbia
What does that imply? (2/2)

• Clause (16) is officially aiming at preventing competition with other sectors/stimulate cascading, but can be interpreted as a way to delegate (at least in first instance) the issue of carbon debt to the member states.

• If different member states apply different methods/ ‘negative lists of feedstocks’, the whole purpose of having harmonized EU-wide sustainability criteria may be void.