Pulp and paper markets and forecasts

Bernard de Galembert
## Top pulp producers - 2006

<table>
<thead>
<tr>
<th>Country</th>
<th>Mt</th>
<th>06/05</th>
<th>Mt</th>
<th>06/05</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>192.3</td>
<td>+1.9%</td>
<td>Indonesia</td>
<td>5.7</td>
</tr>
<tr>
<td>USA</td>
<td>53.2</td>
<td>+0.5%</td>
<td>Chile</td>
<td>3.6</td>
</tr>
<tr>
<td>Canada</td>
<td>23.7</td>
<td>-7.2%</td>
<td>India</td>
<td>3.2</td>
</tr>
<tr>
<td>China</td>
<td>18.2</td>
<td>+11.3%</td>
<td>Germany</td>
<td>2.9</td>
</tr>
<tr>
<td>Finland</td>
<td>13.1</td>
<td>+17.4%</td>
<td>France</td>
<td>2.5</td>
</tr>
<tr>
<td>Sweden</td>
<td>12.2</td>
<td>+1.1%</td>
<td>S. Africa</td>
<td>2.3</td>
</tr>
<tr>
<td>Brazil</td>
<td>11.3</td>
<td>+7.8%</td>
<td>Norway</td>
<td>2.3</td>
</tr>
<tr>
<td>Japan</td>
<td>10.9</td>
<td>+0.4%</td>
<td>Portugal</td>
<td>2.1</td>
</tr>
<tr>
<td>Russia</td>
<td>7.4</td>
<td>+1.4%</td>
<td>Spain</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Source: RISI, CEPI
## Top paper producers - 2006

<table>
<thead>
<tr>
<th>Country</th>
<th>Mt 06/05</th>
<th>Change 06/05</th>
<th>Mt 06/05</th>
<th>Change 06/05</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>382.0</td>
<td>+4.3%</td>
<td>Italy</td>
<td>10.0</td>
</tr>
<tr>
<td>USA</td>
<td>84.1</td>
<td>+1.7%</td>
<td>France</td>
<td>10.0</td>
</tr>
<tr>
<td>China</td>
<td>65.0</td>
<td>+16.1%</td>
<td>Indonesia</td>
<td>8.9</td>
</tr>
<tr>
<td>Japan</td>
<td>31.1</td>
<td>+0.5%</td>
<td>Brazil</td>
<td>8.7</td>
</tr>
<tr>
<td>Germany</td>
<td>22.7</td>
<td>+4.5%</td>
<td>Russia</td>
<td>7.4</td>
</tr>
<tr>
<td>Canada</td>
<td>18.2</td>
<td>-6.8%</td>
<td>India</td>
<td>7.0</td>
</tr>
<tr>
<td>Finland</td>
<td>14.2</td>
<td>+14.2%</td>
<td>Spain</td>
<td>6.4</td>
</tr>
<tr>
<td>Sweden</td>
<td>12.1</td>
<td>+2.5%</td>
<td>UK</td>
<td>5.6</td>
</tr>
<tr>
<td>South Korea</td>
<td>10.7</td>
<td>+1.5%</td>
<td>Austria</td>
<td>5.2</td>
</tr>
</tbody>
</table>

Source: RISI, CEPI
## Paper consumption - 2006

<table>
<thead>
<tr>
<th>Country</th>
<th>Mt</th>
<th>06/05</th>
<th>Mt</th>
<th>06/05</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>381.8</td>
<td>+4.3%</td>
<td>Spain</td>
<td>7.9</td>
</tr>
<tr>
<td>USA</td>
<td>90.5</td>
<td>+1.1%</td>
<td>Brazil</td>
<td>7.7</td>
</tr>
<tr>
<td>China</td>
<td>66.0</td>
<td>+11.3%</td>
<td>India</td>
<td>7.6</td>
</tr>
<tr>
<td>Japan</td>
<td>31.5</td>
<td>+0.2%</td>
<td>Canada</td>
<td>7.1</td>
</tr>
<tr>
<td>Germany</td>
<td>20.9</td>
<td>+5.8%</td>
<td>Mexico</td>
<td>6.7</td>
</tr>
<tr>
<td>UK</td>
<td>12.3</td>
<td>-1.4%</td>
<td>Russia</td>
<td>6.0</td>
</tr>
<tr>
<td>Italy</td>
<td>11.7</td>
<td>-0.3%</td>
<td>Indonesia</td>
<td>5.6</td>
</tr>
<tr>
<td>France</td>
<td>10.9</td>
<td>-0.4%</td>
<td>Taiwan</td>
<td>4.8</td>
</tr>
<tr>
<td>S. Korea</td>
<td>8.6</td>
<td>+2.9%</td>
<td>Thailand</td>
<td>4.2</td>
</tr>
</tbody>
</table>

Source: RISI, CEPI
Graphic papers
World capacity growth

Source: EMGE
Graphic papers
Net capacity increase by region

Source: EMGE
Graphic papers
Demand forecast by region

AVERAGE %pa GROWTH (2006-2011)

Source: EMGE
Containerboard
Main trends and drivers

• Global consumption was approximately 98 Mt in 2006
• The US has been the single largest consumer of containerboard, accounting for over 25% of the consumption
• China’s consumption will continue to grow and is expected to overtake that of the US in the coming years
• Drivers and trends: food & beverage consumption, home delivery of products from increased on-line shopping, economic and industry activity
Containerboard Western Europe capacity development

Yearly increase

![Bar graph showing yearly increase in containerboard capacity development in Western Europe from 1995 to 2009. The graph compares Virgin-Based and Recycled-based materials.]
<table>
<thead>
<tr>
<th>Cartonboard</th>
<th>Mt</th>
<th>06/05</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>49.5</td>
<td>+4.7%</td>
</tr>
<tr>
<td>Asia</td>
<td>17.9</td>
<td>+9.9%</td>
</tr>
<tr>
<td>Europe</td>
<td>14.4</td>
<td>+3.6%</td>
</tr>
<tr>
<td>N. America</td>
<td>14.9</td>
<td>+0.4%</td>
</tr>
<tr>
<td>S. America</td>
<td>1.8</td>
<td>+2.1%</td>
</tr>
<tr>
<td>Africa</td>
<td>0.3</td>
<td>0.0%</td>
</tr>
<tr>
<td>Australasia</td>
<td>0.2</td>
<td>+4.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total P&amp;B</th>
<th>Mt</th>
<th>06/05</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>382.0</td>
<td>+4.3%</td>
</tr>
<tr>
<td>Asia</td>
<td>140.8</td>
<td>+9.0%</td>
</tr>
<tr>
<td>Europe</td>
<td>113.2</td>
<td>+3.2%</td>
</tr>
<tr>
<td>N. America</td>
<td>102.2</td>
<td>+0.1%</td>
</tr>
<tr>
<td>S. America</td>
<td>18.3</td>
<td>+2.7%</td>
</tr>
<tr>
<td>Africa</td>
<td>4.2</td>
<td>+2.9%</td>
</tr>
<tr>
<td>Australasia</td>
<td>3.3</td>
<td>-2.6%</td>
</tr>
</tbody>
</table>

Source: RISI
Main markets and drivers

• Food packaging accounted for largest share: 18 Mt in 2006

• Single biggest sector is pharmaceutical industry (10%), followed by dry foods, frozen foods and tobacco

• Consumption would rise by a yearly average of 5% through 2012 based largely on growing demand in non-food sector

• Drivers and trends: retailers’ behaviour towards sustainability and certification, multimedia, shorter brandlife – constant need for new designs and graphics
Wood Pulp Europe
Production and Consumption

Years of CEPI

Production and Consumption in Wood Pulp Europe from 1999 to 2008.

- Production (blue line)
- Consumption (orange line)

1000 mt


30 000 35 000 40 000 45 000 50 000 55 000
Wood Pulp Europe
Imports and Exports


1000 mt

10000
20000
30000
40000
50000
60000
70000
80000
90000
100000

Imports
Exports

15 years of cepi
Wood Pulp North America
Production and Consumption


Production
Consumption
Wood Pulp North America Imports and Exports

1000 mt


Imports
Exports
Wood Pulp Russian Federation
Production and Consumption

![Graph showing Wood Pulp Production and Consumption from 1999 to 2008. The graph displays a steady increase in production and consumption over the years, with consumption slightly lagging behind production. The x-axis represents the years from 1999 to 2008, and the y-axis represents the quantity in 1000 metric tons (mt).]
Wood Pulp Russian Federation
Imports and Exports

Imports
Exports
Trade Flows of Pulp to and from CEPI Countries in 2006

- **Other Europe**: Exports to 515, Imports from 503
- **North America**: Exports to 197, Imports from 3,394
- **Latin America**: Exports to 23, Imports from 3,089
- **Asia**: Exports to 1,320, Imports from 166
- **Rest of the World**: Exports to 154, Imports from 405

'000 Tonnes
Paper Production and Consumption in CEPI Countries 1991 - 2006

- **Paper Production**
  - Trend: +2.6%

- **Paper Consumption**
  - Trend: +3.0%
Trade Flows of Paper to and from CEPI Countries in 2006

- North America: Exports to 2,973, Imports from 1,513
- Latin America: Exports to 1,455, Imports from 439
- Other Europe: Exports to 6,200, Imports from 1,727
- Asia: Exports to 4,675, Imports from 365
- Rest of the World: Exports to 2,363, Imports from 368

000 Tonnes
Paper and paperboard Europe
Imports and Exports

<table>
<thead>
<tr>
<th>Year</th>
<th>Imports (1000 mt)</th>
<th>Exports (1000 mt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>45,000</td>
<td>50,000</td>
</tr>
<tr>
<td>2001</td>
<td>47,000</td>
<td>55,000</td>
</tr>
<tr>
<td>2002</td>
<td>49,000</td>
<td>60,000</td>
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<tr>
<td>2003</td>
<td>51,000</td>
<td>65,000</td>
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<tr>
<td>2004</td>
<td>53,000</td>
<td>70,000</td>
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<td>2005</td>
<td>55,000</td>
<td>75,000</td>
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<tr>
<td>2006</td>
<td>57,000</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>59,000</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>61,000</td>
<td></td>
</tr>
</tbody>
</table>
Raw Materials in Papermaking in CEPI Countries 2006

- Woodpulp: 42.1%
- Recovered Paper: 42.4%
- Non-Fibrous Materials: 14.4%
- Pulp Other than Wood: 1.1%

Total: 115.4 Million Tonnes
Wood consumption for pulp manufacturing in CEPI Countries 2006

Total: 158 Million Cubic metres in 2006 / +28% over last 10 years

- **Softwood**
- **Hardwood**

- 2006: 72%
- 1996: 25%

---

15 years of cepi
Paper and paperboard North America
Production and Consumption

1000 mt

Production
Consumption

Paper and paperboard North America
Imports and Exports


1000 mt

Imports
Exports

0 5 000 10 000 15 000 20 000 25 000 30 000
Paper and paperboard Russian Federation - Production & Consumption
Paper and paperboard Russian Federation – Imports and Exports

![Graph showing imports and exports of paper and paperboard from Russia from 1999 to 2008. The x-axis represents the years from 1999 to 2008, and the y-axis represents the amount in 1000 metric tons. The graph shows a steady increase in imports and a fluctuating trend for exports.](image-url)
Trade Flows of Recovered Paper to and from CEPI Countries in 2006

North America: Exports to 24, Imports from 230

Latin America: Exports to 1, Imports from 8

Asia: Exports to 7,655, Imports from 0

Other Europe: Exports to 340, Imports from 762

Rest of the World: Exports to 180, Imports from 6

'000 Tonnes
China’s dependence on imported fibre

- Recovered paper account for more than 50% of the total fibre consumption, around 40% is imported.
- The share of non-wood pulp is declining.

Source: Poyry
Paper production forecast - 2020

- 40% of the global production located in Asia
- China taking up 60% of the growth in new capacity
- Link between local demand and local supply disrupted

Source: Poyry
• About 370 Mt of fibre used in the world in 2005
• Recovered paper share to increase from 50% today to 56%
• China utilisation of recovered paper from 35 Mt to 66 Mt

Source: Poyry
The big challenge ahead: bioenergy

Political context

Climate change considerations

Higher relevance of security of energy supply

Implications – managing the transition to a low carbon economy

- Strong international actions to reduce climate change, e.g., CO₂ abatement - 20%
- Strong push for renewable energy sources for power and heat + 13% ➔ 20%
- Strong push for energy efficiency - 20%
- Growth of biomass for power and heat production
- Emergence of biofuels for transportation ➔ 10%
- Changing competitive landscape for traditional users of wood and RP
Will wood supply match demand?

**CEPI-16, wood supply and demand; million m³ (under bark); 2020**

<table>
<thead>
<tr>
<th>Supply</th>
<th>Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current forest biomass supply</strong></td>
<td>355–370</td>
</tr>
<tr>
<td>• Mobilization</td>
<td>160–170</td>
</tr>
<tr>
<td>• Net imports</td>
<td>515–540</td>
</tr>
<tr>
<td>• Recovered wood</td>
<td>Estimated supply</td>
</tr>
<tr>
<td>Estimated gap</td>
<td>200–260</td>
</tr>
<tr>
<td>Estimated demand</td>
<td>720–800</td>
</tr>
<tr>
<td>Non-traditional demand (energy)</td>
<td>340–420</td>
</tr>
<tr>
<td>Traditional demand</td>
<td>~380</td>
</tr>
</tbody>
</table>

- PPI
- WPI

Source: McKinsey/Pöyry team analysis
Possible future scenarios

1. Mismatch between demand and supply of wood biomass
   - Current subsidy levels and structure
   - Current policies and technology expectations

2. No mismatch between demand and supply of wood biomass
   - Increased biomass supply
   - Other RES technologies

3. Enforcing RES target without closing demand-supply gap
   - Some cost increase (regional mismatches/transportation)
   - Limited impact on PPI
   - Rough costs involved
     - Increasing supply of energy crops 1.5-2.0 billion EUR/year
     - Non-biomass RES: 4-6 X

Source: McKinsey/Pöyry team analysis
The pulp and paper industry is not the problem … it is part of the SOLUTION

The PPI is already a substantial participant in bio-energy production…

<table>
<thead>
<tr>
<th>Share of country primary bio-energy production</th>
<th>Percent; Mtoe</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR</td>
<td>71</td>
</tr>
<tr>
<td>FI</td>
<td>68</td>
</tr>
<tr>
<td>BE</td>
<td>62</td>
</tr>
<tr>
<td>SE</td>
<td>60</td>
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<td>PT</td>
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<td>AT</td>
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<td>20</td>
</tr>
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<td>PL</td>
<td>12</td>
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<tr>
<td>FR</td>
<td>11</td>
</tr>
<tr>
<td>DE</td>
<td>10</td>
</tr>
<tr>
<td>UK</td>
<td>6</td>
</tr>
<tr>
<td>NL</td>
<td>2</td>
</tr>
<tr>
<td>IT</td>
<td>1</td>
</tr>
</tbody>
</table>

…and can be a key enabler for reaching future RES targets

The paper industry has:

- **The infrastructure**
  - Biomass generation and sourcing organization in place (both RP and fresh fiber)

- **The locations**
  - Network of installed assets that can be used for power, heat, and fuel

- **The efficiency**
  - Very high efficiency in generating (and using) heat

Source: CEPI bio-energy survey; SBB; McKinsey/Pöyry team analysis
There are solutions to relief pressure

“Close to home”

- Continued aggressive energy-efficiency measures in PPI, e.g., replacing old recovery and multifuel boilers (~10)
- Additional mobilization of round wood and residue (30–35)
- Other measures, e.g., • Lobby for removing existing export tariffs • Decrease landfill of recovered wood (5–10)
- Import more biofuels; efficient use of land for first generation biofuels (50–80)
- Free up additional land to grow more energy crops (estimated 6 million ha) (115–175)

Outside PPI

Potential effect 2020
Million m³

Up to 310
Ways forward: focus on value creation

Comparison on Total Value Added Generation

**Bioenergy Production**
- Upstream impact
- Core impact
- Downstream impact
- Multiplier effect

€= 10 billion euros

= Total value added 33.8 billion euros

**Pulp and Paper Industry**
- Upstream impact
- Core impact
- Downstream impact
- Multiplier effect

€= 10 billion euros

= Total value added 263 billion euros
Ways forward: focus on keeping jobs

Total Employment Generation

Bioenergy Production

- Upstream impact
- Core impact
- Downstream impact
- Multiplier effect

= Total employment creation 0.229 million

=20,000 man years

Pulp and Paper Industry

- Upstream impact
- Core impact
- Downstream impact
- Multiplier effect

= Total employment creation 2.950 million

=20,000 man years