Recovered Paper Outlook

European Conference
March 2018

Rod Young
Chief Economic Advisor
Global Paper & Board Demand
Million Tonnes, Percentage Market Share

Total Demand, 2016: 414 Million Tonnes

<table>
<thead>
<tr>
<th>Market</th>
<th>Forecast Change, 2016-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>+4.4%</td>
</tr>
<tr>
<td>Containerboard</td>
<td>+9.3%</td>
</tr>
<tr>
<td>Cartonboard/Other</td>
<td>+6.9%</td>
</tr>
<tr>
<td>Tissue</td>
<td>+10.9%</td>
</tr>
<tr>
<td>Newsprint</td>
<td>-13.3%</td>
</tr>
<tr>
<td>Printing &amp; Writing</td>
<td>-4.1%</td>
</tr>
</tbody>
</table>
Global Fiber Demand
Growth in Market Wood Pulp and Recycled Fiber

- Future fiber demand developments will depend on the structural change in the global paper and board markets
  - More packaging and tissue, less graphic paper
- Recovered paper supply bottleneck will limit the growth in future demand in certain sectors and regions
World PAB Production and RCP Usage

RCP usage rate is slowly rising

- Future growth in paper packaging demand and production will support further growth in recovered paper demand
World Containerboard Output
Virgin vs. Recycled Grades

- Little increase in virgin containerboard production in the last 16 years
- Continuous growth in recycled containerboard production in 2000-2016
- Most of the new containerboard capacity will continue to run on recycled fiber
World Cartonboard/Other Sector

Virgin vs. Recycled Grades

- Growing cartonboard output
- Recent drop in recycled fiber furnish
  - Growing demand for high-quality cartonboard in developing regions
- Expansion in virgin-fiber based cartonboard capacity in China
World Tissue Sector

- Tissue output trending opposite of P&W paper consumption
- Falling P&W paper consumption means shrinking supply of high grades RCP
- Growing tissue production
  - Likely drop in recycled fiber furnish share
Most of the RCP demand growth will come from Asia, North America, Europe and Latin America.

China and its RCP demand?
Global RCP Trade Pattern

• Global trade has played a big role in the global RCP markets because of the demand/supply imbalance.
• China has been the largest RCP buyer for many years.
• Other emerging economies in Asia have started to buy more RCP in recent years.
• North America, Europe, Japan and Oceania have been the major RCP suppliers to Asia, including China and Other Asia outside of China and Japan.
OCC Price Roller Coaster

- In general, the OCC markets have been strong for the past year
  - High demand and supply bottleneck (Amazon e-commerce effect)
- Market volatility
- China’s impacts on global markets through its imports and policy
Chinese RCP Demand: Net Imports and Domestic Collection

Falling import share in Chinese total RCP demand

- Net import share:
  - 2000: 20%
  - 2005: 49%
  - 2010: 39%
  - 2015: 37%
  - 2016: 36%

- Future under new RCP import policy: ???
North American RCP Market

Domestic Consumption vs. Exports

- Highly dependent on exports
- Net export share
  - 2000: 17%
  - 2005: 26%
  - 2010: 37%
  - 2015-2016: 40%
  - 2017: US exports fell 8%, with China down 18%
- Where will the supply surplus created by China’s new import policy go?
Western European RCP Market

Domestic Consumption vs. Exports

- Exports have been critical in this region as well
- Net export share
  - 2000: 6%
  - 2005: 12%
  - 2010: 15%
  - 2015-2016: 15%
  - 2017: Mixed paper and ONP exports dropped significantly in the first 10 months of the year
OCC Price Roller Coaster (Cont.)
Imported and Domestic OCC Prices in China

- Prices for imported and domestically collected OCC used to follow the same trends in China
- But domestic prices and import prices have started to move in opposite directions in the past few months
- Import permit problems, speculation on both the demand and supply sides
Change in Chinese RCP Import Policy

• Background
  ▪ Increasing environmental concerns
  ▪ China General Administration of Customs announced the National Sword program in early 2017
  ▪ China officially notified the WTO in July 2017 that it would ban imports of unsorted waste paper (mostly mixed paper) by the end of 2017
  ▪ In addition to the mixed paper import ban, China announced in an action plan in July 2017 that it would:
    • Improve domestic recycling
    • Revise its RCP import permit management system
    • Reduce solid waste imports by volume and category
Chinese RCP Imports
Increasing OCC and mixed paper share
Where Did China Import Mixed Paper From?

- China is the largest buyer of mixed paper for each of the major exporting regions.
- Which exporting region will be impacted the most by new Chinese regulations?
  - Probably the USA and Europe
- Chinese imports of mixed paper fell to 4.9 million tonnes in 2017 after tailing off sharply toward year end.
Mixed Paper Ban

• Where will the mixed paper rejected by China go?
  ▪ Stay in the exporting regions
    • Domestic mills
    • Higher grades through more sorting and processing
    • Landfill and burning for energy?
  ▪ Can Other Asia take more mixed paper?
    • About 7 million tonnes of RCP net imports in 2016, and about 15% of that was mixed paper
    • This region could import more to feed its growing demand, but its increase will not be able to match China’s rejection in the near term.
    • And this region may become as “picky” as China in the future.
• Mixed paper prices fell significantly after China announced the mixed paper import ban in July
• Prices plunged again in September-October as no mixed paper could be sent to China
• European market was relatively stable compared to the USA, but has slumped in early 2018
Other Asia RCP Demand: Net Imports and Domestic Collection

- Net import share
  2000: 29%
  2005: 22%
  2010: 18%
  2015: 19%
  2016: 20%
  2017: US exports to Vietnam tripled

- Future
  - Fast-growing demand
  - Increasing availability from the supplying regions
  - More exports of consumer goods
Uncertainty in Global RCP Markets

• Chinese RCP import policy
  ▪ Contamination level of 0.5%
    • How will suppliers in the major exporting regions will react to the new standard?
  ▪ Import permits
    • Will China reduce its total RCP import quota significantly for 2018-2019?
    • Who can get the permits?
      – 50,000 tonne capacity threshold
      – Traders
      – Being issued quarterly rather than annually
      – Nearly 5 million tonnes of permits issued so far in the first quarter of 2018
  ▪ Will there be some corrections/relaxation in the new import policy in the future?
Uncertainty in Global RCP Markets (Cont.)

• Chinese RCP import policy and fiber demand
  ▪ If the Chinese government cuts the RCP import quota significantly, would its domestic supply be enough to meet its demand growth?
    • In the near term, probably no.
  ▪ Then where and how will Chinese mills will get the fiber they need?
    • Import more virgin fiber?
      – Maybe yes for BHK and BSK, but there is not much market UKP capacity available on a worldwide basis.
    • How about more production and consumption of non-wood fiber?
Uncertainty in Global RCP Markets (Cont.)

- Chinese RCP import policy and fiber demand
  - Will China import more finished paper and board products to meet its demand?
    - Probably yes, if China has insufficient fiber to make its own.
    - But from where?
  - Where the new RCP import policy will go depends on how the Chinese government views its paper industry.
  - China’s RCP import policy will have significant impacts not only on global RCP markets, but also on the global paper industry.
Chinese Paper and Board Net Trade (Imports)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>New</td>
<td>208</td>
<td>116</td>
<td>-76</td>
<td>46</td>
</tr>
<tr>
<td>P&amp;W</td>
<td>699</td>
<td>-5</td>
<td>-1,479</td>
<td>-2,614</td>
</tr>
<tr>
<td>TIS</td>
<td>-61</td>
<td>-243</td>
<td>-473</td>
<td>-821</td>
</tr>
<tr>
<td>CNT</td>
<td>1,995</td>
<td>1,883</td>
<td>769</td>
<td>503</td>
</tr>
<tr>
<td>Boxboard/Other</td>
<td>2,012</td>
<td>1,939</td>
<td>328</td>
<td>-1,727</td>
</tr>
<tr>
<td>Total</td>
<td>4,853</td>
<td>3,689</td>
<td>-931</td>
<td>-4,612</td>
</tr>
</tbody>
</table>

- China does not want to be a big exporter of PAB products.
- The RCP import policy will probably impact the containerboard and boxboard sectors the most (high RCP usage rates).
- Will China stop exporting boxboard and import more containerboard?
Thank you!
For more information:

Outlook for Global Recovered Paper Markets 2017
www.risi.com/GlobalRCP

OCC/UKP Market Analysis and Outlook
www.risiinfo.com/OCC-UKP

The China Recovered Paper Market: A Comprehensive Analysis and Outlook
www.risi.com/ChinaRCP

World Pulp and Recovered Paper 5-Year & 15-Year Forecasts
www.risi.com/forecasts

World Recovered Paper Monitor
www.risi.com/OGRPM