Outlook for the World
Paper Grade Pulp Market

São Paulo, Brazil
August 2016

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Recent Developments
Chinese Credit Surge in Early 2016 Boosted Many Commodity Prices

But the effect on paper grade pulp was minor
Chinese BHK Prices Rebounded in the First Half, but Have Since Lost Momentum

- Prices in Europe have lagged behind, as usual, and have not gotten upward traction
BHK Delivered Cash Cost Curve to Shanghai, First Quarter 2016
BHK Price Hikes in China Have Been Amplified by the Weakening Renminbi

Price increase since March:
5% in renminbi, 3% in US dollars
BSK Prices Have Also Bounced Higher, Helped by Production Outages

- Seasonal maintenance and production issues in Canada and Europe reduced inventories
BSK Delivered Cash Cost Curve to Shanghai, First Quarter 2016
BSK Price in China up by 9% in Renminbi Since March

Price increase since March: 9% in renminbi, 7% in US dollars
The BSK-BHK Price Spread in China Is Again Above “Average” Levels

Source: RISI
Near-Term Indicators: BHK Producer Inventories Close to Average

Source: PPPC, RISI

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The High Season for Woodfree Paper Demand in Western Europe Is Over

Seasonal adjustment factors for Western European P&W
Capacity Changes Will Be Key Drivers of Second-Half Market Conditions

• Four major BSK capacity expansion projects will be ramping up in the second half of 2016
  ▪ Three SBSK/fluff projects, one NBSK
• APP OKI mill in Indonesia
  ▪ Still targeting commercial tonnage by the end of this year
• However, there are also conversions from paper grade BHK to viscose DP in the works, which could affect supply in the second half
2016-2017 Forecast Drivers
Pulp Demand Appears to Be on a Rather Steady Growth Trend

• Overall market pulp demand growth has averaged 2.5% per year over the past five years
  ▪ In the 1.3-2.9% range in four of those years (no declines), so much steadier than in past decades
  ▪ Big quarter-to-quarter changes in Chinese demand will drive demand swings in the short run
• In this environment, supply developments are creating more volatility in the market
World Production of Paper and Board: Accelerating, but Very Slowly

Graphic, Packaging and Specialty and Tissue; Percentage Change

- 2000: 3.7%
- 2002: 3.3%
- 2004: 5.7%
- 2006: 4.0%
- 2008: 3.0%
- 2010: 6.6%
- 2011-2015: 0.7% per year

2011-2015: 0.7% per year
Most of the Growth in the Paper Industry Is in Packaging—with a Modest Effect on Market Pulp
World Production of P&W Paper: Relative Stability in 2016-2017?

<table>
<thead>
<tr>
<th>Year</th>
<th>Euro Area</th>
<th>United States</th>
<th>China</th>
<th>World</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>-1.4%</td>
<td>-2.9%</td>
<td>-3.1%</td>
<td>-5.7%</td>
</tr>
<tr>
<td>2014</td>
<td>-1.9%</td>
<td>-3.0%</td>
<td>-3.2%</td>
<td>-5.2%</td>
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<tr>
<td>2015</td>
<td>-3.1%</td>
<td>-5.2%</td>
<td>-3.2%</td>
<td>-1.0%</td>
</tr>
<tr>
<td>2016</td>
<td>-3.0%</td>
<td>-3.2%</td>
<td>-3.0%</td>
<td>-2.6%</td>
</tr>
<tr>
<td>2017</td>
<td>-3.0%</td>
<td>-1.7%</td>
<td>0.4%</td>
<td>-1.0%</td>
</tr>
</tbody>
</table>

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How Much Is Growth in Tissue Contributing to Pulp Demand?

• Tissue demand will grow by 3.6% per year in 2016-2017, so about 1.3 million tonnes per year of additional tissue production and fiber demand

• Slight increase over time in pulp share, compared to recovered fiber (2/3 vs 1/3 at present)
  ▪ In the USA, consumer tissue is growing faster than away-from-home, which is good for pulp demand

• There is increasing use of “integrated” or “captive” pulp to produce tissue
  ▪ Less market pulp demand, but also less pulp capacity available for the market
Like Tissue, Fluff Pulp Demand Is Growing Quite Steadily, Adding About 250,000 tpy to Pulp Demand

World Fluff Pulp Consumption, Millions of Tonnes
And Despite the Downturn in P&W Production in China, Pulp Imports Remain on an Upward Trend

Pulp Imports per Day, Thousand Tonnes
So What Are the Sources of China’s Incremental Pulp Demand?

• Tissue production is rising by about 6-7% or 550,000 tpy
• Rising production virgin-fiber boxboard
• Closures of old pulp and paper capacity favors BHK growth (at the expense of local fiber, including nonwood)
  ▪ *Based on our study, consumption of straw pulp in tissue and P&W will fall by more than 1.0 million tonnes between 2015 and 2020*
• Ongoing move toward more BHK and less BSK as new paper machines are installed
• BSK demand for absorbent applications (fluff pulp) is growing
• *Conclusion: Net imports of BHK into China will continue to show solid growth*
• *World demand growth of approximately 2.8% per year*
Supply: A Wave of New Pulp Capacity Is About to Crest, but There Will Be Less Capacity Than Was Expected

• “Integrated” pulp being converted to “market”
• But three pulp projects postponed/cancelled
• And more paper grade capacity is shifting to produce viscose pulp than was expected
  ▪ E.g., Sun Paper (Yanzhou, China)
  ▪ Conversions of swing capability at large Asian mills
  ▪ The ability to make viscose pulp using continuous digesters is a key development
BHK Capacity Developments

• 2016
  ▪ Klabin Ortigueira, March: 1.1 million tonnes
  ▪ Sun Paper Yanzhou: Switch to BHK from DP, POSTPONED
    • Out of our forecast numbers
  ▪ Alizay (France): BHK restart, POSTPONED indefinitely
    • Out of our forecast numbers
  ▪ APP Sumatra (OKI), 4Q16 (?): 2.8 million tonnes
    • Reduced wood availability not a major impediment

• 2017
  ▪ Fibria, 4Q17: 1.95 million tonnes
  ▪ Further conversions of paper grade BHK to viscose pulp at large mills in China, Indonesia
  ▪ Vietracimex: 400,000 tonnes, POSTPONED
    • Tentatively in our forecast in early 2019
Key BSK Capacity Developments

• 2016
  ▪ Klabin Ortigueira, March: 400,000 tonnes fluff/SBSK
  ▪ IP Riegelwood, 2Q16: 360,000 tonnes fluff/SBSK
  ▪ Domtar Ashdown, 3Q16: >300,000 tonnes fluff/SBSK
  ▪ Sodra Varo, 2H16: 275,000 tonnes
  ▪ Svetlogorksy: 400,000 tonnes BSK/BHK/DP, POSTPONED AGAIN
    ▪ Now showing this in 2017 in our forecast
  ▪ Some Chinese mills will be making BSK rather than BHK depending on fiber availability

• 2017
  ▪ Metsa Fibre, 3Q17-4Q17: 700,000 tonnes BSK
Forecast Summary

• Very modest acceleration in growth of paper and board demand, mostly because of packaging
• Pulp demand will grow by just less than 3% per year
• Supply-side surprises will continue to drive uncertainty and forecast changes
  ▪ For BHK, timing of the OKI startup will be a strong determinant of pricing in the next six months; low operating rate in early 2017
  ▪ For BSK, second half of 2016 looks weak in terms of operating rates, especially for SBSK/fluff; 2017 also looks weak
• Capacity rationalization is an upside risk for operating rates for both BSK and BHK
Thank you for your attention!

For more information:

World Pulp & Recovered Paper 5-Year and 15-Year Forecasts
www.risi.com/WPRP5
www.risi.com/WPRP15

World Pulp Monthly
www.risi.com/wpm
Special Study

The China Pulp Market in Transition: A Comprehensive Analysis and Outlook

This edition features new policies, updated cost analyses of non-wood pulp mills in China, as well as current capacities and closures since the last report. It also includes a downside risk scenario that analyzes how a worse-than-expected path might impact the paper industry.

www.risiinfo.com/chinapulp15