Outlook for Asian Woodchip Markets: Summary and Outlook for 2022/23

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RISI

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Agenda

• Asian Woodchip Demand, 2022/23
  ▪ Hardwoods
  ▪ Softwoods

• Woodchip Supply for Asian Markets, 2022/23
  ▪ Hardwoods
  ▪ Softwoods

• Asian Woodchip Market, Demand/Supply Balance, 2022/23
  ▪ Hardwoods
  ▪ Softwoods
Assumptions on Hardwood Chip Demand in Asia

- China: Chenming mills at Shouguang and Huanggang start up, but no other net new capacity is developed beyond 2019.
- Japan: No net new capacity, and consolidation begins to reduce production to bring more in line with demographic/market trends in Japan.
- South Korea, Taiwan, India: No new woodchip importing mills planned, but existing customers continue to import.
- Indonesia: Demand seems likely to exceed 1.0 million BDMT by 2022/23, if not substantially more.
Assumptions on Softwood Chip Demand in Asia

• Japan: Continued shift towards more production of packaging grades and biomass chip demand results in a small increase in demand for softwood chips.

• China: Despite years of efforts, lack of success to date for softwood chip imports indicates very little potential for increased softwood chip imports. Lower chip density and lower pulp yield makes it very difficult.
The Asian woodchip market will remain more than 90% hardwood in 2022/23

Forecast of Woodchip Import Demand in the Asia-Pacific Region, 2022/23 Forecast

<table>
<thead>
<tr>
<th></th>
<th>China</th>
<th>Japan</th>
<th>Korea</th>
<th>Taiwan</th>
<th>India</th>
<th>Indonesia</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hardwood Chips</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017 Actual</td>
<td>11,164</td>
<td>10,521</td>
<td>444</td>
<td>549</td>
<td>263</td>
<td>0</td>
<td>22,941</td>
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<tr>
<td>2018 Estimate</td>
<td>11,720</td>
<td>10,600</td>
<td>500</td>
<td>540</td>
<td>170</td>
<td>50</td>
<td>23,580</td>
</tr>
<tr>
<td>2022/23 Forecast</td>
<td>13,000</td>
<td>9,700</td>
<td>530</td>
<td>500</td>
<td>200</td>
<td>1,000</td>
<td>24,930</td>
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<tr>
<td><strong>Softwood Chips</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017 Actual</td>
<td>236</td>
<td>1,646</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1,882</td>
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<tr>
<td>2018 Estimate</td>
<td>350</td>
<td>1,710</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2,060</td>
</tr>
<tr>
<td>2022/23 Forecast</td>
<td>400</td>
<td>2,000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2,400</td>
</tr>
</tbody>
</table>
Woodchip Supply Assumptions by Country
Vietnam: Near peak export levels

- Vietnamese government still has an official policy of reducing woodchip exports in favor of more domestic processing in Vietnam.
- Wooden furniture industry is still expanding in Vietnam, and will require greater volumes of wood-based panels in the future.
- There appears to be little potential to expand pulpwood plantations further in Vietnam, due to lack of suitable lands (and competition with other land uses).
- Economic development will continue to offer new job opportunities in the cities to rural youth, resulting in less available labor for manual planting and harvest operations in Vietnam in the future.
- We assume that government in Vietnam does not stop woodchip exports, but volumes will be limited by other factors (increasing labor costs, competition from other sectors for both land and labor, etc.)

2018 Exports (Est.) = 9.2 million BDMT
2022/23 Exports (Forecast) = 8.5 million BDMT
Other Woodchip Sources in Southeast Asia

- Thailand: Volumes have reduced by more than half since 2012 peak. Increased domestic fiber usage, combined with farmers shifting land to other crops, has limited exports. Higher prices could attract more farmers to shift back to planting eucalyptus, and with the short (<4 year) cycle in Thailand, volumes could begin increasing again by 2022. But without evidence of such a trend, we assume stable volumes.
- Indonesia: most of the pulpwood will remain in country to feed domestic mills.
- Malaysia: restrictions on log exports could shift some exports to Indonesia from pulplogs to chips, but this is not a net increase in volume.
- Other countries: no potential for new chip export facilities in Cambodia or Myanmar. Philippines has been tried but again we see no evidence of success there.
Australia: Record hardwood chip exports last year, possibly a bit higher this year, but then???

- New land planting of eucalyptus basically ended in 2008, and since then the new owners (institutional investors) have shifted some lands back to agriculture after timber harvest.
- The accelerated exports of woodchip was possible due to over-age plantations which had built up a surplus of volume. But increased chip exports, plus a surge in exports of eucalyptus logs to China for veneer production, has greatly reduced this surplus in some areas already.
- But available woodchip supply from plantations is beginning to decrease, and even with some increase possible from native forests, volumes will likely begin reducing in 2019 and by 2022 will be 1.0-1.2 million BDGT less than in 2018. Further decreases in 2023 and beyond are likely, but will depend on market acceptance of native hardwood chips.

2018 Exports (Est.) = 6.35 million BDGT
2022/23 Exports (Forecast) = 5.3 million BDGT
Chile has long been a reliable supplier of hardwood chips, and will ship a record volume in 2018

- Like Australia, Chilean woodchips are E. nitens and E. globulus of high quality.
- Arauco’s conversion of its Valdivia pulp mill to dissolving pulp will increase consumption of eucalyptus by up to 1.0 million BDMT, beginning in late 2019. But the biggest impact on chip exports will be when Arauco’s MAPA project starts up in early 2021. Actually, the impact will begin much sooner, as Arauco will buy more open market wood in the years leading up to MAPA start-up.
- Without question, independent landowners will want to retain the export option, but price will be the determining factor. By 2022, we expect Chile’s hardwood chip exports to decline between 1.0 million and 1.5 million BDMT (or more).

2018 Exports (Est.) = 3.2 million BDMT
2022/23 Exports (Forecast) = 2.0 million BDMT
South African woodchip exports have reduced due to limitations on plantations and expanded domestic demand

- South African hardwood chip exports declined by more than 50% from the peak. While there was some recover in 2013-2016, stronger domestic demand and a weak market in India will result in reduced volumes in 2018.
- We assume that land ownership issues will have relatively little impact on woodchip supplies over the next five years, although it is possible that in some locations some farmers may opt for early harvest due to uncertainty over land issues.
- Sappi’s expansion at Saiccor will result in some reduction in chip exports, although Sappi has been converting some of its pine plantations to eucalyptus over the years.
- On balance, we are projecting that South African exports in 2022 will be more or less the same as in 2018.

2018 Exports (Est.) = 1.54 million BDMT
2022/23 Exports (Forecast) = 1.4 million BDMT
Brazilian hardwood chip exports to Asia will be a record volume in 2018, but some shipments also to Europe

• 2017 exports (to all markets) were 58% wattle from southern Brazil and 42% eucalyptus from northern Brazil. Currently, wattle is going 100% to Asia, but some of the eucalyptus and biomass chips are going to Europe.
• The three existing suppliers are all long-term, sustainable companies, with no threat to their exports from domestic processors.
• By 2021-2022, we expect one new woodchip export operation to start up, and there is the possibility of higher volumes from some existing suppliers if prices warrant.
• While the European market appears to offer good potential for biomass chips, the shortage of woodchips in the Asian market will continue to attract almost all additional pulp grade chips.

Brazil Hardwood Chip Exports to Asia

2018 Exports to Asia (Est.) = 1.12 million BDMT
2022/23 Exports (Forecast) = 1.4 million BDMT
Other Sources of Plantation Hardwood Chips???

- Mozambique? Still waiting for definitive news, but we are assuming one facility starting up by 2022/23.
- Other Africa? Very unlikely.
- Colombia? Yes, at least one facility on north (Caribbean coast), probably something via Orinoco River by 2022/23.
- Argentina --- *possibly* very small volume.
- Uruguay --- volume continues to Europe.
- USA? No hardwood plantations.
- Canada? No plantations.
- By 2022, we are only counting on an increase of 630,000 BDMT from the rest of the world: Malaysia, Colombia, Mozambique, and a bit from minor SE Asian supply sources (Philippines? Cambodia?)
Even with a fairly optimistic view on Vietnam supply, total *expected* supply will decline by 2.4 million BDMT

### Hardwood Chip Supply Forecast

*Thousand BDMT*

<table>
<thead>
<tr>
<th>Country</th>
<th>2017</th>
<th>2018E</th>
<th>2022/23F</th>
<th>5-Year Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>6,304</td>
<td>6,450</td>
<td>5,300</td>
<td>-1,150</td>
</tr>
<tr>
<td>Vietnam</td>
<td>7,872</td>
<td>9,200</td>
<td>8,500</td>
<td>-700</td>
</tr>
<tr>
<td>Chile</td>
<td>3,129</td>
<td>3,200</td>
<td>2,000</td>
<td>-1,200</td>
</tr>
<tr>
<td>Thailand</td>
<td>1,646</td>
<td>1,350</td>
<td>1,400</td>
<td>50</td>
</tr>
<tr>
<td>South Africa</td>
<td>1,707</td>
<td>1,540</td>
<td>1,400</td>
<td>-140</td>
</tr>
<tr>
<td>Brazil</td>
<td>975</td>
<td>1,120</td>
<td>1,400</td>
<td>280</td>
</tr>
<tr>
<td>Indonesia</td>
<td>760</td>
<td>350</td>
<td>200</td>
<td>-150</td>
</tr>
<tr>
<td>Other</td>
<td>548</td>
<td>570</td>
<td>1,200</td>
<td>630</td>
</tr>
<tr>
<td><strong>Total Hardwood</strong></td>
<td><strong>22,941</strong></td>
<td><strong>23,780</strong></td>
<td><strong>21,400</strong></td>
<td><strong>-2,380</strong></td>
</tr>
</tbody>
</table>
Assumptions on Softwood Chip Supply

• USA – West coast will continue to represent the best likely source for small expansion in softwood chip supplies. A new export facility could be developed in Washington state.  
• Australia – Exports will continue to be limited by Chinese demand for small pine logs, but sawmills will continue to rely on the export market.  
• New Zealand – A reduction in volume is the most likely trend.  
• Fiji – Supplies limited by plantation resource, no significant expansion is possible.  
• Chile – We are showing a small but steady volume from Chile in the future, but this will depend on market pricing and freight costs.  
• Russia – Will continue to disappoint those who expect chip exports to surge.
We believe a small increase in softwood chip supply is likely, and a slightly larger one is possible.

### Softwood Chip Supply Forecast

*Thousand BDMT*

<table>
<thead>
<tr>
<th>Country</th>
<th>2017</th>
<th>2018E</th>
<th>2022/23F</th>
<th>5-Year Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>634</td>
<td>733</td>
<td>750</td>
<td>17</td>
</tr>
<tr>
<td>US West</td>
<td>839</td>
<td>896</td>
<td>1,100</td>
<td>204</td>
</tr>
<tr>
<td>New Zealand</td>
<td>157</td>
<td>160</td>
<td>100</td>
<td>-60</td>
</tr>
<tr>
<td>Canada</td>
<td>37</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fiji</td>
<td>129</td>
<td>156</td>
<td>180</td>
<td>24</td>
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<tr>
<td>Russia</td>
<td>62</td>
<td>63</td>
<td>70</td>
<td>7</td>
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<tr>
<td>Chile</td>
<td>24</td>
<td>51</td>
<td>100</td>
<td>49</td>
</tr>
<tr>
<td><strong>Total Softwood</strong></td>
<td><strong>1,882</strong></td>
<td><strong>2,059</strong></td>
<td><strong>2,300</strong></td>
<td><strong>241</strong></td>
</tr>
</tbody>
</table>
Asian Woodchip Market Balance, 2022/23

Softwood markets will adjust relatively easily.

Hardwood markets face a huge shortfall of 3.5 million BDMT and adjustments will be dramatic.
Softwood Chip Markets

• Currently, there are no softwood chip exports from Western Canada, due to a shortage of supply there. However, if one or more pulp mills on the coast close over the next 4-5 years, that could free up considerable volume.
• A new facility exporting softwood chip could be developed on the Colombia River, or farther north in Washington state. But export volumes could also be increased through existing exporters, if market prices can be higher.
• Australian exports are unlikely to expand to any significant extent, due to lack of sawlog supply and demand from China for small pine log exports.
• While a small volume of pine chip exports from Chile could possibly develop, New Zealand shipments may decrease further and no other new sources of softwood chips are likely at expected price levels.
• But we expect the market will balance relatively easily.
Hardwood Chip Markets – A Real Battleground

- The anticipated imbalance in the hardwood chip markets in Asia is so large that it can only be resolved by a combination of
  - Price adjustments (higher)
  - Capacity closures in Asia
  - Minor new sources of plantation fiber
  - Some acceptance of certified natural hardwood forest fiber (tanoak from US; FSC beech from Chile; PEFC native eucs from Australia???)
- A lack of new hardwood pulp supply entering the market through 2022/23 will help to support higher prices for woodchip shipments to Asia. The next large new hardwood pulp plant to start production will be in Chile (MAPA project), with other new projects not likely to start until late 2021 or 2022 at earliest. Thus, with relatively strong prices for market pulp, some importers in Asia will be able to justify higher prices for woodchips.
But in the long-term, higher prices for woodchips will be necessary to attract new investment in plantation.