Particleboard and MDF
North American Market Analysis

North American Conference
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Overview

• Markets have been steady thus far in 2016 for North American particleboard and MDF producers
  ▪ What will drive growth in the future?
• Imports and their effect on particleboard and MDF markets
  ▪ Are domestic producers losing market share to imports?
• The furniture market is rebounding
  ▪ Will this benefit domestic particleboard and MDF producers?
• Operating capacity and demand/capacity ratios
  ▪ Where will capacity grow to meet increasing demand?
• Costs and profitability
  ▪ Will market conditions improve profitability for domestic producers?
Demand for particleboard produced in the USA and Canada will increase in 2016-2017 and accelerate in 2018, driven by growth in housing starts and a strong furniture market.

Particleboard capacity in the USA and Canada will grow as a new mill begins operating in 2018.

Demand/Capacity will increase and approach the 90% level by 2018. Operating capacity will be managed to meet demand growth.

Prices will trend slightly higher as demand growth allows producers some pricing power in the near term.
US Particleboard Consumption: Furniture Production Drives Growth
North American Particleboard Producers Need Strong Furniture Industry for Consumption Growth
North American Particleboard Consumption Will Continue to Exceed MDF/HDF
North American MDF: Forecast Summary

**Demand**
Demand for MDF produced in the USA and Canada will grow in 2017 and 2018, driven by growth in housing starts, repairs and remodeling, and furniture production.

**Capacity**
MDF capacity in the USA and Canada will grow as operating rates increase with demand, but all mothballed capacity is on line.

**D/C Ratio**
Demand/Capacity will increase over the coming years as operating capacity is managed to match demand growth; however, imports pose a risk to producers.

**Prices**
Prices will increase only slightly but lower input costs will help improve margins. Competition from imports will continue to limit producer pricing power.
US MDF Consumption: Residential Uses Driving Growth

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Sources of North American Particleboard and MDF/HDF

• North American particleboard markets are primarily supplied by US and Canadian manufacturers
  ▪ Imports are a very small amount of total supply
    • Just 4.9% in 2015 (175 MMSF)
  ▪ The import share is unlikely to climb significantly, barring a domestic price jump that makes the North American market sufficiently attractive for offshore suppliers
Sources of North American Particleboard and MDF/HDF

• In contrast, MDF/HDF imports are extremely significant
  ▪ In 2015, MDF/HDF imports (panels, moldings and flooring) were 960 MMSF
    • Representing 30% of total supply
  ▪ Once the North American MDF industry runs into its capacity ceiling, increased imports will be needed to supply the market unless new North American MDF capacity is forthcoming
## US MDF Imports: July 2016

**MMSF, 3/4-Inch Basis**

<table>
<thead>
<tr>
<th></th>
<th>2015 Total</th>
<th>2016 YTD</th>
<th>2015 YTD</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>424</td>
<td>276</td>
<td>236</td>
<td>17%</td>
</tr>
<tr>
<td>China</td>
<td>323</td>
<td>190</td>
<td>199</td>
<td>-5%</td>
</tr>
<tr>
<td>Chile</td>
<td>207</td>
<td>123</td>
<td>121</td>
<td>2%</td>
</tr>
<tr>
<td>Other Europe</td>
<td>104</td>
<td>79</td>
<td>60</td>
<td>31%</td>
</tr>
<tr>
<td>Germany</td>
<td>72</td>
<td>49</td>
<td>31</td>
<td>57%</td>
</tr>
<tr>
<td>Brazil</td>
<td>43</td>
<td>25</td>
<td>23</td>
<td>7%</td>
</tr>
<tr>
<td>Oceania</td>
<td>6</td>
<td>6</td>
<td>4</td>
<td>50%</td>
</tr>
<tr>
<td>All Others</td>
<td>37</td>
<td>35</td>
<td>20</td>
<td>76%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,215</strong></td>
<td><strong>782</strong></td>
<td><strong>693</strong></td>
<td><strong>13%</strong></td>
</tr>
</tbody>
</table>
North American Offshore* Imports of MDF/HDF Will Surpass 1 BSF

Particleboard imports remain well below previous peaks

* Note: Offshore includes Mexico
Furniture Is Still Important to the North American MDF Market

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Trends in the US Furniture Industry

- US furniture production has been growing but so have imports
  - US furniture producers have been losing market share to imports
- US furniture imports passed their previous peaks in 2014
  - New record-high import level set in 2015, and 2016 on track to surpass that peak
- Meanwhile, US furniture production in 2015 was 30% below its 2005 peak

<table>
<thead>
<tr>
<th></th>
<th>US Furniture Production</th>
<th>US Furniture Imports</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>5.3%</td>
<td>6%</td>
</tr>
<tr>
<td>2013</td>
<td>0.8%</td>
<td>7%</td>
</tr>
<tr>
<td>2014</td>
<td>0.4%</td>
<td>7%</td>
</tr>
<tr>
<td>2015</td>
<td>3.5%</td>
<td>11%</td>
</tr>
<tr>
<td>2016 (July YTD)</td>
<td>1.6%</td>
<td>4%</td>
</tr>
</tbody>
</table>
US Wood Furniture Imports Surpass Their Previous Peak

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# US Wood Furniture Imports: July 2016

**Millions 2015 US Dollars**

<table>
<thead>
<tr>
<th>Country</th>
<th>2016 YTD</th>
<th>2015 YTD</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>5,766</td>
<td>5,677</td>
<td>2%</td>
</tr>
<tr>
<td>Vietnam</td>
<td>1,963</td>
<td>1,804</td>
<td>9%</td>
</tr>
<tr>
<td>Canada</td>
<td>974</td>
<td>857</td>
<td>14%</td>
</tr>
<tr>
<td>Mexico</td>
<td>612</td>
<td>568</td>
<td>8%</td>
</tr>
<tr>
<td>Malaysia</td>
<td>417</td>
<td>429</td>
<td>-3%</td>
</tr>
<tr>
<td>Italy</td>
<td>399</td>
<td>371</td>
<td>7%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>352</td>
<td>370</td>
<td>-5%</td>
</tr>
<tr>
<td>Poland</td>
<td>170</td>
<td>197</td>
<td>-14%</td>
</tr>
<tr>
<td>India</td>
<td>139</td>
<td>120</td>
<td>16%</td>
</tr>
<tr>
<td>Thailand</td>
<td>75</td>
<td>86</td>
<td>-12%</td>
</tr>
<tr>
<td>Taiwan</td>
<td>87</td>
<td>84</td>
<td>3%</td>
</tr>
<tr>
<td>Germany</td>
<td>94</td>
<td>71</td>
<td>32%</td>
</tr>
<tr>
<td>Brazil</td>
<td>68</td>
<td>70</td>
<td>-3%</td>
</tr>
<tr>
<td>All Others</td>
<td>498</td>
<td>509</td>
<td>-2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>11,615</strong></td>
<td><strong>11,214</strong></td>
<td><strong>4%</strong></td>
</tr>
</tbody>
</table>
US Furniture Production: Crash Followed by (Muted) Recovery

2007 = 100

+33%
Canadian Furniture Production: Bottomed Later Than USA, Similar Recovery
Mexican MDF’s Effect on North American Markets

• Total new capacity will be 680,000 m³ (390 MMSF)
• Given the added Mexican MDF capacity and estimates of Mexican MDF consumption we forecast that US exports to Mexico may be displaced
  ▪ We also believe that the new capacity will not be enough to flood the US market
  ▪ Will increased Mexican MDF capacity lead to more MDF furniture production?
US MDF Exports and Imports to Mexico

*M2016 data annualized
Particleboard and MDF Operating Capacity Increasing
MDF Reaching “Name-Plate” Levels by 2017
North American D/C Ratios Will Improve Through Forecast
Lower Input Costs Helping Lower Total Costs
Wood and Resin Cost Savings

Total Costs, US South

- $/MSF, ¾-Inch Basis
- 05 06 07 08 09 10 11 12 13 14 15 16 17 18
- Particleboard
- MDF
Particleboard Profitability Improving

Lagging in the West

Mill Realization/Average Total Cost

Full cost breakeven

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Recent MDF Profitability the Best in Years
Will remain elevated in near future
Conclusions

• Growth expected to accelerate in 2017-2018
  ▪ Moderate increases in PB & MDF consumption over the next two years
  ▪ Driven by strong furniture market and residential construction

• Increasing demand/capacity ratios
  ▪ Will require effective operating capacity to be closely managed given excess nameplate capacity

• Slow price increases in the coming years
  ▪ Strong US dollar limits the ability of producers to raise prices when facing competition from imports
Thank you!

For more information:

Particleboard and MDF Commentary
www.risi.com/pbandmdfcommentary

Wood Panels 5-Year Forecast
www.risi.com/woodpanel5year