Global Containerboard Outlook
With a focus on the Asian market

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• One of the original Resource Information Systems, Inc. economists
• With RISI since 1983
• Developed RISI packaging models
• Works with more than 200 packaging paper clients worldwide
• Assisted by five local economists in RISI regional offices
• Directs numerous single- and multi-client studies on paper packaging materials

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Agenda

• Global Overview
• Asia
• Europe
• North America
• Latin America
• Africa, the Middle East, Oceania
• Conclusions
Global Containerboard Demand

Asia has the largest market, followed by North America and Western Europe

162 Million Tonnes in 2016

- Far East: 47%
- North America: 19%
- Western Europe: 14%
- Latin America: 8%
- Emerging Europe: 7%
- Emerging Europe: 5%
- All Others: 162 Million Tonnes in 2016
Share of Virgin Containerboard Demand Varies by Region

- Far East: 9%
- North America: 61%
- Western Europe: 21%
- Latin America: 38%
- Emerging Europe: 21%
- All Others: 30%
Global Capacity Will Grow Mostly in Recycled Containerboard

Global Capacity, Thousand Tonnes
Global Virgin Containerboard Demand Is Dominated by North America

40 Million Tonnes in 2016

- Far East: 47%
- North America: 17%
- Western Europe: 12%
- Latin America: 12%
- Emerging Europe: 6%
- All Others: 6%
Asia
China Continues to Account for More Than 60% of Asian Demand
Apparent Consumption, Thousand Tonnes
Wave of Capacity Expansion Dominated by China

• China set for huge increase in capacity in 2017-18 with total of 7.8 MT at 23 projects
  ▪ Announcements of another 19 with 6.5 MT

• How much capacity will be shut?
  ▪ Due to new environmental regulations
  ▪ Forced temporary reductions will affect levels

• Outside of China, biggest development is capacity additions in Vietnam
  ▪ 5 projects (2 are small) in 2017 w/capacity of 1.2MT; 1 project in 2018

• Thailand and Indonesia also have capacity additions in 2017 and 2018

<table>
<thead>
<tr>
<th></th>
<th>No. of Projects</th>
<th>Tonnage (Million)</th>
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<tbody>
<tr>
<td>2016</td>
<td>China</td>
<td>10</td>
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<td>1H17</td>
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<td>2018</td>
<td>China</td>
<td>9</td>
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<td></td>
<td>Other Asia</td>
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</table>
Capacity Growth in Asia Is Expected to Outpace Demand in 2017

![Chart showing capacity growth in Asia outpacing demand in 2017](chart.png)
Net Exports of Recycled Containerboard in Asia Are Expected to Grow in 2017

Net Exports, Thousand Tonnes

![Graph showing net exports of recycled containerboard in Asia from 2011 to 2018. The graph compares virgin containerboard (blue bars) and recycled containerboard (red bars). In 2017 and 2018, net exports have grown significantly compared to previous years.]
Not a Lot of Room for Growth Since Most Recycled Trade Is Regional

• In 2016, 85% of Asian recycled linerboard exports and 91% of recycled medium exports went to Asia
• The Middle East and Africa were the next two leading destinations in 2016
  ▪ The Middle East accounted for 12-18% in 2015, but then Indonesia pulled back exports
  ▪ Compete mostly with European suppliers in these markets
• Only 8-12% of Asia’s recycled imports come from outside the region
  ▪ Mostly from Oceania and Western Europe
• There may be opportunities for recycled linerboard to displace kraftliner

* Japan, South Korea, Taiwan, China, Indonesia and Thailand accounted for 96-98% of 2016 Asian exports
The Containerboard Price Surge in China Eased Off a Bit in March

Renminbi per Tonne
Will This Pattern Repeat in the Future?
Anatomy of a Price Bubble

• Bubbles tend to follow periods of persistent oversupply and the inevitable price weakness
  ▪ Inventories far lower than normal
  ▪ Producers unable to pass through cost increases
• Unexpected shift in the demand/supply balance pushes prices upward
• At some point, panic buying sets in, driving prices through the roof
• Double ordering sets up sudden end to the bubble when inventories are overstocked
  ▪ Leading to eventual crash
• Prices find new equilibrium level
  ▪ Inventories are maintained slightly higher than before, just in case
Europe
Total Containerboard, Western Europe
Demand Growth Is Slowing Down in 2016 and 2017
Trade Trends in Western Europe
Virgin Containerboard Imports to Decline in 2017

Net Exports of Containerboard

<table>
<thead>
<tr>
<th>Year</th>
<th>Virgin Containerboard</th>
<th>Recycled Containerboard</th>
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<tbody>
<tr>
<td>2011</td>
<td>-0.5</td>
<td>-1.0</td>
</tr>
<tr>
<td>2012</td>
<td>0.0</td>
<td>-0.5</td>
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<tr>
<td>2013</td>
<td>0.5</td>
<td>-0.7</td>
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<tr>
<td>2014</td>
<td>1.0</td>
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<td>2015</td>
<td>1.5</td>
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<td>2016</td>
<td>2.0</td>
<td>-0.8</td>
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<td>2017</td>
<td>2.5</td>
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<tr>
<td>2018</td>
<td>2.0</td>
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Containerboard Demand Growth in Emerging Europe to Accelerate Toward 2018
Dynamic Changes in Regional Net Imports in Emerging Europe

Net Imports, Thousand Tonnes

- Eastern Europe
- Central Europe
- Southeastern Europe

North America
Recycled Containerboard Is Gaining Market Share in North America Over Time

Apparent Consumption, Thousand Tonnes

![Bar chart showing apparent consumption of containerboard by type over time (2011-2018)]
Demand Is Currently Outpacing Capacity Growth in North America

Change in Thousand Tonnes, Percent
Accident at International Paper’s Pensacola Mill in Cantonment, Florida

- An explosion on the evening of January 22, 2017, caused significant structural damage to the pulp digester and the power house
- Paper capacity is 486,000 metric tons per year of lightweight fully virgin kraft linerboard
- Machine was down a little over two months, leading to a reduction in capacity of roughly 100,000 tonnes
- The consequences were a significant tightening of the global kraftliner supply/demand balances in the first half of 2017
North American Net Exports of Virgin Containerboard Should Drop in 2017

Change in Net Exports, Million Tonnes

-0.25
-0.20
-0.15
-0.10
-0.05
0.00
0.05
0.10
0.15
0.20
0.25
0.30

Virgin Containerboard
Recycled Containerboard

2013 2014 2015 2016 2017 2018
Demand Growth in Latin America Accelerates as Brazilian Economy Recovers

Change in Thousand Tonnes, Percent
Brazil and Mexico Account for More
Than 70% of Latin American Demand

Mexico will outpace Brazil in 2017-2018
Net Imports in Latin America Are Set to Grow in the Future

Change in Net Imports, Thousand Tonnes
African Demand Has the Best Outlook
Apparent Consumption, Thousand Tonnes
Net Imports to Grow for Both the Middle East and Africa, Oceania to Export More

Net Imports, Thousand Tonnes

-900 -400 100 600 1,100


Middle East Africa Oceania
Conclusions

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Global Demand Growth to Accelerate in 2018 After Slowdown in 2017

Apparent Consumption, Thousand Tonnes

<table>
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<tr>
<th>Year</th>
<th>Kraftliner</th>
<th>Sem. Medium</th>
<th>Rec. Liner</th>
<th>Rec. Medium</th>
<th>Demand Growth, %</th>
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Take Home Points on Global Containerboard

• Global demand growth will slow in 2017, but will improve in 2018
  ▪ Emerging markets will accelerate toward 2018

• Massive capacity expansions to happen in recycled containerboard across the globe
  ▪ Putting pressure on fiber costs

• Globally tighter supply/demand balances in virgin containerboard in the near term
  ▪ Higher operating rates in this segment
Thank you!

Any questions?

For more information on RISI’s global paper packaging and containerboard coverage, visit www.risi.com.