Corrugate Trends & Impact on Recovery
Dennis Colley, President/CEO, Fibre Box Association

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Agenda

- What’s been the trend of OCC recovery in the US?
- How is China’s National Sword Program impacting recovery?
- Will the announced paper mill additions in the US consume more waste paper?
- How does E-commerce change the landscape?
Recycling Corrugated

• Approximately 35 million tons produced
• Over 31 million tons of fiber recovered
• Positive trend for past 20 years
• Hovering near 90% recovery for past seven years

Experienced a 4 basis-point reduction in 2017 OCC recovery, driven by lower exports of OCC
Corrugated Recovery

- About 90% of boxes are recovered and made into new boxes
- Some are composted
- Some are burned for energy
- Less than 6% go to landfill
Of the 31 million tons of fiber recovered...

17 million tons were used to make new containerboard in the U.S.

5 million tons were used to make other packaging products in the U.S.

9 million tons were exported, primarily to Asia
Percent of corrugated boxes to landfill – EPA 2015

EPA 2015 Report

% OCC Landfill Recovered

Percent of Wax Boxes to the Landfill

EPA 2015 Report

Opportunity

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

0 1 2 3 4 5

2002 2009 2016

Wax Boxes
China’s National Sword Program

• Intended to increase local recovery of OCC
• Ban on imported mixed waste
• Restrictions on OCC contaminations
• Closure of inefficient containerboard mills in China
• Reduction of recovered paper (RCP) imports by approximately 6 million tons

What happens now to US waste fiber?
## Announced Capacity Additions

### North America Containerboard Capacity Additions

<table>
<thead>
<tr>
<th>Year</th>
<th>Company</th>
<th>Location</th>
<th>Capacity (000 tons)</th>
<th>Cost of Project (US$MM)</th>
<th>Cost/Ton (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>Midwest Paper Group</td>
<td>Combined Locks, WI (Conversion)</td>
<td>350</td>
<td>30</td>
<td>86</td>
</tr>
<tr>
<td>2018</td>
<td>Packaging Corporation</td>
<td>Wallula, WA Mill (Conversion)</td>
<td>400</td>
<td>150</td>
<td>375</td>
</tr>
<tr>
<td>2018</td>
<td>Packaging Corporation</td>
<td>DeRidder, LA</td>
<td>150</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>2018</td>
<td>Hood Container</td>
<td>St. Francisville, LA</td>
<td>120</td>
<td>61</td>
<td>508</td>
</tr>
<tr>
<td>2018</td>
<td>Verso</td>
<td>Androscoggin, Maine (Conversion)</td>
<td>200</td>
<td>19</td>
<td>95</td>
</tr>
</tbody>
</table>

**Capacity Additions in 2018**

- 1,220

<table>
<thead>
<tr>
<th>Year</th>
<th>Company</th>
<th>Location</th>
<th>Capacity (000 tons)</th>
<th>Cost of Project (US$MM)</th>
<th>Cost/Ton (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>International Paper</td>
<td>Riverdale, AL (Conversion)</td>
<td>450</td>
<td>300</td>
<td>667</td>
</tr>
<tr>
<td>2019</td>
<td>Grupo Gondi</td>
<td>Mexico (new mill)</td>
<td>441</td>
<td>300</td>
<td>680</td>
</tr>
<tr>
<td>2019</td>
<td>Pratt Industries</td>
<td>Wapakoneta, OH (new mill)</td>
<td>400</td>
<td>275</td>
<td>688</td>
</tr>
<tr>
<td>2019</td>
<td>Copamex</td>
<td>Anahuac, Mexico (Conversion)</td>
<td>176</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

**Capacity Additions in 2019**

- 1,467

<table>
<thead>
<tr>
<th>Year</th>
<th>Company</th>
<th>Location</th>
<th>Capacity (000 tons)</th>
<th>Cost of Project (US$MM)</th>
<th>Cost/Ton (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>McKinley Paper (BioPappel)</td>
<td>Port Angeles, WA (Conversion)</td>
<td>160</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>2021</td>
<td>Green Bay Packaging</td>
<td>Green Bay, WI</td>
<td>445</td>
<td>500</td>
<td>730</td>
</tr>
<tr>
<td>2021</td>
<td>Cascades Inc</td>
<td>Bear Island, Virginia (Conversion)</td>
<td>400</td>
<td>300</td>
<td>750</td>
</tr>
</tbody>
</table>

**Capacity Additions in 2020/2021**

- 1,005

**Total Capacity Additions in North America (2018-2021)**

- 3,692

Source: Company filings, BMO estimates
China Mills in the US

Nine Dragons

• Purchased Catalyst Paper mills for $175MM
  - Rumford, Maine – lightweight liner (R15), pulp (export), invest $111MM
  - Biron, Wisconsin – containerboard (B25), pulp (export), invest $189MM
• Purchased Resolute’s recycled kraft pulp mill in Fairmont, West Virginia
• Purchased Old Town, Maine kraft pulp mill, capacity increase 155k to 275k tons

Global Win Wickliffe

• Purchased Verso Mill in Ballard County, Kentucky
• $16MM
• Pulp & brown paper packaging
• Invest $150MM
Market Dynamics

China National Sword Program (6MM)

Announced US capacity additions 3.7MM

US mills fiber substitution ?

US mill system creep ?

Export of US fiber to other parts of the world ?

Export of China mills’ pulp to China ?

The long-term demand for OCC is positive
E-Commerce – changing everyday

Shift in delivery destinations

Box On-demand

Omni-channel

Ship in own container

Over box

Master label

Last mile
So what happens to all of those boxes at my front door?
More than 6.1 million tons of OCC are generated by residents on an annualized basis.

Only 2.2 millions tons of OCC are recovered from residents

36% collection rate

** 2016 State of Curbside Report
How Boxes are Recovered today

95% Recovery Rate

30-40% Recovery Rate

85% Commercial

15% Residential

90% Overall Recovery Rate

What happens if that trend changes?
Industry Working Group

Collaborative effort between manufacturers, associations, waste haulers

- Cascades/Norampac
- Georgia Pacific
- International Paper
- Kruger
- PCA
- Pratt Industries
- WestRock
- AF&PA
- AICC
- Ameripen
- FBA
- ISRI
- The Recycling Partnership
- RRS
- Waste Management
Collaborative effort between manufacturers, associations, waste haulers

- Use wheeled carts instead of bins
- Match frequency of recycling and trash collection
- Establish clear and harmonized messages and graphics
- Use direct “call-to-action” recycling messages on boxes
- Educate to encourage recycling behaviors and reduce contamination
- Develop better building codes for multi-family dwellings
- Promote successful multi-family and rural recovery programs
Make it easier for retailers to recycle

- Fewer waxed boxes
- Efficient shelf-ready packaging
- Easier to disassemble boxes
- Support zero-waste retail initiatives
Provide residents with

• Better information on what and how to recycle
• Larger recycling containers
• More frequent pick-ups
• Easier to disassemble boxes
• Ways to eliminate contamination
Waste Haulers

Work with waste/recovery haulers to adapt to the changes in demand

- Size of collection carts
- Frequency of pick-up
- Rural drop-off locations
- Contamination of single-stream
Multi-Family Dwellings

- Encourage landlords to find space and provide bins for recycling in existing buildings

- Encourage cities to promote recycling capabilities in existing multi-family dwellings

- Encourage developers to include adequate space for recycling in new buildings
It’s up to all of us

Corrugated Industry – Promote the need for recovered fiber, responsible stewardship and easier disassembly of boxes

Local communities – Promote recycling messages and recovery of corrugated cardboard boxes

Commercial – Promote recycling messages on boxes and advertisements
A used corrugated cardboard box is not WASTE, but rather a valuable RESOURSE waiting to be reused.
Thank You