Corrugated Packaging Alliance
Life Cycle Assessment (LCA)
Webinar

June 28, 2017
2 pm EDST/ 11 am PDST
Agenda

Moderator: Brian O’Banion, Fibre Box Association

• Welcome participants
• GoToMeeting orientation - Caitlin Salaverria, FBA
• Review Antitrust Guidelines - Greg Heinen, Foley & Lardner, CPA counsel
• CPA’s sponsors and mission
• Review Study
• Communication Tools
• Q&A
Who is CPA?

**Sponsors**
The Corrugated Packaging Alliance (CPA) is a corrugated industry initiative, jointly sponsored by the American Forest & Paper Association (AF&PA), AICC – The Independent Packaging Association, Fibre Box Association (FBA) and TAPPI.

**Mission**
To foster growth and profitability of corrugated in applications where it can be demonstrated, based on credible and persuasive evidence, that corrugated should be the packaging material of choice.

To provide a coordinated industry forum that effectively acts on competing materials matters that could not be accomplished by individual members.
LCA Study Overview
Background

• Sustainability continues to be a primary discussion topic with corrugated customers. Many have built sustainability into their corporate strategies and expect their suppliers to show continuous improvement.

• The aim of the study is to generate high-quality, up-to-date data on the environmental impacts of corrugated packaging and compare these results to previous studies using 2006 and 2010 data.

• The study evaluates the performance of an industry average corrugated container throughout its entire life cycle, “cradle-to-grave” (seedlings to end-of-life)
Audiences

Audiences are both internal to the industry:

– Corrugated Packaging Alliance
– All corrugated industry members

And external across user groups and other interested stakeholders:

– Retailers, CPGs
– Government Agencies (Environmental Protection Agency)
– Non-government Organizations (NGOs)
– International corrugated community (ICCA, FEFCO)
– Academics, LCA practitioners, software providers
Industry Average LCA

**Purpose:**

- Answer the question, “What is the cradle-to-grave impact of one kilogram of corrugated product on the environment?”

- Compare the results over time
  - First study used 2006 data, published 2009
  - Second study used 2010 data, published 2014
  - Current study used 2014 data
Scope

Figure 1.

System Scope and Life-cycle Phases for U.S. Average Corrugated Product
Summary of System Boundaries

- Emissions to air, water and soil (waste)
- Landfill incineration
- System boundary for corrugated product manufacturing
- Forestry
- Containerboard mills
- Converting plants
- Transport to customer-use phase
- End-of-life
- Raw materials, coatings, adhesives, sodium sulfate, soda, etc.
- Energy, fuels, electricity, etc.
- Recycling
- OCC Export

CORRUGATED PACKAGING ALLIANCE
Product Systems

Functional Unit:

• Per kilogram of U.S. Industry Average Corrugated Product shipped
Industry Average Box

Consists of:

• 66.8 percent linerboard and 33.2 percent corrugated medium

• A basis weight of 131.6 lb./thousand square feet (msf, 0.642 kg/m2).

• 52 percent recycled fiber (domestic)
Example of a 1 kg box:

- **Style:** RSC
- **Inside Dimensions:** 20 x 18 x 20
- **Board Weight:** 35#/26#C/35#
- **Square Feet:** 20.47
- **Basis Weight:** 108.18#/msf
- **Box Weight:** 2.2 lbs/ 1 kg
Indicators Studied

• **7** environmental impact indicators:
  – Global warming potential
  – Ozone depletion
  – Photo-chemical oxidation (smog)
  – Acidification
  – Eutrophication
  – Respiratory effects (particulates)
  – Fossil fuel depletion

• **4** inventory indicators:
  – Non-renewable energy demand
  – Renewable energy demand
  – Water use
  – Water consumption
Indicators Studied

**Environmental Impact Indicators:**

- Global Warming (GWP) – greenhouse gas impact on the atmosphere;
- Ozone Depletion (ODP) – impact on the protective ozone layer in the stratosphere;
- Acidification (AP) – acid rain impact on forests;
- Eutrophication (EP) – impact of over-fertilization on soil and water;
Indicators Studied

Environmental Impact Indicators:

• Photo-Chemical Oxidant Formation (Smog, POCP) – impact on ozone formation in the lower atmosphere;

• Respiratory Effects (Particulates, RES) – impact of atmospheric concentration of particulates on respiration;

• Fossil Fuel Depletion (FF) – energy-intensive impact of extracting the fossil fuel;
Indicators Studied

**Inventory Indicators:**

- Non-renewable Energy Demand (NRPE) – fossil fuel energy used;
- Renewable Energy Demand (RPE) – biomass and other renewable energy used;
- Water Use (WU) – water withdrawn from the environment (water withdrawal);
- Water Consumption (WC) – water removed, but not returned, i.e. – evaporated or incorporated in the paper.
Process

• Study was performed by The National Council for Air and Stream Improvement (NCASI).

• The FBA Sustainability Committee provided technical review and oversight.

• CPA members, AF&PA Containerboard Kraft Sector members, and legal counsel from both AF&PA and FBA contributed significantly to the review process.

• A Critical Review was performed to review the study, assuring objective conformance to ISO comparative LCA standards.
Comparing 2006, 2010 and 2014 Product
Actual Results: 2014 vs. 2006

- Global Warming: 35% reduction
- Eutrophication: 29% reduction
- Smog: 23% reduction
- Respiratory: 21% reduction
- Water Use: 21% reduction
- Acidification: 20% reduction
- Renewable energy: 13.8% reduction
- Non-renewable energy: 9.8% reduction
- Ozone depletion: 3.4% reduction
- Fossil fuel depletion: 3.8% reduction
## Main Change Drivers

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Parameter Description</th>
<th>2006</th>
<th>2010</th>
<th>2014</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recovery Rate</td>
<td></td>
<td>72%</td>
<td>85%</td>
<td>89.5%</td>
<td>Increasing recovery rate decreases amount going to landfill, leading to reduced GW.</td>
</tr>
<tr>
<td>Utilization Rate (kg/ kg CBD)</td>
<td></td>
<td>0.42</td>
<td>0.46</td>
<td>0.52</td>
<td>Increased usage of recovered fibers reduces carbon removal (sequestration), total energy use at mills (renewable) and water use. Overall, a net benefit to GW.</td>
</tr>
<tr>
<td>Board from 100% recycled fibers</td>
<td></td>
<td>22.3%</td>
<td>26.6%</td>
<td>30.5%</td>
<td></td>
</tr>
<tr>
<td>Carbon Removal (kg CO2eq/kg CP)</td>
<td></td>
<td>-2.8</td>
<td>-2.6</td>
<td>-2.4</td>
<td>Reduced carbon removal is due to use of more recycled fibers, leading to increased GW.</td>
</tr>
</tbody>
</table>
## Main Change Drivers

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</thead>
<tbody>
<tr>
<td>Total fossil fuels used at mills (MJ HHV/kg CBD)</td>
<td>23.8</td>
<td>23.4</td>
<td>22.1</td>
<td>Less fossil fuel use reduces GW and other air emissions (ODP, POCP, AP, RES).</td>
</tr>
<tr>
<td>Share of natural gas in mill fuel mix</td>
<td>46%</td>
<td>54%</td>
<td>73%</td>
<td>More natural gas in the fuel mix reduces GW and air emissions, but increases fossil fuel depletion (FF) because it is harder to extract.</td>
</tr>
<tr>
<td>Total energy used in converting (MJ/kg CP)</td>
<td>2.1</td>
<td>1.9</td>
<td>1.9</td>
<td>Less energy reduces GW and other air releases. It also reduces non-renewable energy demand (NRPE).</td>
</tr>
<tr>
<td>Natural gas used in converting (MJ HHV/kg CP)</td>
<td>0.82</td>
<td>1.03</td>
<td>1.09</td>
<td>More natural gas in the fuel mix reduces GW and air emissions, but increases fossil fuel depletion (FF) because it is harder to extract.</td>
</tr>
</tbody>
</table>
Industry continues to improve due to:

• **Increased recovery of OCC** at end-of-life from 72% in 2006 to 89.5% in 2014, which reduced landfill emissions of methane (GW impact)

• **Reduced energy use at mills**, which reduced GHG and other air releases. (GW, ODP, POCP, AP, RES, NRPE)

• **Increased use of more-efficient fossil fuels** by switching from oil/coal to natural gas, which reduced GHG other air emissions and increased Fossil Fuel Depletion. (GW, ODP, POCP, AP, RES, NRPE, FF)

• **Increased use of recycled fibers**, which reduces water and total energy use at mills as well as carbon sequestration (NRPE, WU, NRPE, RPE, GW).
What about 100% Recycled?

The study also compared the environmental performance of 2014 industry average product with 100% recycled product produced in 2014, to better address our customers’ questions.

The key take-aways are:

• Neither product is better than the other across all indicators, regardless of allocation method.

• Neither system acting alone is viable.

• The worldwide market needs both new and recycled fibers to produce the best quality product and to ensure a consistent and sustainable supply.
Communicating the LCA Results
Communicating the Results

• Study became publicly available Monday, June 26, 2017
  – Press release distribution
  – Study posted to CPA website, www.corrugated.org

• Communications Tools available to members
  – Press Release
  – Executive Summary
  – Full Report
  – Infographic
  – Carbon Calculator
Communications Tools

Environmental Impact of Corrugated Packaging

The study tracked the environmental impact of corrugated products through 4 life cycle phases:

- Converting: Uinting, corrugating, printing, stacking
- UHI: Stacks corrugated in transport, storage and display products
- End of life: Recovery by recycling, composting or incineration, landfilling

What was the progress between 2006-2014?

- 35% reduction in VOC emissions
- 29% reduction in CFC emissions
- 23% reduction in greenhouse gas (GHG) emissions
- 21% reduction in specific energy usage

What drove the improvements?

1. Increased recovery rates of corrugated fiberboard (CFC)
2. Increased efficiency in converting systems
3. Increased use of landfills for waste disposal

Corrugated packaging is circular by nature

Removable, reusable, recyclable corrugated comes full circle, every day. From efficient use of corrugated fiberboard to sustainable practices in recycling and reusing, corrugated packaging continually reduces waste as our natural resources are preserved.

Learn more about corrugated packaging at www.corrugated.org.

Corrugated Industry Extends Record of Environmental Progress

IRASCA II (June 5, 2017) – The Corrugated Packaging Alliance (CPA) today released a new U.S. corrugated industry life cycle assessment (LCA), which shows the corrugated industry’s environmental progress.

The full LCA is available for download here: http://www.corrugated.org/IIRasca

“The LCA results demonstrate the efforts our mills and converting facilities are making to reduce the industry’s supply chain impact on the environment,” said CPA Executive Director Servio Calio, “Sustainable forest procurement, along with the high-end corrugated containers (OCC) recovery rate provide for a well-balanced system of fiber and supports the sustainability of our industry’s products.”

The LCA examined the effects of a 1-kilogram industry-average corrugated product manufactured in 2014 on seven environmental impact indicators: global warming potential (GWP) of greenhouse gas emissions, eutrophication, acidification, smog, ozone depletion, respiratory effects, fossil fuel depletion and four inventory indicators: water use, water consumption, renewable energy demand, and non-renewable energy demand.

The corrugated industry reduced its GHG emissions by 35 percent between 2006 and 2014. The reduction was driven by increased OCC recovery and use of energy generated from renewable, carbon neutral biomass and decreased overall use of fossil fuels.

The recovery rate for OCC increased from 72 percent in 2006 to 89.5 percent in 2014. As more is recovered, less goes to landfill, thereby reducing methane emissions.

Other notable improvements between 2006 and 2014 include a 29 percent reduction in the effects of nutrient releases on receiving waters and soils (eutrophication), a 23 percent reduction in photochemical ozone creation, a 21 percent reduction in water use, and a 22 percent reduction in respiratory-related effects.

The peer-reviewed study, commissioned by the CPA and conducted by the National Council for Air and Stream Improvement, is the third study in a series of industry LCA’s. It was conducted in accordance with ISO 14044 standards and guidelines for life cycle assessment studies.

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CPA members include corrugated manufacturers and converters throughout North America: Corrugated Packaging Alliance, Inc. (50 Park Blvd., Suite 385), Itasca, IL 60143; Ph: 847.564.8650; F: 847.564.8659.

Visit us on Twitter @corrugatedpkg at https://twitter.com/corrugatedpkg

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FOR IMMEDIATE RELEASE
Where can I find these items?

www.corrugated.org

Sustainability Tab
Questions and Answers

To ask a question use the Q&A function in the bottom right-hand corner of your screen.
Conclusion

• **Recommendation:** Companies should have a point person to access industry information and determine how it fits company sustainability strategy/story

• **Please call 847-364-9600, with any questions**

• For additional information and/or to hear a recording of this session please visit the CPA website

[www.corrugated.org](http://www.corrugated.org)