

**CORRUGATED PACKAGING ALLIANCE (CPA)**

# **LIFE CYCLE ASSESSMENT OF U.S. AVERAGE CORRUGATED PRODUCT**

## **2020**



**PREPARED BY:**

- National Council for Air and Stream Improvement
- Anthesis

**THIRD PARTY REVIEW BY:**

- The Athena Institute
- Lindita Bushi

**October 2, 2023**

# Introduction



**American  
Forest & Paper  
Association**



**FIBRE BOX ASSOCIATION®**



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, the 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; and to provide a coordinated industry focus that effectively acts on industry matters that cannot be accomplished by individual members.

**OUR MEMBERS:** CPA members include corrugated manufacturers and converters throughout North America.



# Communicating LCA Results



## **MEDIA RELEASE 10/3/23**

- Press release to trade/mainstream media
- Social media amplification
- Editorial coverage in target publications



## **MEMBER RESOURCES**

- Member toolkit
- Member meetings and customer visits
- Industry webinars



## **INDUSTRY EVENTS 2023**

- E-Pack U.S.: 10/3/23 – 10/4/23
- Fastmarkets International Containerboard  
Conference: 11/6/23 – 11/8/23
- Sustainability in Packaging – 3/6 – 3/8



## **KEY AUDIENCES**

- CPA sponsors and their members
- CPA member customers – Box buyers
- Legislators and policy influencers
- Media (trade and mainstream)

# Life Cycle Assessment (LCA)

**What is the impact of corrugated boxes on the environment?**

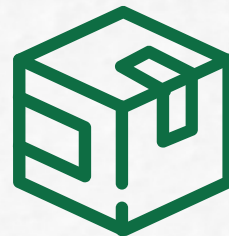
**In this study, the processes used to manufacture corrugated products in 2020 included:**



**MANAGED FORESTS**



**PAPER  
MILLS**



**CONVERTING  
PLANTS**



**TRANSPORTATION**



**DISPOSAL**

# Industry Representative Data



69% of containerboard mill production

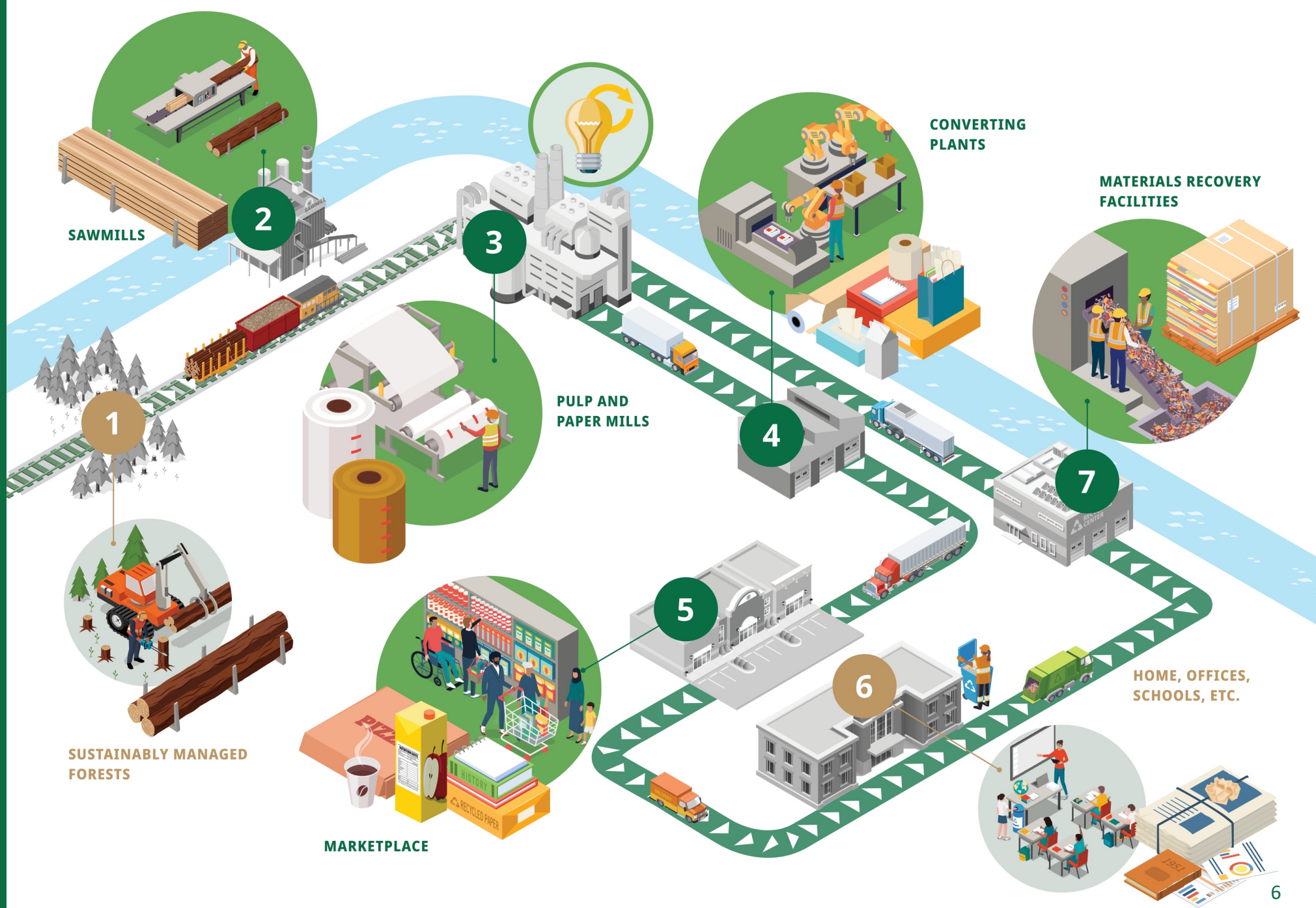


57% of corrugated box shipments

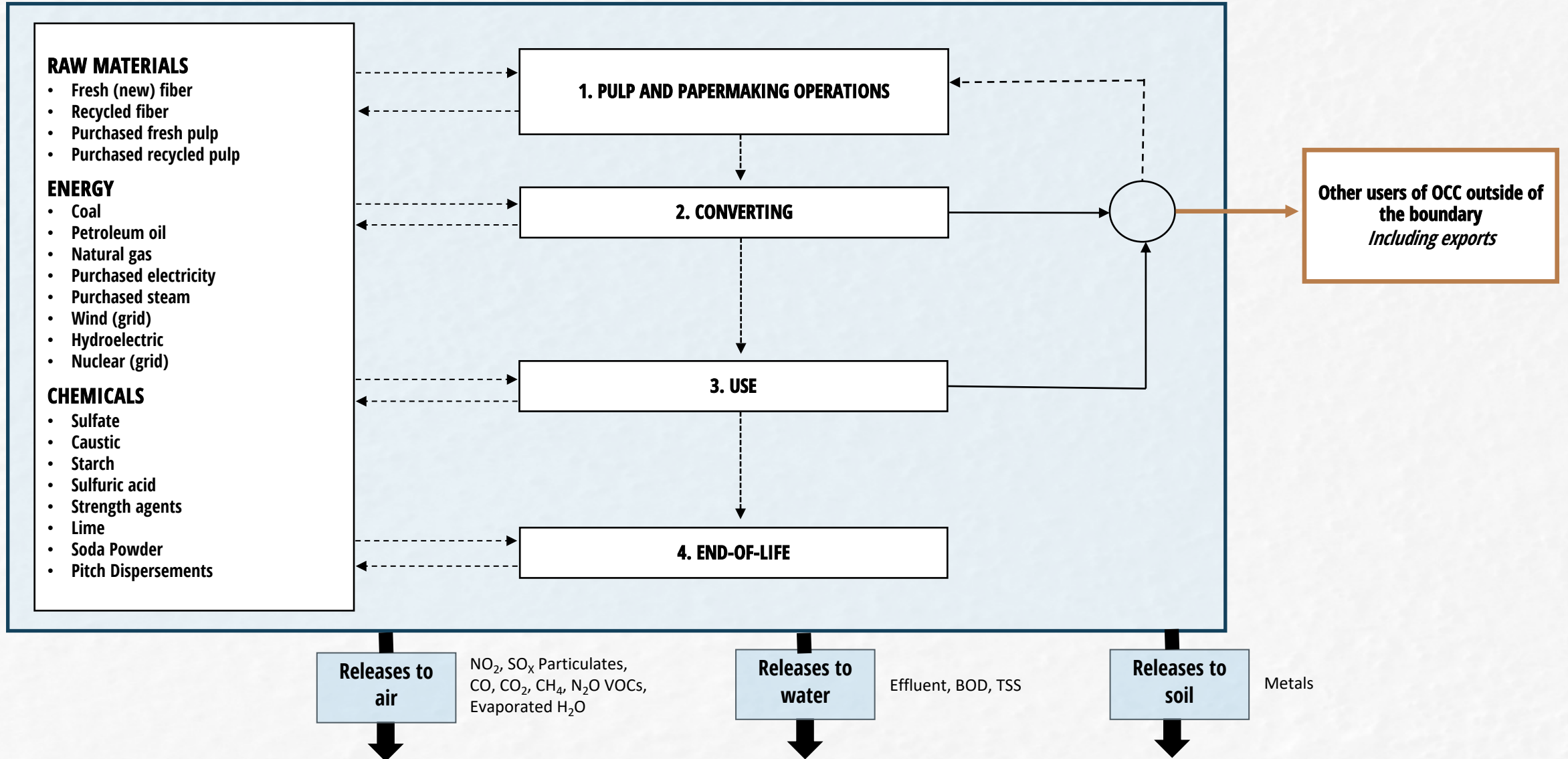


# The Paper & Packaging Industry

## Advancing a Circular Value Chain

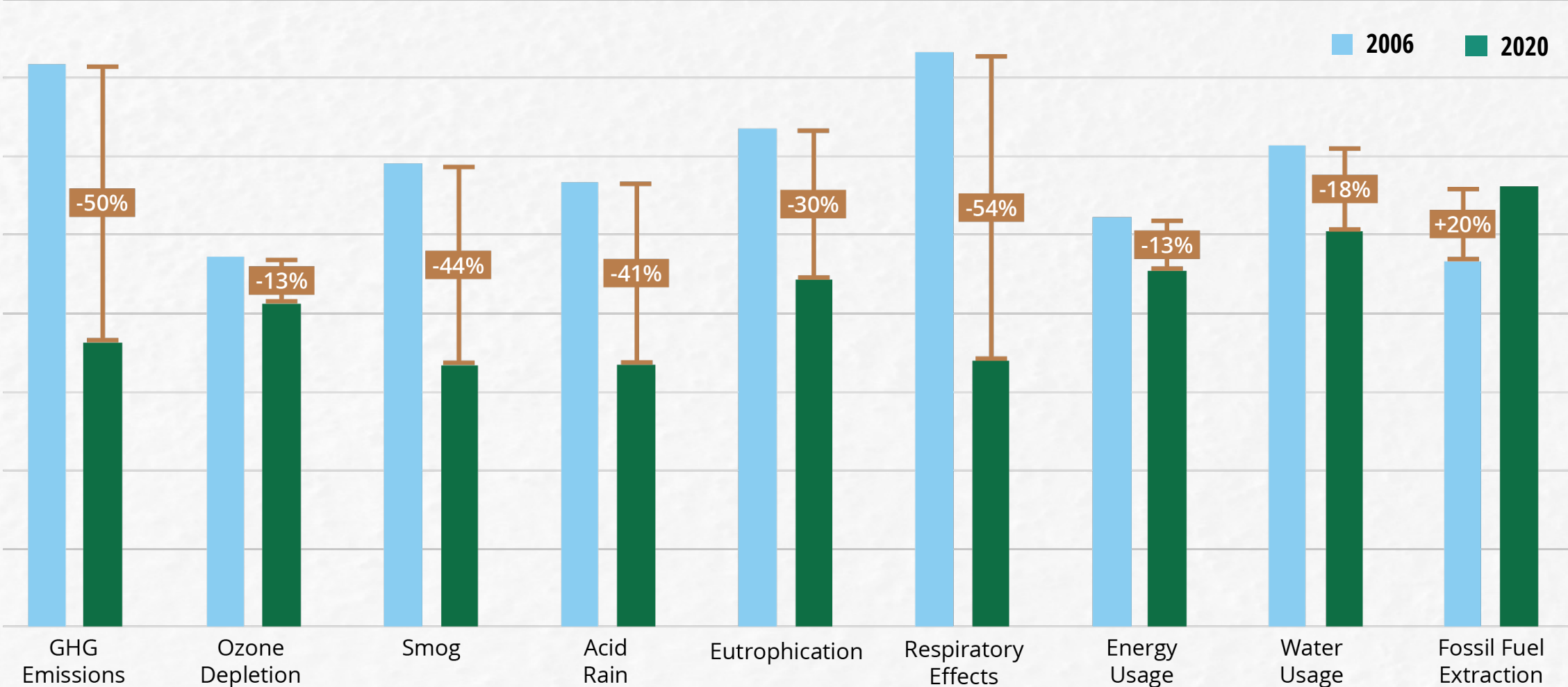


# System Boundary



# Highlighted Results

The corrugated packaging industry has substantially reduced its environmental impact since 2006.





# Key Drivers of Progress



## ENERGY IMPROVEMENTS:

- Shift to cleaner-burning fuel
- Increased participation in a greener U.S. electric grid
- Energy efficiency investments



## RECYCLING INFRASTRUCTURE:

- 3-Year OCC Average: 90.5% (2019-2021)
- Decreased CO<sub>2</sub> and methane emissions
- Exported OCC used by other containerboard producers



## MANAGED FORESTS:

- CO<sub>2</sub> removals from trees
- Efficiency of the forest



## COMMITMENTS TO PROGRESS:

- *Better Practices, Better Planet 2030* Sustainability Goals



American  
Forest & Paper  
Association

BETTER PRACTICES  
BETTER PLANET 2030  
SUSTAINABLE PRODUCTS FOR A SUSTAINABLE FUTURE



REDUCE GREENHOUSE GAS EMISSIONS



ADVANCE A CIRCULAR VALUE CHAIN



STRIVE FOR ZERO WORKPLACE INJURIES



ADVANCE SUSTAINABLE WATER MANAGEMENT



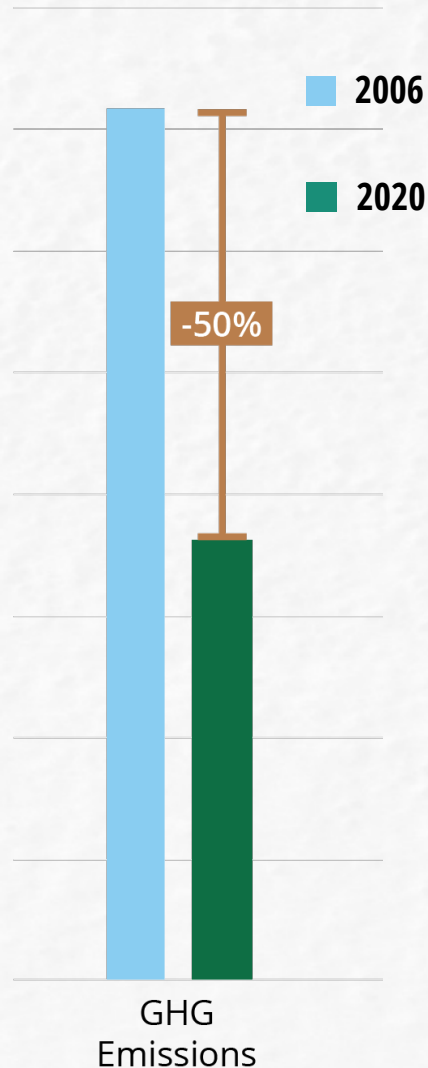
ADVANCE MORE RESILIENT U.S. FORESTS

## DIVERSITY, EQUITY & INCLUSION: More than Words at AF&PA



See our 2030 Goals and DE&I Statement of Principles at [afandpa.org/2030](https://afandpa.org/2030)

# Greenhouse Gases (GHGs)

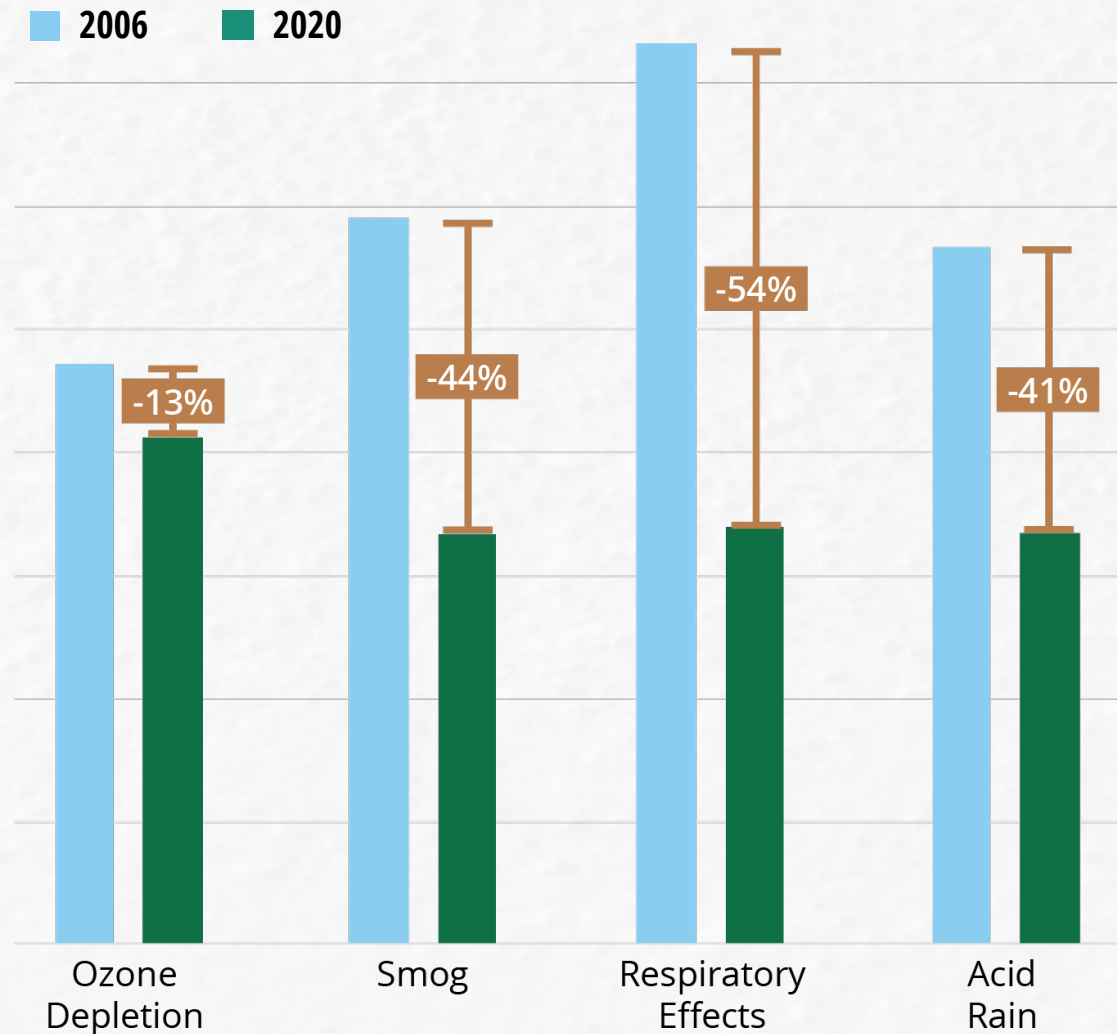


**The corrugated packaging industry reduced greenhouse gas emissions (GHG) by 50% from 2006 – 2020.**

- CO2 removals, primarily from trees grown to produce containerboard, are equivalent to 83% of all 2020 emissions
- 3-year average for OCC recovery rate (2019-2021) was 90.5% leading to reduced CO2 and methane emissions from fewer boxes in landfills
- Increased participation in a greener U.S. electric grid



# Air Related Indicators



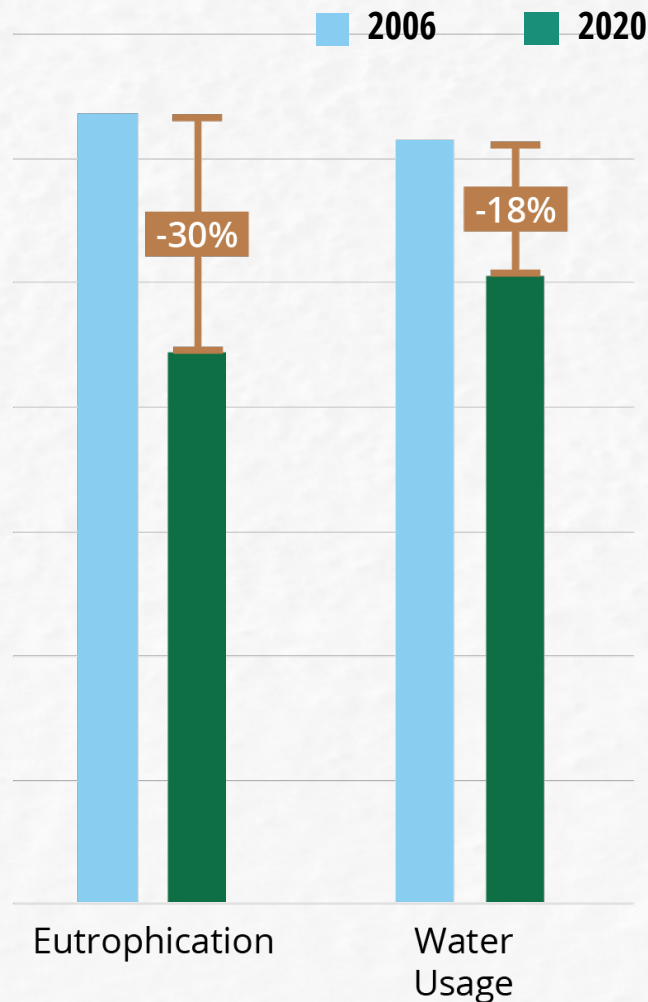
## Reductions between 2006 and 2020:

- Ozone depletion by 13%
- Smog by 44%
- Respiratory effects by 54%
- Acid rain by 41%

## Key drivers:

- Reduction of SO<sub>2</sub> emissions and particulates from containerboard mills
- Increased use of cleaner-burning fuel

# Water Related Indicators



## Reductions between 2006 and 2020:

- Eutrophication from nutrient discharge by 30%
- Water usage by 18%
- Water consumption by 26% from 2010 to 2020\*

*\*No 2006 comparison for Water Consumption indicator*

# Combination of Fibers

**The combination of new, fresh fibers and recycled fibers maximizes fiber reuse and enables circularity.**



## **The Contributions of Both Production Streams:**

- **Introduction of fresh fiber drives removal calculations of CO<sub>2</sub> from the atmosphere**
- **Use of OCC contributes to avoidance of CO<sub>2</sub> and methane from landfill**
- **Impact indicators are equal to or favorable to the environment for air emissions and water usage**



# Summary Results

**The corrugated packaging industry has substantially reduced its impact on the environment since 2006.**

**GHG per unit emissions by 50%**

**Ozone depletion by 13%**

**Smog by 44%**

**Acid rain by 41%**

**Eutrophication by 30%**

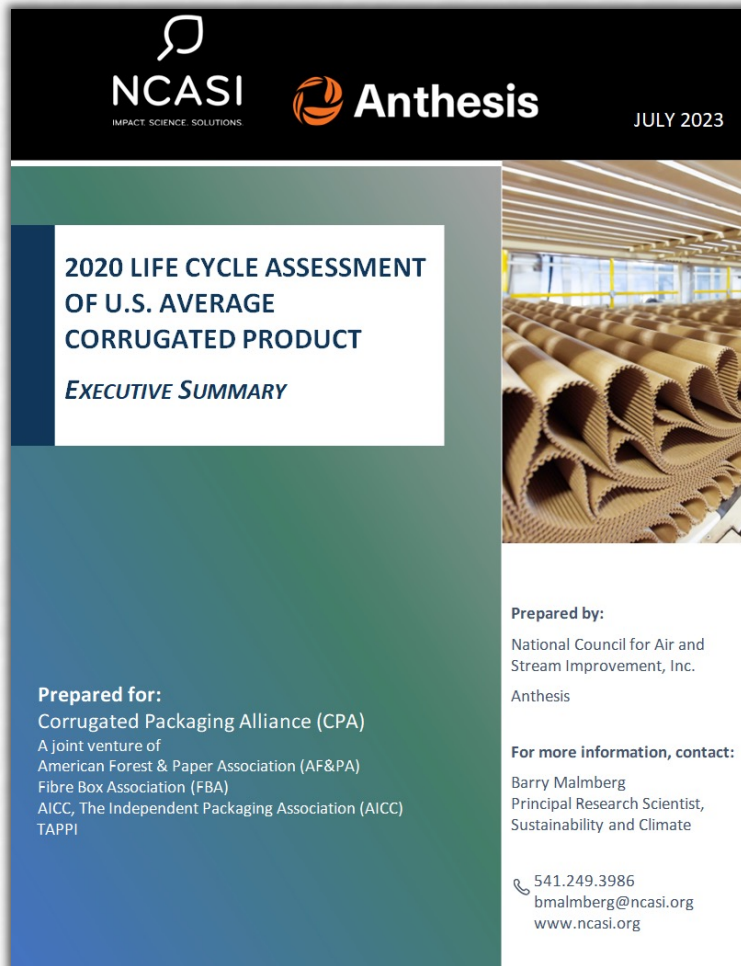
**Respiratory effects by 54%**

**Energy usage by 13%**

**Water usage by 18%**

**The corrugated industry 3-year average recycling rate was 90.5% (2019-2021).**

# Download the LCA & Toolkit



## [FIBREBOX.ORG/LIFE-CYCLE-ASSESSMENTS](https://fibrebox.org/life-cycle-assessments)

- **Executive Summary**
- **Full Report**
- **Frequently Asked Questions**
- **Webinar Recording**
- **Presentation Slides**

# Contact Information

## AMERICAN FOREST & PAPER ASSOCIATION

- Media Contact: Tim Ebner, Director Communications & Press Secretary [comm@afandpa.org](mailto:comm@afandpa.org)
- Terry Webber, Vice President, Industry Affairs: [Terry\\_Webber@afandpa.org](mailto:Terry_Webber@afandpa.org)

## FIBRE BOX ASSOCIATION

- Media Contact: Rachel Kenyon, Senior Vice President: [rkenyon@fibrebox.org](mailto:rkenyon@fibrebox.org)



# Appendix Slides

## 2020 Life Cycle Assessment Topline Messages

**The corrugated packaging industry has substantially reduced its environmental impact since the industry's first Life Cycle Assessment (LCA) in 2006.**

- The corrugated packaging industry reduced its greenhouse gas emissions (GHG) by 50% from 2006 – 2020.
  - The industry's shift to a cleaner-burning fuel, increased participation in a greener U.S. electric grid for purchased power, and improved energy efficiencies at mills and converting facilities led to the reductions in GHG emissions.
- The Old Corrugated Container (OCC) recycling rate contributed to the reduction in GHG and methane emissions. The 3- year average OCC recycling rate is 90.5% (2019 – 2021) compared to 72% in 2006.
- Carbon dioxide (CO<sub>2</sub>) removals from trees in managed forests were equivalent to 83.5% of biogenic CO<sub>2</sub> and other GHG emissions in 2020. This compares to 77% in 2006.
- The LCA showed additional reductions in respiratory effects (54%), smog (44%), acid rain (41%), eutrophication from nutrient discharge (30%) , reduction in water use (18%) and energy usage (13%).

**Corrugated packaging comes full circle every day.** From efficient use of managed forest lands to sustainable manufacturing practices and high recovery rates that put fiber back into the system, corrugated packaging is truly circular by nature.

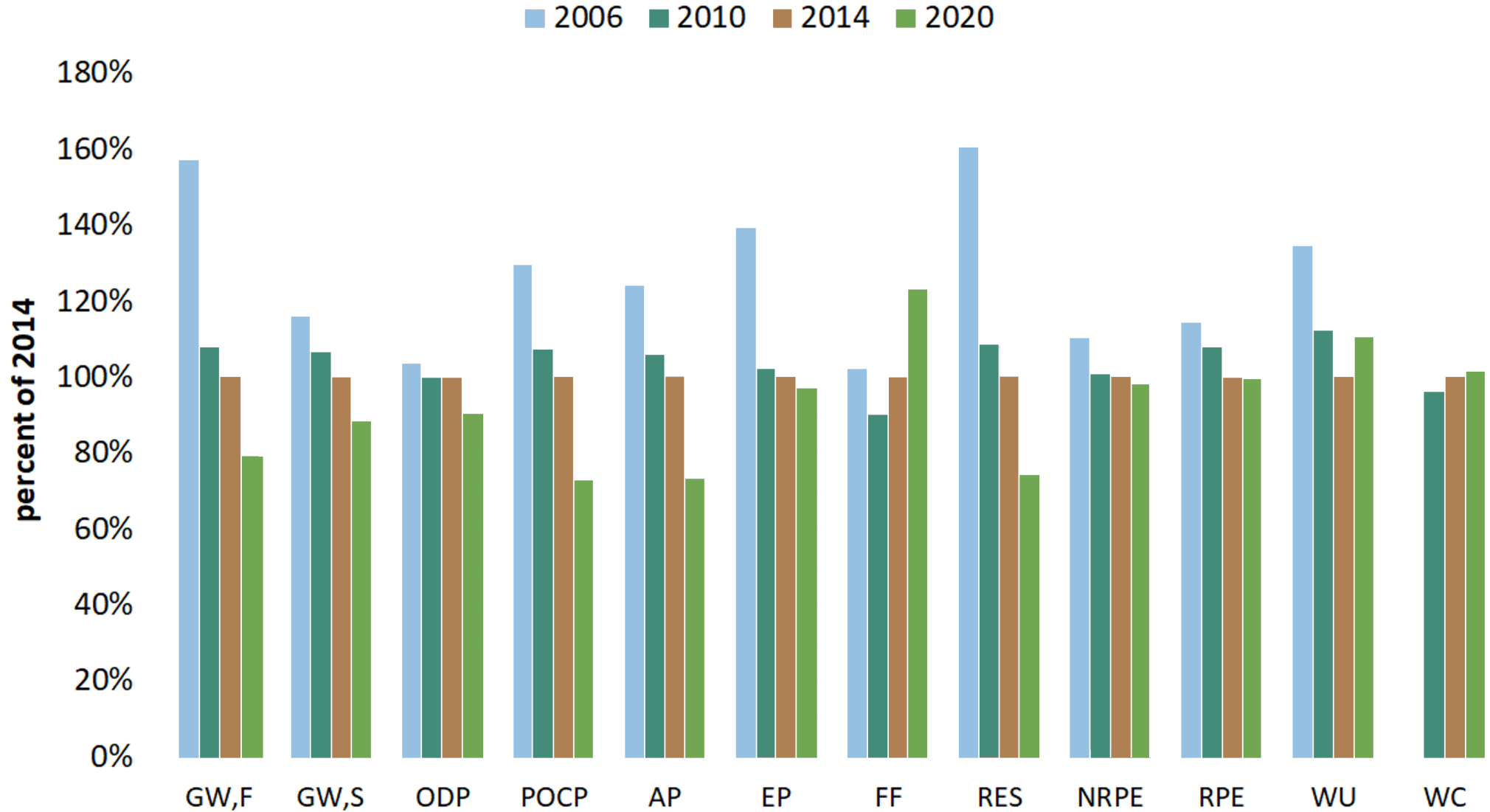
- The corrugated packaging industry has committed to continued reductions in its environmental impact as part of the paper industry's *Better Practices, Better Planet 2030* sustainability goals.
- The combination of new, fresh fibers with recycled fibers maximizes fiber reuse and enables circularity.

## Life Cycle Environmental Performance by Year

Indicator	Unit	2006	2010	2014	2020	% change 2020-2014	% change 2020-2010	% change 2020-2006	
Global warming, flow accounting	GW,F	kg CO <sub>2</sub> eq.	0.82	0.56	0.52	0.41	-20.5%	-26.4%	-49.5%
Global warming, stock accounting	GW,S	kg CO <sub>2</sub> eq.	N/Av.	1.53	1.43	1.27	-11.7%	-17.2%	-23.8%
Ozone depletion	ODP	kg CFC11 eq.	7.1E-08	6.9E-08	6.9E-08	6.2E-08	-9.7%	-9.5%	-12.7%
Photo-chemical oxidation (smog)	POCP	kg O <sub>3</sub> eq.	0.16	0.13	0.12	0.09	-27.0%	-32.0%	-43.6%
Acidification	AP	kg SO <sub>2</sub> eq.	0.015	0.013	0.012	0.009	-26.7%	-30.8%	-41.0%
Eutrophication	EP	kg N eq.	1.3E-03	9.8E-04	9.5E-04	9.3E-04	-2.8%	-5.0%	-30.3%
Respiratory inorganics	RES	kg PM2.5 eq.	1.6E-03	1.1E-03	9.7E-04	7.2E-04	-25.7%	36.6%	-53.7%
Fossil fuel depletion	FF	MJ Surplus	1.80	1.59	1.76	2.17	23.2%	-31.5%	20.6%
Non-renewable primary energy demand	NRPE	MJ	20.5	18.72	18.59	18.27	-1.7%	-2.4%	-10.9%
Renewable primary energy demand	RPE	MJ	11.1	10.5	9.73	9.69	-0.4%	-7.7%	-13.0%
Water use	WU	kg	52.8	44.04	39.24	43.37	10.5%	-1.5%	-17.9%
Water consumption	WC	kg	N/Av.	10.02	10.43	10.59	1.5%	-26.4%	N/Av.



# Comparing Life Cycle Environmental Performance by Year



# Audience Q&A