

Executive Summary

PakTech has commissioned a comparative life cycle assessment (LCA) to evaluate the environmental performance of its recycled high-density polyethylene (rHDPE) beverage can handles relative to paperboard alternatives in the Australian market. The study was undertaken by Sphera Solutions, Inc. (Sphera) and conducted in accordance with ISO 14044 requirements, including independent critical review by a panel of three experts.

Study Scope and Methodology

Products evaluated:

- PakTech rHDPE handles for 4- and 6-can beverages (produced at PakTech's Australian manufacturing partner in New South Wales, Australia).
- Generic 4- and 6-can paperboard carriers and paperboard wraps, representative of the Australian market.



PakTech 100% Recycled HDPE



Paperboard Carrier Clip



Paperboard Wrap

System boundaries:

Cradle-to-grave: That is, it considers impacts associated with the extraction of resources from nature up to the point at which the products are disposed or recycled at end-of-life. > raw material production, manufacturing, distribution, end-of-life, and all associated transport. Beverage cans and contents were excluded.

Impact assessment methods:

- Climate change: IPCC 6th Assessment Report characterization factors.
- Other categories: US TRACI 2.2 methodology.
- Additional indicators: primary energy demand (non-renewable) and blue water consumption.

Key Findings

Across both 4- and 6-can formats, PakTech's rHDPE handles consistently demonstrated lower environmental impacts than the paperboard carrier and wrap alternatives:

Climate Change (GWP100e):

rHDPE handles exhibited the lowest global warming potential, 53–45% lower than paperboard carriers and 62% lower than paperboard wraps.

Other Impact Categories:

Acidification, eutrophication, human health impacts, and photochemical smog formation were consistently lower for rHDPE handles.

Resource Use:

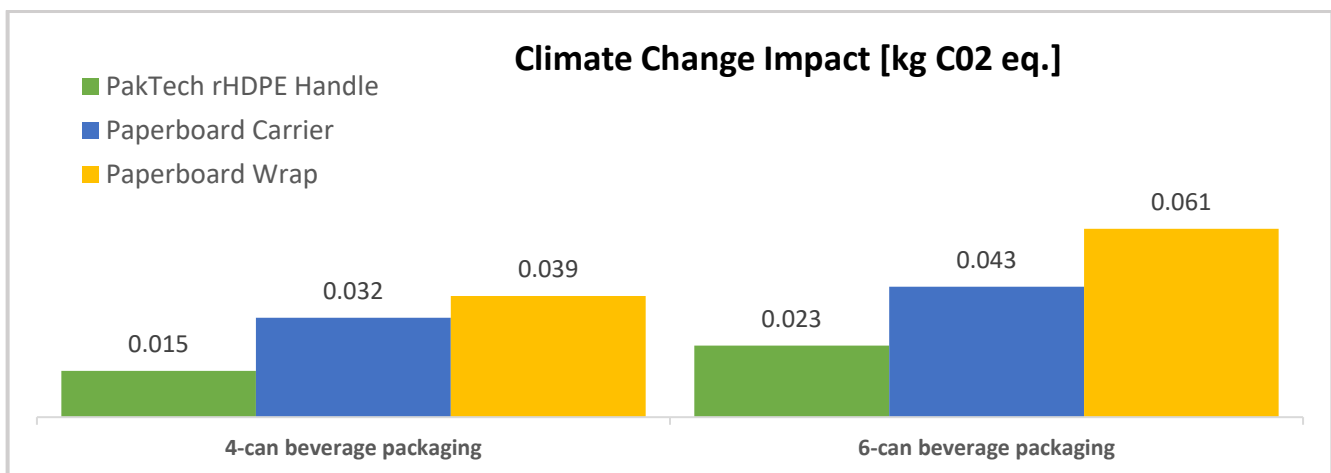
rHDPE handles required significantly less non-renewable primary energy and blue water consumption.

The comparative advantage of rHDPE handles is primarily attributed to their lower material mass (54–75% lighter than paperboard alternatives), use of 100% recycled content, and energy-efficient domestic manufacturing processes. By contrast, paperboard wraps showed the highest environmental impacts due to greater material intensity.

Conclusion

The LCA results demonstrate that PakTech’s rHDPE handles offer a clear environmental advantage over paperboard beverage packaging alternatives in Australia across multiple indicators. These findings reinforce the importance of lightweight, high-recycled-content packaging solutions in reducing environmental impacts and advancing circular economy outcomes.

Indicator	rHDPE Handle	Paperboard Carrier	Paperboard Wrap
Climate Change (GWP100e)	53–62% lower	Higher	Highest
Material Mass	54–75% lighter	Heavier	Heaviest
Recycled Content	100%	Partial	Partial
Production	Domestic, efficient	Global supply chain	Global supply chain



Converted to Decimal	4-can beverage packaging			6-can beverage packaging		
	rHDPE Handle	Paperboard Carrier	Paperboard Wrap	rHDPE Handle	Paperboard Carrier	Paperboard Wrap
IPCC AR5	12.5	19.8	22.5	19.5	26.0	36
Climate change, excl. bio. CO2 [kg CO2 eq.]	0.015	0.032	0.039	0.023	0.043	0.061
TRACI 2.1						
Acidification [kg SO2 eq.]	0.000073	0.000184	0.000223	0.000111	0.000242	0.000350
Eutrophication [kg N eq.]	0.000037	0.000104	0.000124	0.000057	0.000137	0.000196
Human Health Impacts from Exposure to PM [kg PM2.5 eq.]	0.000005	0.000021	0.000025	0.000007	0.000028	0.000039
Photochemical Smog Formation [kg O3 eq.]	0.001260	0.003680	0.004400	0.001930	0.004850	0.006950
Other Indicators						
Primary energy demand, non-renewable [MJ]	0.181	0.384	0.462	0.279	0.501	0.718
Blue water consumption [kg]	0.100	0.133	0.164	0.155	0.175	0.256