

Avoiding Greenhouse Gas Emissions The Essential Role of Chemicals



Polypropylene (PP) containers for water-based paints

A Braskem case study

Replacing tinplate rigid containers by Polypropylene containers for waterbased paints in Brazil can lead to a 18% reduction in GHG emissions amounting to 0.6 kgCO₂e per container, over the whole lifecycle of the paint containers.

If one million liters of paint were packaged in such polypropylene containers instead of tinplate containers, this would avoid GHG emissions equivalent to those of a passenger car giving 5.5 laps around the Earth and the equivalent of 1.26 Olympic pools of acid rain.

Brazil is one of the five largest markets for paints. In 2014, 1.397 billion liters of paint were produced, and this market is essentially dominated by tinplate (TP) pails.

With the objective of proposing a solution to the paint pail market to reduce environmental impact, Braskem developed an alternative packaging that is lighter and more resistant to corrosion, based on polypropylene (PP).

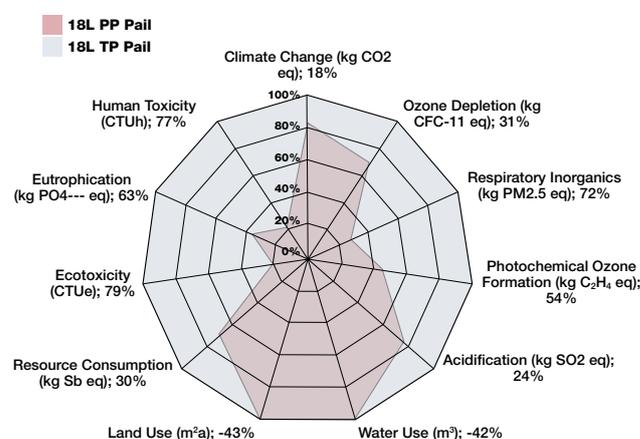
Life cycle GHG emissions for a typical 18 litre tinplate container amount to 3.33 kgCO₂e/container whereas PP containers have a total emission of 2.73 kgCO₂e/container. The majority of impact in the life cycle of these containers are concentrated in the production process of the materials (tinplate and polypropylene).

The main trade-offs of the polythelene container in the life cycle are in the impact categories of Land Use and Water Use.

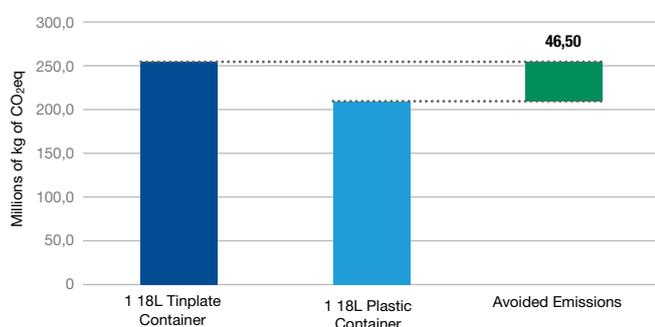
Full study available at: www.icca-chem.org/energy-climate

Full Life Cycle Impact Assessment Profile

Comparative environmental profile of tinplate containers for Water-based Paints against polypropylene containers – Climate change + all other environmental impact categories



CO₂e Emissions: 1,397 billion litres of paint in market



kg CO₂e

	kg CO ₂ e
1 18L Tinplate Container	3.33
1 18L Polypropylene Container	2.73
Avoided Emissions	0.60

Considering the Brazilian 2014 market (1,397 billion litres of paint) for the studied 18L containers, the graph highlights the emissions in CO₂e for both solutions and the emissions avoided by the substitution of tinplate by plastic containers (46.5 millions of kg CO₂e).



This case study illustrates how the reduction of greenhouse gas (GHG) emissions can be enabled by chemical products, as part of a series of case studies brought to you by ICCA. Chemical industry members offered Life Cycle Assessment [LCA] case studies for the purpose of showing illustrative examples on how to calculate avoided greenhouse gas emissions. The avoided emission calculations were based on the guidelines developed by ICCA and WBSCD (World Business Council for Sustainable Development) - Chemical Sector, with the support of Arthur D. Little and Ecofys. Other life cycle environmental impacts such as water and land use change were outside the scope and usually not considered.

