

## The carbon footprint of corrugated packaging

### Background

The carbon footprint for corrugated packaging presented here has been calculated in accordance with the frameworks set out in the CEPI's "*Framework for Carbon Footprints for Paper and Board Products, April 2017*" and the subsequent CITPA "*Guidelines for calculating carbon footprints for paper-based packaging, March 2018*". As recommended by these documents, the value calculated covers the cradle-to-grave carbon impact of corrugated packaging, taking account of fossil and biogenic greenhouse gas (GHG) emissions and removals and emissions from direct land use change (dLUC).

### Results

The cradle-to-grave carbon impact is recalculated at 531kg CO<sub>2</sub>equivalents per tonne of corrugated packaging, as summarised in the table below:

|              | Fossil GHG emissions    | Biogenic GHG emissions  | GHG removals             | Direct land-use        | <b>Total</b>                 |
|--------------|-------------------------|-------------------------|--------------------------|------------------------|------------------------------|
| Recalculated | 718 kgCO <sub>2</sub> e | 442 kgCO <sub>2</sub> e | -639 kgCO <sub>2</sub> e | 11 kgCO <sub>2</sub> e | <b>531 kgCO<sub>2</sub>e</b> |

The ongoing work with the data indicated an error in the transport data used for 2018 calculation, which is now corrected. Due to the lower transport impact there is a slight reduction in the fossil CO<sub>2</sub>e emissions leading to reduction in the total GHG emissions of 1.3%.

In addition to the quantitative results, attention is also drawn to the following statements that should be considered when evaluating the carbon impact of paper-based packaging.

- 1) All paper and board products have two unique positive attributes:
  - They are based on a renewable raw material, using as a starting point the capacity of forests to bind CO<sub>2</sub>.
  - They store carbon and, furthermore, the recycling of paper and board products delays this CO<sub>2</sub> from returning to the atmosphere.
- 2) When forests are managed sustainably, carbon stocks are growing or at least stable. According to the European GHG inventory<sup>1</sup>, forests of the EU-28 are a net carbon sink, with net CO<sub>2</sub> removals by forests having increased by over 19 % between 1990 and 2014.

### Interpretation

Primary data for production of liner and fluting materials and for conversion of these into corrugated boxes was sourced from the 2018 European Database for Corrugated Board Life Cycle Studies. Secondary data for other unit processes was derived from publicly available databases, as detailed in an Annex to the CITPA guidelines. A closed loop recycling rate of 89% has been considered for the end-of-life.

The method applied for previous iterations of the carbon footprint of corrugated packaging focused on fossil GHG emissions from cradle-to-gate only. This latest calculation reflects significant changes to the methodology outlined by CEPI and CITPA, covering cradle-to-grave fossil and biogenic emissions and removals as well as direct land-use change. Therefore, it is not appropriate to compare the result presented in this document with those previous iterations. However, if we were to calculate the 2018 carbon impact of corrugated packaging using the same methodology as

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<sup>1</sup> Annual European Union greenhouse gas inventory 1990–2014 and inventory report 2016, [https://acm.eionet.europa.eu/reports/EEA\\_Rep\\_15\\_2016\\_annualGHGinv](https://acm.eionet.europa.eu/reports/EEA_Rep_15_2016_annualGHGinv)

applied in those previous iterations, then the result would show a 11% improvement for 2018 compared to 2015.

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