16 April 2026

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Fact sheet

European paper sacks reduce carbon footprint by 9% between 2021 and 2024

INTRODUCTION

Achieving climate neutrality is a key objective for policymakers, industry and value-chain partners. In parallel with net zero commitments, European regulatory frameworks increasingly require transparent and verifiable information on the climate impact of products across their entire life cycle. Life-cycle-based carbon footprint assessments are an essential tool to support informed decision-making, identify emissions reduction potentials along the value chain and provide a credible basis for sustainability communication. CEPI Eurokraft and EUROSAC have assessed the environmental performance of sack kraft paper and paper sacks since 2007. This document presents the latest cradle-to-gate fossil carbon footprint results for Europe for the year 2024. The continued downward trend demonstrates the sector's strong collaboration and steady progress on its net zero pathway.

ABOUT THE RESEARCH

The analysis has been carried out by the Swedish research institute RISE. It conducted a cradle-to-gate assessment of the fossil carbon impact of sack kraft paper and paper sacks. Cradle-to-gate covers emissions from raw material extraction through production, up to the factory gate. The life cycle inventory data include resource inputs, energy use, emissions and waste generated during production per tonne of average sack kraft paper and per tonne of paper sacks manufactured in Europe in 2024.

The calculations are based on guidelines and tools designed for paper-based packaging developed by the International Confederation of Paper and Board Converters in Europe (CITPA)[1] and the Confederation of European Paper Industries (CEPI)[2].

Data sources

The calculations make use of the gate-to-gate life cycle inventory data for 2024 covering sack kraft paper production and paper sack converting. The datasets were compiled by CEPI Eurokraft and EUROSAC from European mills and converting facilities representing about 75% of sack kraft paper production in Europe and about 74% of European sack converting activities. The results represent the average European paper sack based on aggregated industry data from participating mills and converting facilities.

From 2021 onwards, in cases where mills and convertors did not purchase a specific electricity product, emissions factors for purchased electricity have been calculated using the residual grid mix instead of the production grid mix applied in 2007–2018. A production grid mix reflects the overall electricity generation mix of a country or region (e.g. fossil, nuclear and renewable sources). In contrast, the residual grid mix represents the remaining electricity after renewable energy certificates (e.g. Guarantees of Origin) have been claimed by specific

[1] Guidelines for calculating CO_2 footprints for paper-based packaging Version 4.0, CITPA, November 2025
[2] Framework for Carbon Footprints for Paper and Board Products, CEPI, April 2017

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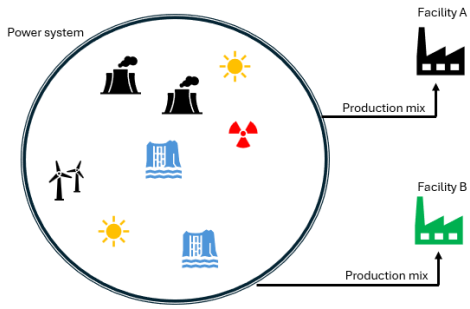
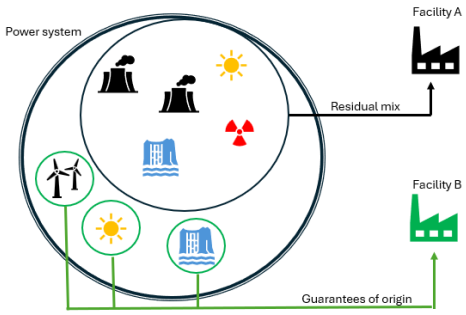
purchasers. As a result, the residual mix typically has a higher share of fossil-based generation and therefore a higher emissions factor. This approach reflects best practice, as it avoids potential double counting of benefits for renewable electricity. For the years 2007 to 2018, residual grid mix data were not widely available, therefore the national production mix was applied. Due to this methodological change and limited historical data availability, a fully consistent long-term comparison across all years is not possible in this report. However, the overall trend since 2007 shows a continuous decline in the carbon footprint.



Production grid mix



Residual grid mix

Furthermore, the source for emissions factors was standardised around the Ecoinvent database. For calculations prior to 2021, emissions factors for transport steps were sourced from the European Life Cycle Database.

Paper sacks specification

Paper sacks are manufactured from sack kraft paper combined with other components to deliver an effective, lightweight and functional package. The sack kraft paper is manufactured primarily from virgin fibres. The paper sack considered in this analysis represents an average European paper sack. Its composition is summarised in the table below:

Component	Share of composition by weight	
Paper	90.9%	115.3 g
Film (HDPE/LDPE)	5.8%	7.4 g
Glue (starch and PVA glues)	1.8%	2.3 g
Ink	1.0%	1.3 g
Other components	0.5%	0.6 g
Total	**100%**	**126.8 g**

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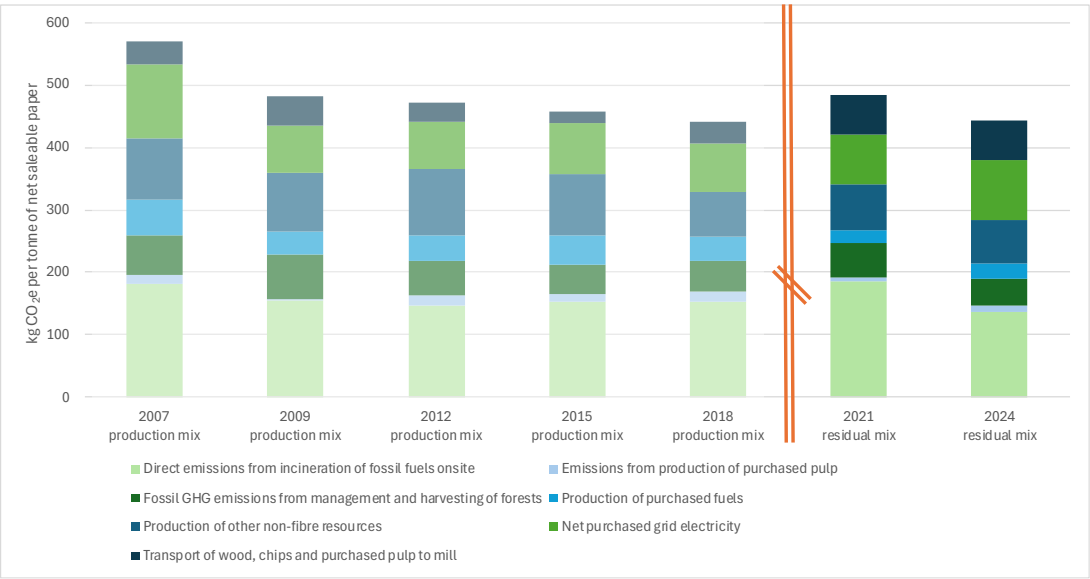
CARBON FOOTPRINT RESULTS

There is a consistent downward trend in the cradle-to-gate fossil carbon impact of average European sack kraft paper and paper sacks.

For the production of sack kraft paper

- 2021 to 2024: The fossil carbon footprint per tonne of sack kraft paper was decreased by 5% – from 484 kg CO_2e in 2021 to 462 kg CO_2e in 2024.

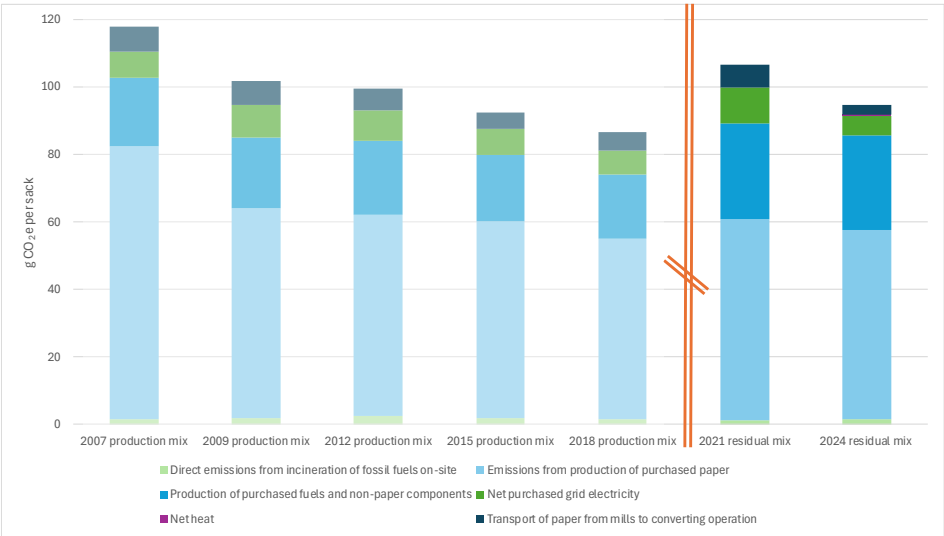


Evolution of the cradle-to-gate fossil carbon footprint of sack kraft paper, kg CO_2e per tonne net saleable paper

The apparent increase in impact between 2018 and 2021 is due to the change in methodology to account for the application of residual electricity emissions factors rather than the electricity production mix, see also “Data sources” chapter.

For the production of paper sacks

- The production of sack kraft paper is the dominant contributor to the cradle-to-gate fossil carbon footprint of paper sacks.
- 2021 to 2024: The fossil carbon impact per paper sack was reduced by 9% – from 106.7 g CO_2e in 2021 to 97.3 g CO_2e per sack in 2024.



Evolution of the cradle-to-gate fossil carbon footprint of paper sacks, g CO_2e per sack

Also here, the increase from 2018 to 2021 reflects a methodology change rather than higher value chain emissions.

The emissions per paper sack in 2024 are as follows:

Description	Fossil GHG emissions	Percentage
Production of purchased kraft paper	58.5 g CO_2e	60%
Production of purchased fuels and non-paper components	28.2 g CO_2e	29%
Production of purchased electricity	6.0 g CO_2e	6%
Transport to converting operation	3.0 g CO_2e	3%
Direct emissions from production site	1.5 g CO_2e	2%
Net heat	0.1 g CO_2e	0%
	97.3 g CO_2e	**100%**

SIGNIFICANT DECREASE IN FOSSIL ENERGY CONSUMPTION

The main contributor to the above-mentioned improvements from 2021–2024 is a change in the purchased electricity mix in the paper mills and in the converting plants.

Sack kraft paper: The production of sack kraft paper is very energy-efficient and uses a high degree of renewable energy sources. A growing share of paper mills purchased low-carbon electricity supported, for example, by Guarantees of Origin. During 2024, 54% of the electricity consumed by the mills was sourced from renewable or low-carbon sources – a significant increase compared to 29% in 2021. Biofuels account for 85% of all fuels consumed on-site. Internal biofuels alone represent 77% of total on-site energy consumption. The mills produce 58% of their own electricity requirements.

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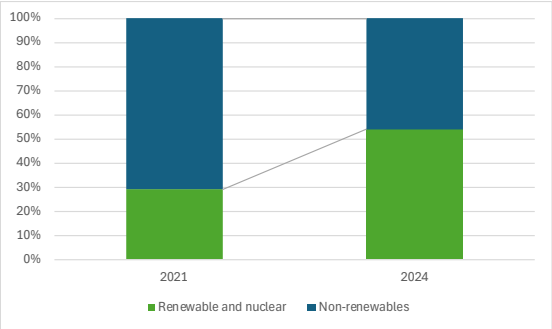
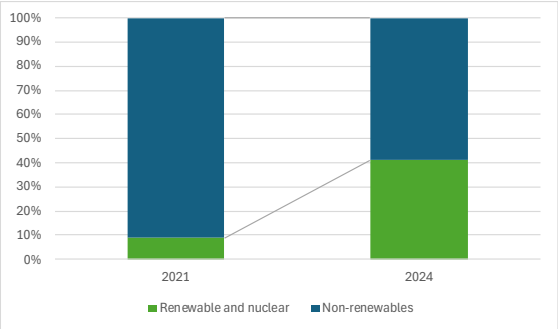
Paper sacks: In addition to the lower emissions from purchased paper, sack converters also increased their use of renewable electricity compared to previous years. The emissions from purchased grid electricity were reduced by 44% in 2024 compared to 2021. In 2024, 41% of the electricity consumed at the converting plants was sourced from renewable or low-carbon sources.



Share of purchased electricity at paper mills from renewable or low-carbon sources, 2021–2024



Share of purchased electricity at sack converting plants from renewable or low-carbon sources, 2021–2024

LOW-CARBON SOLUTION

The study confirms that paper sacks are a low-carbon packaging solution with a steadily declining fossil carbon footprint. Adding to that, paper sacks are widely recyclable. EUROSAC and CEPI Eurokraft aim to increase collection and recycling after use to further strengthen their contribution to a circular economy.

CEPI Eurokraft *is the European Association for Producers of Sack Kraft Paper for the Paper Sack Industry and Kraft Paper for the Packaging Industry. It has ten member companies representing a volume of 3.0 million tonnes of paper produced in eleven countries.* ***www.cepi-eurokraft.org***

EUROSAC *is the European Federation of Multiwall Paper Sack Manufacturers. The federation represents over 80 % of European paper sack manufacturers. Its members operate in 20 different countries. They produce more than 5 billion paper sacks per year, representing 630,000 tonnes of paper converted in 55 plants. Sack manufacturers from all continents and bag manufacturers also contribute to the federation as corresponding members, and more than 30 suppliers (paper, film, machine or glue manufacturers) are registered as associate members.* ***www.eurosac.org***

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