

Cartonboard Packaging



A Resource and Carbon Efficient Packaging Solution



Sustainability



Pro Carton’s Life Cycle data shows that the cartonboard packaging industry’s environmental performance continues to improve



Increasingly, consumers want to know about packaging’s effect on the environment and often, this can affect their decision whether or not to buy the packed product. The cartonboard packaging industry has a great environmental story to tell, and can reassure consumers that the carton is the best choice for the environment. Since 2005, Pro Carton has regularly gathered and reported data on the environmental impact of the production processes of European cartonboard and cartons. The latest report presents Life Cycle data from 2011 which includes virgin and recycled fibres and printed cartons¹. It represents over 69% of the production capacity in Europe (cartonboard mills and carton plants together). When using the same basis to compare the data from 2011 with data collected in 2008, improvements were found in the following major environmental impact categories. Many of the improvements are due to more efficient use of electricity, increasing use of bio-energy, and more focus on measurement and control of water use.

Table of Improvement

The relative changes in the major environmental impact categories since 2008 are:

Consumption of non-renewable resources (Abiotic depletion)	-1%
Emissions that can cause acid rain (Acidification)	-4%
Emissions that can lead to loss of oxygen (Eutrophication)	-6%
Emissions that can harm the ozone layer (Ozone layer depletion)	-8%
Carbon Footprint reduction	-5%

Sustainable Forest Management

European cartons’ environmental credentials are underpinned by the use of cartonboard whose wood raw material comes from sustainably managed forests. Not only are they a renewable resource, but new growth exceeds the wood harvested by an area equivalent to 1.5 million football pitches per annum. To achieve this, European forest owners and operators follow a combination of national, European and international regulations. The EU Timber Regulation comes into force in March 2013, which prohibits imports into the EU of illegal wood and wood derived products and obliges due diligence on the supply chain to ensure that the timber has been logged legally. In addition, European forest owners and operators can prove forests are sustainably managed through Forest Certification Schemes, such as FSC® and PEFC™. A “chain of custody” certificate demonstrates that the wood used to make cartonboard in Europe originates from legal and traceable sources. Goods manufacturers can alert consumers to the environmental benefits of cartons through a label which shows that the cartonboard packaging comes from responsible sources.



In Europe, responsible sourcing of raw material for cartonboard which is used for the production of folding cartons is from both wood and recovered paper.

¹ For further details, visit www.procarton.com Sustainability / Carbon Footprint



Reducing Carbon Footprint



Pro Carton's fossil Carbon Footprint is 915 kg CO₂ eq / tonne cartonboard produced and converted

Using Pro Carton's Life Cycle data, experts calculated the carbon footprint of the cartonboard and carton industries, first in 2005 and again in 2008. Analysis of the data collected in 2011 showed that the updated carbon footprint for cartons is 915 kg CO₂ eq / tonne cartonboard produced and converted and the carbon footprint for cartons has reduced by 5% since 2008. This new Carbon Footprint figure continues the trend for continuous improvement in the environmental performance of the industry. In 2008, Pro Carton published a Carbon Footprint figure of 964 kg CO₂ eq / tonne cartonboard produced and converted which was a 7% reduction from 2005.

As the ISO discussions on Carbon Footprinting were still on-going at the time its data was being analysed, Pro Carton followed the CEPI (Confederation of European Paper Industries) framework for measuring carbon dioxide equivalents emitted from fossil fuels in the production of paper based products. The boundaries are cradle-to-gate, which means they start with the forest and end at the exit door of the carton converter. Therefore the carbon emissions of the goods manufacturer and retailer, and the final disposal of the carton at the end of its life, are excluded¹.



Biogenic Carbon in Cartons

In 2009, IVL Swedish Environmental Research Institute developed a methodology to calculate biogenic carbon in the Carbon Footprint of cartons.²

The raw material for cartonboard is wood fibre which is derived from sustainably managed forests whose trees absorb and store carbon. IVL's methodology measures biogenic carbon in cartons by relating the carbon benefits of the natural raw material to cartonboard packaging.

IVL proposed a positive link between net carbon sequestration in sustainably managed forests and consumption of cartons: consumer demand for cartons stimulates demand for timber (wood fibre to make cartonboard) which in turn encourages the sustainable management of forests.

The study suggests that due to demand for cartons from the market, 730 kg of biogenic carbon dioxide per average tonne of cartons in Europe, is removed from the atmosphere. Therefore, choosing cartons encourages the capture of carbon dioxide to make a renewable material and shows the positive contribution which cartonboard packaging is making in the debate about climate change and the environment. IVL's work complements Pro Carton's data which measures the amount

of carbon dioxide equivalents emitted in the industry's production process (cradle-to-gate). For 2011, Pro Carton's Carbon Footprint figure is 915 kg CO₂ eq / tonne cartonboard produced and converted. In a cradle-to-gate approach, the emission of 915 kg CO₂ eq / tonne cartonboard produced and converted is significantly compensated by the figure of -730 kg biogenic CO₂ sequestration.



¹ For further details, visit www.procarton.com Sustainability / Carbon Footprint

² "Carbon Footprint of Cartons in Europe – Carbon Footprint methodology and biogenic carbon sequestration" by IVL Swedish Environmental Research Institute 2009"



Resource efficiency



“A resource-efficient Europe” is a central element of the EU’s 2020 Strategy, which aims for a resource-efficient, low-carbon economy with sustainable growth

This challenge presents a great opportunity for cartonboard packaging to show its environmentally responsible use of resources and the innovations which help to deliver them efficiently and economically.

Renewable resource

Almost all of the wood fibre used for production of cartonboard in Europe comes from managed European forests. This resource is sustainably managed and renewable and forest owners supplying the industry can demonstrate this by applying to independent, third party, auditing bodies for an assessment of their performance. The two main certification schemes are PEFC™ and FSC®.

Responsible use of materials



Cartonboard manufacturers use wood fibres from forest thinnings, small diameter tops of large trees and the round sections of the trunks which are removed in the saw mills (saw mill waste). **No tropical rain forests are destroyed in order to produce cartonboard in Europe.** The paper and board industry does not use wood from tropical rain forests, as, apart from other considerations, this wood is not technically suitable¹.

Furthermore, the main fibre source for the European cartonboard industry is used paper and board, through recovering and recycling of household and industry collections. Paper and board including cartonboard achieved a recycling rate of 78% in 2010. It's the most recycled packaging material in Europe, according to CEPI (Confederation of European Paper Industries) calculations using Eurostat data. This latest data continues an upward trend from 63.8% achieved in 2000 and 73.3% achieved in 2005, and far exceeds the 60% target set by the Packaging and Packaging Waste Directive.

Efficient use of Energy

European paper and board companies, including cartonboard manufacturers, are leaders in renewable energy, with more than half of the European pulp and paper industry's total primary energy consumption coming from bio-energy. This corresponds to one fifth of the bio-energy produced in Europe.

More and more electricity and heat is produced on site at cartonboard mills, thanks to investment in biomass boilers, which use by-products of the cartonboard production process, such as sawmill waste. Investments in biomass boilers have meant that up to 90% of the heat to make steam can come from biofuels, and around 30% of the electricity is produced internally from the steam. In addition, increasing amounts of energy are supplied to the national grid, as mills located near to towns have installed systems to supply homes with the surplus heat generated.





A recent development which shows the way for the future, is the installation of a state-of-the-art recovery boiler (part of the wood pulping process) at a cartonboard mill which will allow it to become completely self-sufficient in electricity.

The use of renewable resources for energy generation, which are used responsibly and which benefit climate change as a substitute for fossil fuels, such as coal and oil, is undoubtedly an asset for the industry and an excellent example of resource efficiency.

The use of bio-energy also has an enormous impact on the emissions profile of the industry. Carbon dioxide emissions from biomass are considered at least carbon neutral and according to a recent study, using cartons has a positive effect on the climate change issue². The trend is also continuing for using less energy. From 1991-2010, the European pulp and paper industry's consumption of electricity and all primary energy fell steadily by 14%, thanks to more efficient processes and use of cogeneration.

Efficient water usage

As water issues are local to the manufacturing site and carry different weights depending on location in Europe, the European paper and board industry has focused to date on water abstraction by mills. Companies are encouraged to improve efficiency of the water resources used at the mills in the production process and the water resources drawn from the ground or surface. The trend during the past two decades has been to reduce the withdrawal of fresh water by 20% in total volume. In 2008, 94% of the water taken by the European paper industry was returned to surface water supplies.



Preventing Food Waste

It was estimated in 2011, that the total food lost and wasted globally, amounted to one third of the edible parts produced for human consumption, amounting to about 1.3 billion tons per year.³ In industrialised countries, 40% of the losses occur at the retail and consumer levels.³ Increasingly, food waste is being recognised as a major social and environmental issue. In the EU Commission's "Road map to a Resource Efficient Europe," food has been identified as a key impact area, and therefore indirectly, packaging is involved in this debate.

Packaging protects food from damage during its journey from the farm and factory, through retailing, to the final consumer, and thus conserves the valuable resources that were used in creating the product. The environmental impact of producing the packed product is many times greater than the environmental impact of producing its packaging. In Europe, 62% of folding cartons produced are used to package food⁴ and together with other packaging, are part of the solution to the problem of food waste. By protecting food and reducing food waste, cartons contribute to resource efficiency and more sustainable consumption.

¹ Paper and Paperboard Packaging Technology. Ed. M.J. Kirwan

² "Carbon Footprint of Cartons in Europe – Carbon Footprint methodology and biogenic carbon sequestration" by IVL Swedish Environmental Research Institute 2009"

³ Gustavson, Jenny; Cederberg, Christel; Sonesson, Ulf; van Otterdijk, Robert; Meybeck, Alexandre (2011). Global Food Losses and Food Waste. FAO

⁴ Source: ECMA (European Carton Makers Association)





Pro Carton is the Association of European Cartonboard and Carton Manufacturers. Its main purpose is to promote the use of cartons and cartonboard to brand owners and retailers as well as designers, the media and regulatory decision-makers, as an economically and ecologically balanced packaging medium which plays an important role in society.

For more information, please visit the Sustainability and Resource Efficiency sections at: www.procarton.com

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