



The GOB

FEVE publishes comprehensive Life Cycle Assessment

The GOB is a journal of FEVE, The European Container Glass Federation, focusing on glass container issues for a broader audience. We are trying to keep you up-to-date about the latest issues and news of the container glass industry and try to shed some light on the most pressing issues of the industry. In the third edition of The GOB we want to highlight the in 2010 published Life Cycle Assessment (LCA) from FEVE.

The European Container Glass Federation (FEVE) and member companies commissioned together with GPI - the US container glass trade body - PE America and PE International, to conduct a Life Cycle Assessment (LCA) on container glass production in Europe and the US.

The purpose was to measure the industry's environmental footprint, focusing on cradle-to-cradle assessment and including raw materials extraction to manufacturing and end-of-life recycling. Not of least importance was to enable the industry to actively and directly participate in the international debate on environmental sustainability and Life Cycle Analysis.

This is the first multi-continental transatlantic LCA for a ready-to-use packaging. It is the most comprehensive Cradle-to-Cradle, peer-reviewed LCA ever commissioned on one segment within the packaging industry. The study is representative of all EU countries, Turkey and Switzerland and it represents a volume of 14.31 million tonnes of produced glass corresponding to 72% of European production in 2007.



The Life Cycle Analysis (LCA) is a tool to measure, assess and orient improvements in the environmental performance and impact of a product from raw materials through to production, use, and end-of-life phases.

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Cradle to Cradle

The FEVE study is a full Life Cycle Assessment from Cradle-to-Cradle for 1 kg of formed and finished glass ready to use, enabling us to meaningfully estimate the overall environmental impact at the level of a single bottle. Cradle-to-Cradle is the ultimate test in assessing the environmental impact of a product because it ensures that all aspects of a product's life, end-of-life and reincarnation are accounted for. Only the Cradle-to-Cradle scenario tells the whole story for products because it is the only methodology which properly accounts for reuse and closed loop recycling.

This is important because from reuse and the closed loop recycling process come new, identical products (e.g. glass bottles from collected glass bottles), meaning no downcycling. Downcycling into other applications ultimately means it will be lost forever from the closed loop system.

However, sustainability is about the entire product not just the packaging, which is a delivery system to support demand for actual products. It does not exist for its own end and therefore it cannot be considered in isolation. The FEVE Life Cycle Inventory (LCI) can thus be used as background input data for overall life cycle assessments of products packed in glass.

The FEVE LCA - Main Results

➤ **Most comprehensive and most representative Life Cycle Assessment (LCA) of a packaging material**

The container glass industry has produced the first multi-continental transatlantic LCA for a ready-to-use packaging. It is the most comprehensive Cradle-to-Cradle, peer-reviewed LCA ever commissioned on one segment within the packaging industry. The companies studied represent almost three quarters of production in the EU-27, Turkey and Switzerland. The FEVE study covers over 200 furnaces operating in 2007 and represents a volume of 14.31 million tonnes of produced glass.

➤ **Glass offers a unique closed loop system**

Glass is resource efficient because it is not chemically altered by the recycling process. Glass fully meets the ISO standard 14044 definition of a Closed Loop System – when material is recycled into the same product system (bottle-to-bottle) and the material does not undergo a change to its inherent properties (chemical or physical). Glass is thus one of very few materials that can operate in a closed loop system infinitely.

The glass closed loop system has other advantages. It is also the simplest recycling system to manage as glass is not mixed with other packaging materials: sorting after collection is much reduced. In addition to kerbside collections, it is also using community based voluntary bring back collection systems which work due to the widespread participation of consumers.

➤ **The FEVE LCA is a full Life Cycle Assessment from Cradle-to-Cradle**

The FEVE study is a full Life Cycle Assessment from Cradle-to-Cradle for one kg of formed and finished glass ready to use, enabling us to meaningfully estimate the overall environmental impact at the level of a single bottle. Cradle-to-Cradle is the ultimate test in assessing the environmental impact of a product because it ensures that all aspects of a product's life, end-of-life and reincarnation are accounted for.

➤ **I'll be back! Glass is 100% recyclable and infinitely so**

Sixty two per cent of all glass bottles and jars consumed in Europe are collected (2007 data). Over 80 percent were recycled by European glassmakers to make new glass bottles and jars. The rest went to other industries or was too contaminated to use.

Because glass is 100% recyclable and infinitely so nearly all the glass bottles and jars 'collected' in Europe are in practice 'recycled' into new bottles and jars forming a real closed loop system, avoiding downcycling, landfilling or incineration.

The EU's waste hierarchy, after prevention and reuse, recognises recycling as the best environmental option over energy recovery and landfilling.

➤ **Glass controls its impacts**

In glass container production, the raw materials are melted and finished into a bottle or jar all under the same roof. This one step process limits transport, and also means that the majority of environmental impacts associated with glass-making can be controlled by the glass maker. Glass packaging producers are thus uniquely placed to act on the environmental performance of their products on the basis of the LCA results.

➤ **Glass is safe in landfill**

Glass does not need to go into landfill or be incinerated because glass is 100% recyclable. This gives glass the potential to become a zero waste packaging material. Even if it does needlessly end up in landfill, used glass bottles and jars are inert and are a non-hazardous waste material. Container Glass under EU law is considered inert; that is without risk of contaminating the environment. In addition glass will not be found polluting oceans in vast areas of floating debris.

➤ The glass industry is local

The glass industry is a truly local industry. Today the weighted average transport distance of raw materials (including recycled glass) to an EU production facility is about 300 km. If more recycled glass is used instead of virgin raw materials, transport can be even lower because recycled glass is locally collected – the total weighted average transport distance from a cullet facility to a glassmaker is no more than 50 km. So the higher the average ratio of recycled glass used in the production cycle, the lower the average transport distance of raw materials. This makes glass not only a sustainable local business but also a local product, with raw materials from nearby resources keeping transport at a minimum.

➤ Glass saves resources and avoids littering: Only glass forms a real bottle-to-bottle closed loop system

Glass is resource efficient because glass is not chemically altered by the recycling process: 100 kilograms recycled glass replaces 120 kilograms of virgin raw materials! Glass fully meets the ISO standard 14044 definition of a Closed Loop System – when material is recycled into the same product system (bottle to bottle) and the material does not undergo a change to its inherent properties (chemical or physical). Glass is thus one of very few materials that can operate in a closed loop system indefinitely. Closed-loop recycling means keeping the same resources within a continuous closed loop thus avoiding extracting new virgin materials, littering, landfilling and incineration.

➤ Glass recycling reduces CO₂ emissions, raw materials and energy use

Virgin raw materials can be replaced by recycled glass (or cullet) in the batch which is fed into the furnace. By doing so, a substantial reduction of CO₂ takes place for different reasons:

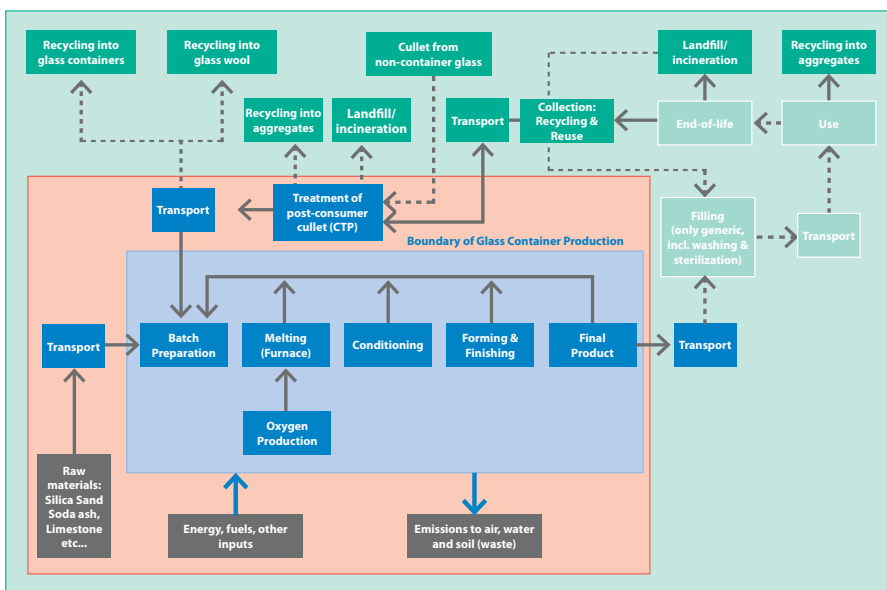
- Less energy is required to melt recycled glass than to melt raw materials and transform them into glass. Approximately 30% less energy is required to melt cullet in the furnace compared to virgin raw materials.
- Raw materials contain carbonates which decompose in the furnace to form CO₂.
- The energy and CO₂ emissions resulting from the extraction and transport of raw materials are saved (1 kg cullet used replaces 1.2 kg virgin raw materials). Of course, cullet has also to be transported, but, on average, the transport distance for cullet is much smaller than the transport distance of raw materials.

The FEVE LCA shows that by replacing 1.2 kg of raw material by 1 kg of cullet, 0.67 kg of CO₂ are saved.

In 2008, across Europe, an estimated 25.5 billion glass bottles and jars⁽¹⁾ (or nearly 11.5 million tonnes of cullet) were dropped into bottle banks ready to be recycled. In terms of CO₂ savings this equals to remove nearly 4 million cars from the road⁽²⁾.

⁽¹⁾ Based on an indicative weight of 450gms per bottle. This is a very conservative reference as nowadays bottles can achieve a weight of about 300 gms.

⁽²⁾ These figures have been calculated by using results on CO₂ savings drawn from the FEVE LCA, and applying a methodology implemented by CO.RE.VE (Italian Recycling Organisation (www.coreve.it) and the Italian Research Institute, Stazione Sperimentale del Vetro (<http://www.spevetro.it>). This is based on technical, scientific and economic parameters currently used in Italy.



The FEVE LCA examines three boundary levels:

Gate-to-Gate (the blue box, covers from the entry to the exit gate of the glasswork).

Cradle-to-Gate (the orange box, includes sourcing of raw materials, fuels and transport).

Cradle-to-Cradle (the green box, includes the End-of-Life phase)



FEVE
The European Container
Glass Federation

Glass has nothing to hide.

For your health we advise



The FEVE Friends of Glass has since its start in 2009 attracted Friends from all over Europe to join the movement and to exchange views and thoughts about glass as the ultimate packaging material for the way we consume. Now the Friends of Glass movement has announced it will start together with its international Friends a new campaign in October focusing on the topic of Health and Taste!

Check out the Friends of Glass website for the latest News:

www.nothingisgoodforyou.com



FEVE
The European Container
Glass Federation

FEVE – Fédération Européenne du Verre d’Emballage

- is the Federation of European manufacturers of glass packaging containers and machine-made glass tableware. The member companies manufacture glass bottles, jars and/or tableware items such as drinking glasses in the European Union, Switzerland and Turkey. Europe is the largest producer of glass containers world-wide.

For more information
please visit www.feve.org

