

## **European producers of glass beads for industrial products are aware of their impact on climate change.**

Exploring the possibilities of reducing CO<sub>2</sub> emission and improving energy efficiency, Euroadbead (see insert ) has commissioned a Product Carbon Footprint (PCF) study of glass beads for road marking applications.

### **Scope**

The project, the first representative exercise ever done on glass bead production in Europe, is a 'cradle-to-gate' life cycle assessment (LCA) of glass beads for technical applications. It assesses the environmental impact of glass beads from raw materials up to the finished product collectable in Europe and includes the total inputs and outputs of energy and materials used for the raw materials (upstream data) and for the bead production up to the factory gate (on-site data). Findings and conclusions of this study can therefore be regarded as valid for all the glass bead applications using the same manufacturing process.

The glass beads are either recycled or lost and can be regarded as landfill. The environmental consequences however are slight as glass is an inert material and presents no contamination issues nor energetic or GHG effects, hence the "cradle to gate" approach.



Euroadbead is an international non-profit organization focused on the European glass bead industry and representing the three major glass bead producing companies in Europe, totalling 13 production sites and a production capacity of over 200.000 tons of glass beads per year. More details on Euroadbead can be found on [www.euroadbead.eu](http://www.euroadbead.eu)

### **Methodology: Product Life Cycle Accounting and Reporting Standard**

A detailed approach with economic allocation has been provided by Climact (see insert) in accordance with the GHG Protocol standard for products which is the most widely used international accounting tool to understand, quantify, and manage greenhouse gas emissions. The PCF is aligned with the ACV standard ISO 14040-44 (2006) for the CO<sub>2</sub> dimension, aligned with the ADEME methodology and takes into account the upcoming ISO 14067 (which builds on the PAS2050).

The study uses European aggregated data collected by Euroadbead and Climact. In cases where no primary data were available, either estimations provided by the involved companies or calculated data, e.g. on CO<sub>2</sub>, were used.

Cullet being the primary raw material for bead production, the cullet emission was modelled using economic allocation, which means that the footprint of cullet depends on the availability of glass and glass cullet on the market. Wasted materials from another industry do not require to account for any GHG emission but cullet is a by-product rather than waste: it has economic value and is used by other industries rather than landfilled. For instance, on average, 30% of the weight of a float glass pane comes from internally recycled cullet.

Primary Energy Demand (PED) was not commissioned in this study.



CLIMACT is a Consulting & Project Financing company active on energy efficiency & renewable energy projects. They provide end-to-end services from environmental strategies, diagnosis (including Organisation and Product Carbon Footprint) and action plans to implementation and third-party financing of projects to lower energy consumption and GHG emissions. They work for private and public organisations, as well as local collectivities. <http://www.climact.com/>



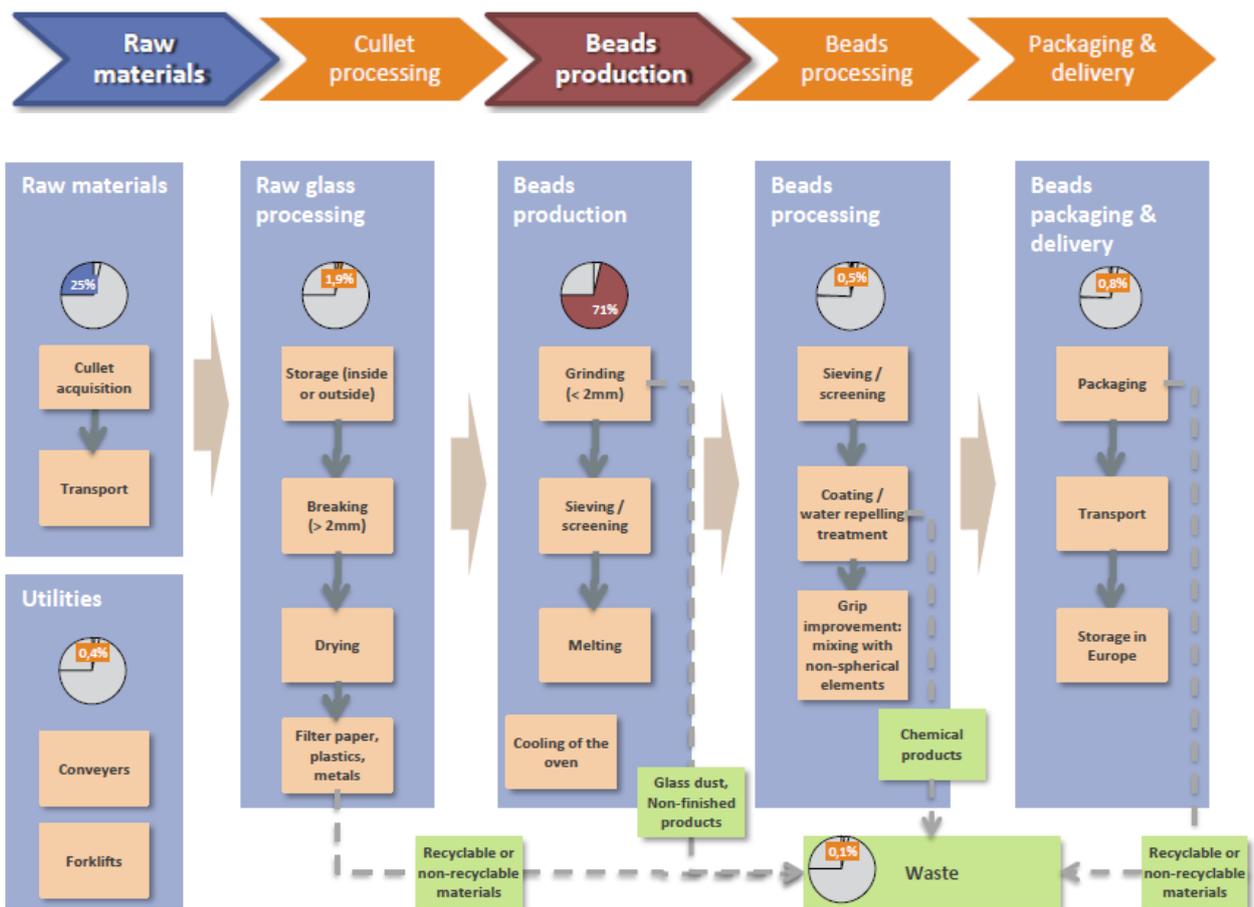
## Preamble



Glass beads for road markings are added, either premixed or dropped on, to add retroreflective properties to the road marking products. Without the glass beads road markings can't stand out in the dark. Glass beads are also fit for industrial applications such as surface treatment and in product engineering as additives for plastics and coatings.

## Glass bead production

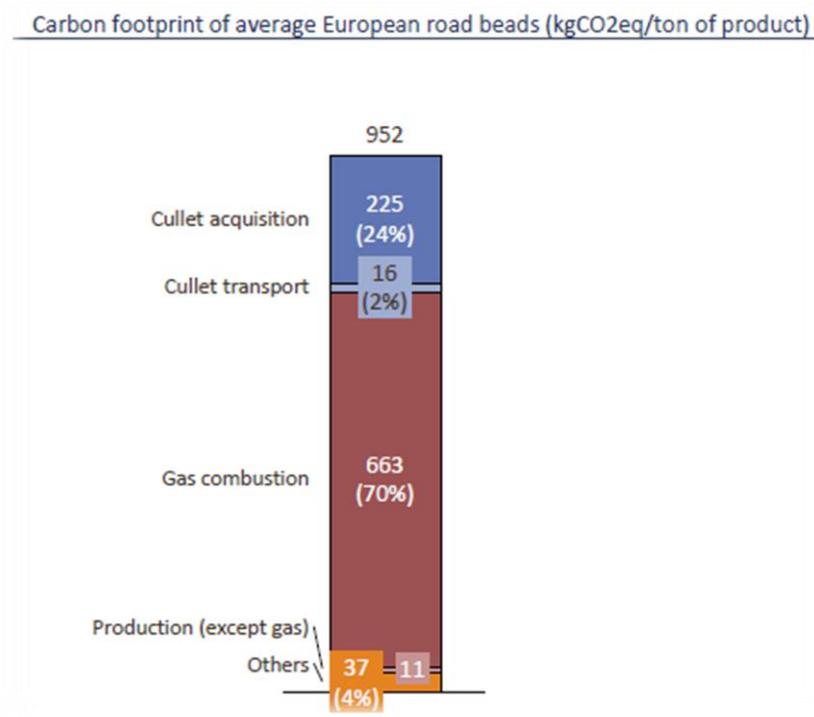
The main manufacturing processing activities are raw glass (cullet) processing, the actual beads production, beads processing and finally packaging and storage.



The unit of analysis adopted in this study is 1 ton of beads with these properties: refractive index: > 1.5, medium bead size: 125-710 µm, any surface treatment, beads packaged and ready for delivery in Europe.

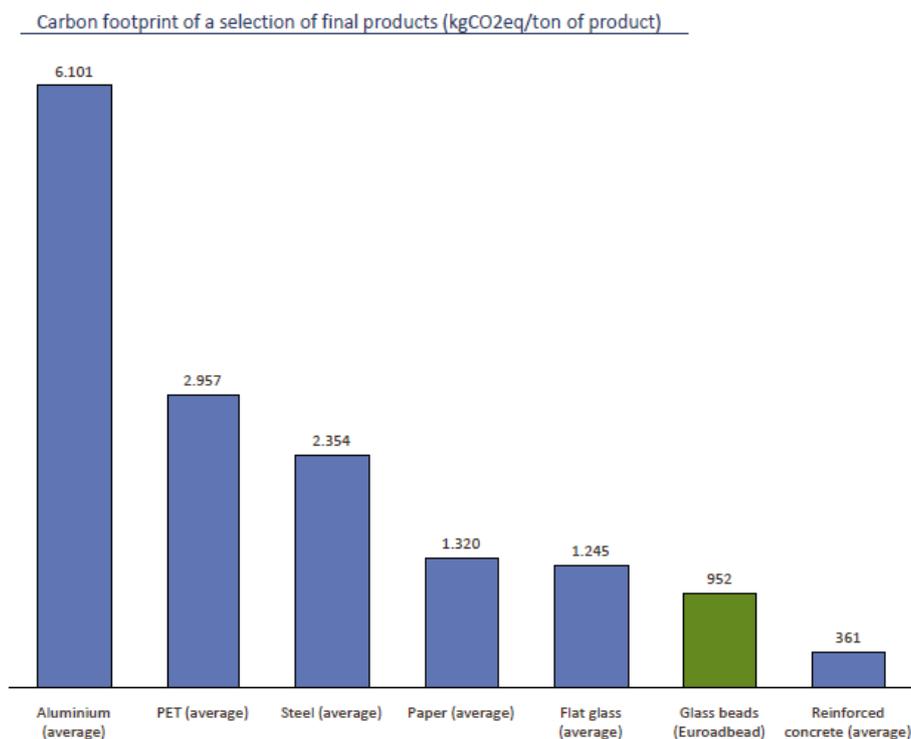


## Findings

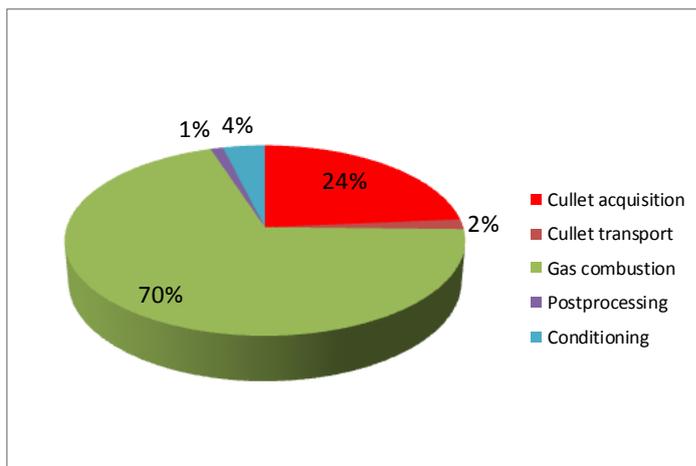


In the currently maintained model European glass beads produce less than 1000 kg CO<sub>2</sub>eq per ton of product.

This footprint is consistent with other materials manufactured with high energy needs

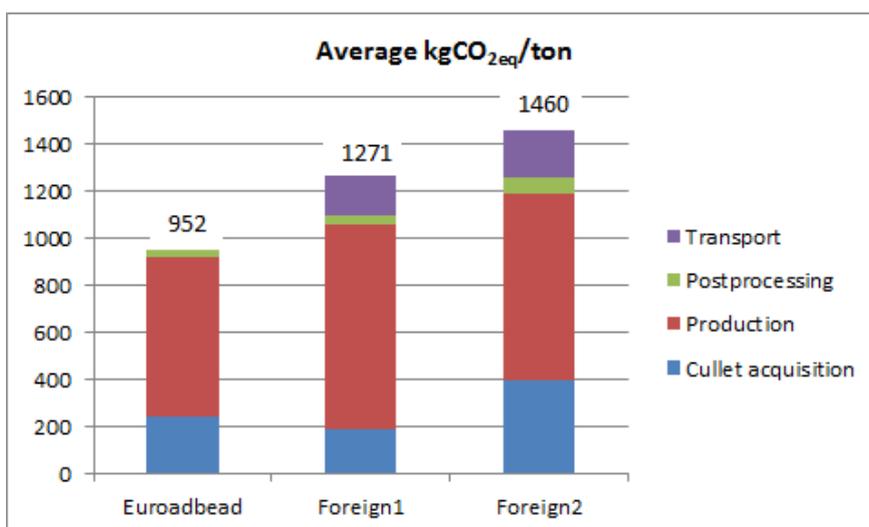


The study also reveals that cullet acquisition and gas combustion account for over 90% of the Carbon Footprint. Cullet accounts for approximately a fourth of the footprint <sup>1</sup>.



### Why prefer European glass beads?

Compared to foreign glass beads, i.e. originating from non-European countries, European beads are 25 to 35% less carbon intensive than imported beads <sup>2</sup>.



Economic allocation implies that the footprint of cullet depends on the prices of glass and glass cullet on every market. Foreign cullet is therefore more carbon intensive than European cullet. Foreign production, mainly involving gas combustion using a different technology, is less efficient. Beads transport is also an important share of the foreign beads footprint.

In addition to maintaining a high quality standard in respect of the EU regulations, European glass bead manufacturers strictly retain the content of dangerous substances below 200 mg/kg (class1 in the EN1424 standard), a threshold which is not always observed by other bead manufacturers.

<sup>1</sup> Production of cullet actually emits 1245 kgCO<sub>2</sub>e/ton. As it is a by-product of the float glass industry only a part of this footprint is taken in account in the road beads footprint (principle of economic allocation). Cullet is sourced in average at 208km of the factories. Currently 100% of Cullet is delivered by truck

<sup>2</sup> Based on data publicly available, data provided by Euroadbead producers and validated hypotheses.



## Conclusions



A Product Carbon Footprint (PCF) indicates the influence on the climatic change by quantifying the greenhouse gas emissions caused by a product in the course of its whole life cycle.

This study commissioned by Euroadbead demonstrates that the European glass bead producers are aware of their climate change impacts. They focus on R&D to improve energy efficiency and aim at delivering an environmental contribution to the reduction of GHG emissions. Without claiming it to be a benchmark they have managed to produce a reference mark.



The study also proves that European glass beads perform better than imported glass beads in both qualitative and environmental respect, making it evident that European enterprises enterprises make the wiser decision when applying domestic glass beads.

