The European Container Glass Federation (FEVE)

Environmental, social and economic contribution of the Container Glass sector in Europe

Final Report

February 2015

EY
Building a better working world

Contents

Glossary

- **Gross Domestic Product (GDP)**: aggregate measure of the economic activity in a country, calculated by adding the Gross Values Added (GVA) of all resident institutional units engaged in production of goods and services.

- **Gross Added Value (GVA)**: contribution of a sector or a company to the Gross Domestic Product (GDP). For this study, it has been estimated as follows: *Turnover – Intermediary consumption*.

- **Contributions (direct, indirect, and induced):**
  - **Direct contribution** corresponds to employment and added value generated in the EU by the container glass activity itself (glass manufacturers). Other direct indicators have been assessed in this study, such as the amounts invested by the glass industry or the level of taxes and social charges paid byglass manufacturers.
  - **Indirect contribution** refers to employment and value added generated in the EU through orders to suppliers of glass manufacturers (Tier 1 and beyond). For example, indirect jobs represent the share of full-time equivalent workers employed by suppliers, which are dedicated to the container glass supply chain.
  - **Induced contribution** corresponds to employment and value added generated through the household spending of glass manufacturers' employees and employees of the container glass sector's suppliers. It represents the impact on the general economy of the day-to-day consumption of direct and indirect employees (food and housing, transport, leisure, services, etc.).

- **Recycling rate**: fraction of used container glass (waste) which is collected for recycling (either through voluntary contribution, glass banks, comingled collection or sorted collection). It is a measure of packaging consumption level as well as sorting and collection performance. This figure is calculated as the amount of container glass collected for recycling in a given geographical area divided by the total amount of container glass consumed in the same area (i.e. production + import – export), and expressed as a percentage.

- **Cullet incorporation rate**: fraction of secondary raw material (used glass prepared to this end) used in the glass production as a substitute for virgin raw materials. This figure is calculated as the amount of cullet incorporated in glass furnaces of a given perimeter divided by the amount of glass produced in the same perimeter, and expressed as a percentage.

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1 Context and objectives

Despite the recent economic downturn and a subsequent restructuring, the container glass sector still significantly contributes to the economic activity of the regions where it is based with more than 40 000 direct jobs in Europe.

The container glass sector has fairly standardised operations, which are well distributed throughout Europe. It is a key player in promoting a circular economy and, as such, it contributes to local value and job creation, while aiming at reducing the sector's environmental footprint.

The overall objective of this study is to characterise the economic, social and environmental contribution of the container glass industry in Europe (EU27). As illustrated below, this study aims to provide quantitative information, at European level, demonstrating that the container glass industry:

- ✓ Shows high level of local job and value creation, especially due to closed loop recycling; and
- ✓ Is fully integrated into local businesses, upstream and downstream.

This report presents the results of our calculations and analysis of the container glass sector's impact on the following key topics:

- Job creation (direct, indirect and induced);
- Contribution to GDP (direct, indirect and induced);
- Contribution to public finances (taxes and social charges);
- Level of industrial investments;
- Circular economy (recycling rate and use of cullet in glass furnaces); and
- Local presence, highlighting the proximity with its upstream and downstream value chains.

2 Methodology

2.1 Perimeter and time period covered

This study provides figures for the container glass industry at the European level (EU27)[1]. In this report, the container glass industry refers to the activity of glass bottle and jar production in the EU27 by FEVE members (including flaconnage but excluding tableware).

Except when noted otherwise, the figures presented in the rest of this report refer to the year 2012.

To assess the environmental, social and economic contribution of the container glass sector in Europe, we first selected, with FEVE, the topics to be investigated and the related indicators, as well as the scope coverage (indirect, direct and induced impact). Those are presented in the Figure 1 below.

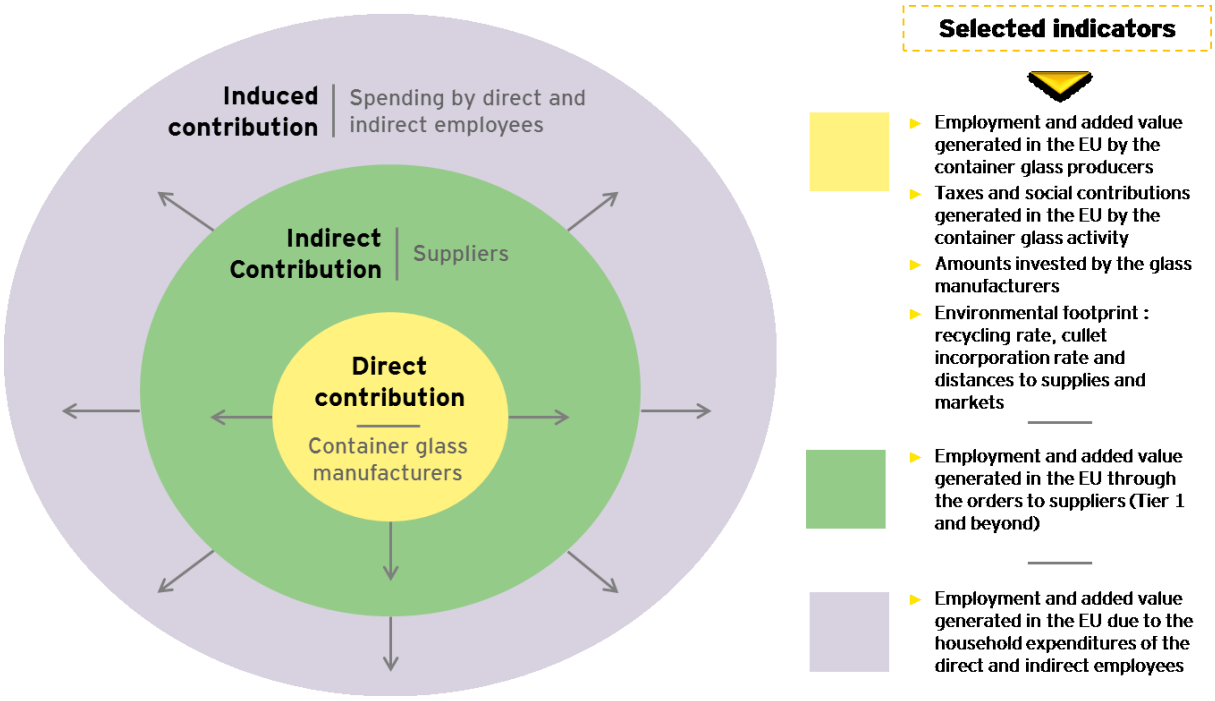

Figure 1 : Scope of the study

A few assumptions or limitations are worth mentioning:

- Indirect contributions are calculated based on operational expenditure only (excluding the capital expenditure during the year).
- Direct added value represents the difference between turnover and intermediate costs. It does not take into account inventoried products.
- Tax contributions include business taxes, value added taxes, corporate taxes, as well as a company's social contributions (pension plan, contribution to public healthcare system, medical insurance).

[1] FEVE geographical scope in the EU27: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, France, Germany, Greece, Hungary, Italy, The Netherlands, Poland, Portugal, Romania, Slovakia, Spain, Sweden, United Kingdom.

2.2 Technical approach

Our approach relied on detailed data collection from an extensive sample of glass manufacturers, national associations, and FEVE, combined with calculations as described below.

Data collection

We collected data from glass manufacturing companies in a selection of EU27 countries through a detailed and confidential questionnaire (number of employees, value added, wages and salaries, operational expenses, information on logistics and transports, etc.). The sample of countries[2] was selected based on its contribution to European (EU27) glass production. Additional data was also obtained through documentary review or was collected from the national container glass associations of the same countries and FEVE. The following table provides an overview of the different information sources used.

	Data sources		
	Container glass manufacturers[2]	Container glass national associations[2]	FEVE
Number of employees (direct)	✓		
Value added (direct)	✓		
Wages and salaries (direct)	✓		
Operational expenses	✓		
Investments	✓		
Taxes and social charges	✓		
Share of locally sourced raw materials		✓	
Share of container glass sold in the European market		✓	✓
Distances (from suppliers / to clients)	✓	✓	
Recycling rate			✓
Cullet incorporation rate	✓		✓
Container glass production	✓		✓

This data collection served as the primary source of information for establishing the direct impact of the sector. The direct economic and social contributions and the environmental footprint of the EU27 container glass sector were derived from this data, through consolidation and/or extrapolation, as necessary.

Calculation of indirect and induced contributions

Indirect and induced contributions to employment and Gross Domestic Product have been calculated using the following steps:

1. The amounts spent by EU27 glass manufacturers on operational and maintenance costs are considered as an input to the European economy, thus generating local output, creating added value and employment by suppliers. Each cost item (transport services, cullet purchase, other raw material purchases, energy, etc.) is broken down by segment of the domestic economy. A multiplier model, based on input-output data, allows the calculation of indirect impacts by assessing the effect of 1 euro spent in each industry or service segment in terms of turnover and gross value added (GVA). Multipliers for indirect impacts are based on Eurostat's input-output tables which detail the interdependencies between different sectors (services or industries) and the share of imports within the economy. Jobs are calculated based on economic segment-specific labour intensity ratios.

[2] France, Germany, Italy, Spain, and the United Kingdom. For Germany, the German Glass Association BV Glas managed the data collection and compilation. In France, a similar study was conducted in 2010 and was updated with the collection of selected data items only.

2. Induced impacts calculation is based on household spending by the container glass sector's employees and the container glass sector suppliers' employees. Household spending arises from wages. A multiplier model based on Eurostat's tables allows assessment of the effect of 1 euro of household consumption spending in each industry or service segment in terms of GVA and jobs.

3 Main findings

3.1 Contribution to employment

The container glass sector generates around 125 000 jobs in the EU

The container glass sector creates or maintains more than 124 300 jobs in the EU, including almost 44 000 direct jobs at glass manufacturers.

For each direct job in the container glass sector, about 1.9 indirect or induced jobs are generated on average in the EU.

In the EU 27, container glass production generates on average about 6 100 jobs (direct, indirect and induced) per million tons of glass produced.

With 162 plants producing 20.3 million tons of glass bottles and jars in 2012 (i.e. 55 000 tons every day in average), the container glass industry creates employment across Europe.

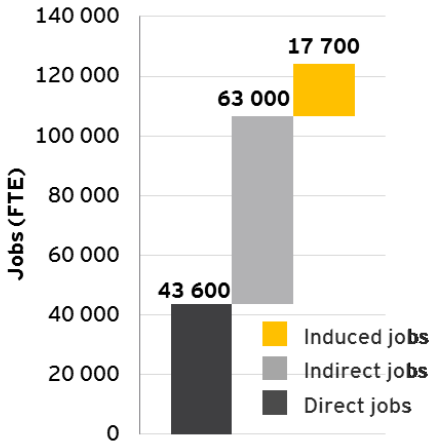

Figure 2 : Direct, indirect and induced jobs generated in the EU by the container glass sector in 2012

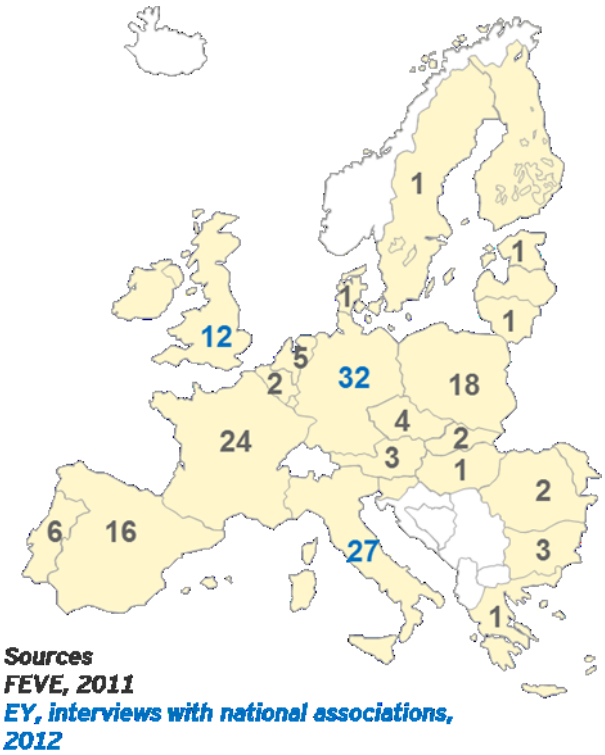

Figure 3 : Container glass plants by country

Overall, the container glass sector generates more than 63 000 jobs in its supply chain and the economy

Half of the 63 000 indirect jobs are generated in seven sectors, including transport, temporary work services and subcontracting (i.e. repair & maintenance).

Although most raw materials and products travel relatively short distances, container glass production generates almost 9 000 jobs in the transport sector, primarily road transport.

The substitution of virgin raw materials by cullet (prepared from used recycled glass) has no negative impact on employment, while reducing CO_2 emissions and saving natural resources. Job creation in the used glass collection and cullet production sector compensates the reduction in jobs related to sand and lime extraction. The cullet sector (used glass collection and cullet preparation) was assessed at around 4 000 jobs in the EU (6% of the indirect jobs generated by container glass production), which is likely to be underestimated.

Although glass manufacturing is an energy-intensive industry, energy-related jobs rank fifth among indirect jobs, because a large share of spending in the energy sector is exported and does not benefit the domestic economy.

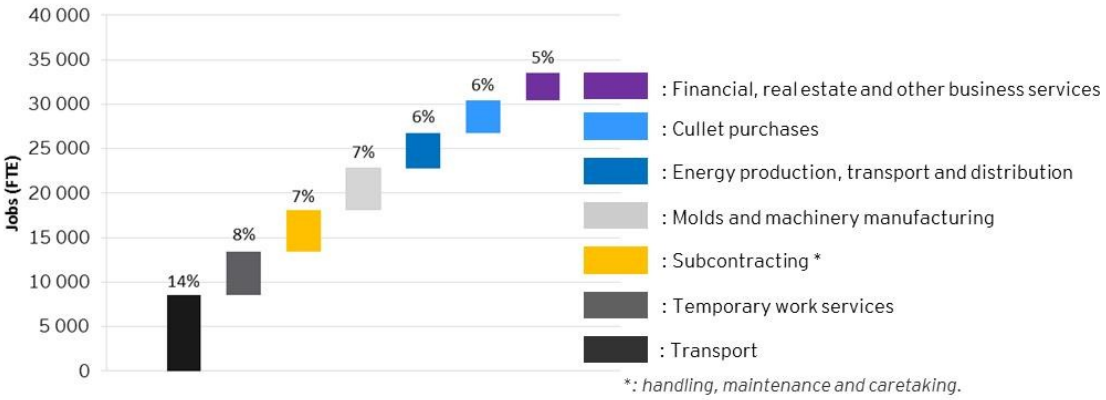

Figure 4 : Total indirect jobs generated by sector in 2012 (7 main sectors)

3.2 Contribution to Gross Domestic Product

The glass container sector contributes up to € 9.5 billion to the EU GDP

Container glass manufacturers directly create € 4.0 billion of Gross Value Added (GVA), i.e. almost as much as their suppliers (€ 4.4 billion). Container glass production also represents a total amount of €1.7 billion in salaries paid to direct employees and more than € 6 billion of purchases paid to direct suppliers.

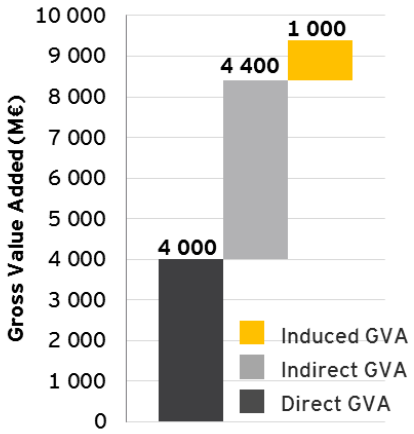

Figure 5 : Direct, indirect and induced Gross Value Added (GVA) created in 2012 in the EU

More than 50% of the total indirect value added is created through orders with direct suppliers

Gross Added Value created by direct suppliers (Tier 1) amounts to € 2.3 billion, almost 75% of which is created through 5 main sectors:

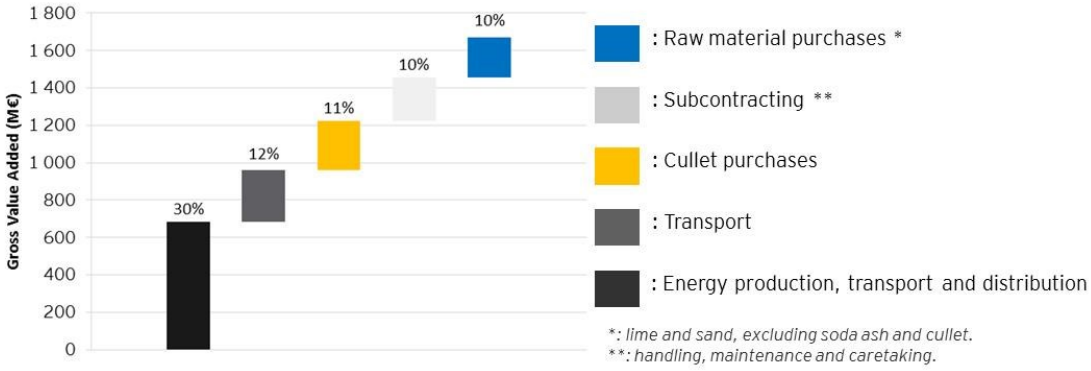

Figure 6 : Tier 1 indirect Gross Value Added created by sector in 2012 (5 main sectors)

Products packaged in glass contribute positively to the EU27 trade balance

The container glass industry provides packaging material to a variety of industrial sectors, ranging from food and beverages to perfumes and cosmetics. Those downstream value chains have their own social and economic contribution (not assessed as part of this study).

However, it is worth mentioning that, while exporting a small fraction of its production (worth € 500 million), the container glass industry is indirectly contributing to several product groups that have a positive extra-EU27 trade balance. In 2012, the products that relied primarily on glass for packaging represented a positive trade balance of more than € 21 billion per year. The same year, the general extra-EU27 trade balance showed a deficit of almost € 110 billion. This positive impact is mainly due to spirit and wine products (48% and 30%, respectively).

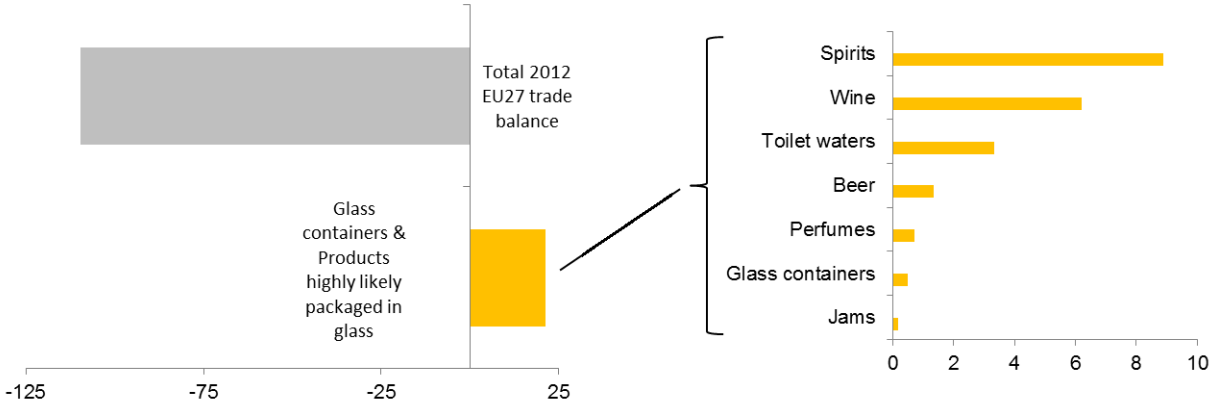

Figure 7 : 2012 extra-EU 27 trade balance and contribution by product group (€ billion)

3.3 Contribution to fiscal revenues

In 2012, the **direct contribution of the container glass sector to public finances** (State, regional and local authorities, social welfare systems) is estimated between € 0.75 billion and € 1 billion.

3.4 Investments

The container glass sector is a capital-intensive industry. Over the past 10 years, the total investment at the EU27 level is estimated between € 500 million and € 610 million per year on average, i.e. close to 10 % of the operational and maintenance costs.

Investments carried out over the period 2003-2012 mainly aimed at upgrading plants, such as substitution of fuel with gas for the furnaces and investments in air emission filters, implying higher energy efficiency and less CO_2 emissions.

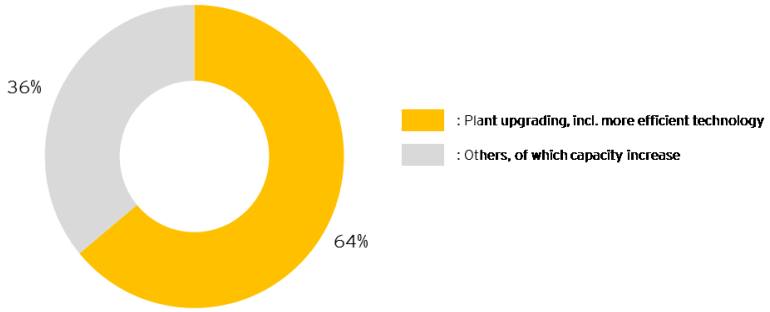

Figure 8 : Average annual investments (CAPEX) over the 2003-2012 period

3.5 Environmental footprint

Thanks to its circular value chain, the container glass industry helps reduce environmental externalities

As a result of its recycling initiatives for several decades, the container glass industry shows a recycling rate[3] of 70% in average and a cullet incorporation rate[3] of 52%. The container glass sector plays a leading role in the preservation of natural resources at all stages of the life cycle. The incorporation of used glass (cullet) contributes to minimise the sector's raw materials footprint, with slightly more cullet

[3] Cf. Glossary p3.

than virgin raw materials used in 2012 production (cullet represents 52% of total raw materials used and 12 680 ktons of external cullet). Moreover, the use of cullet contributes to lowering the energy consumption and CO2 emissions per ton of glass produced.

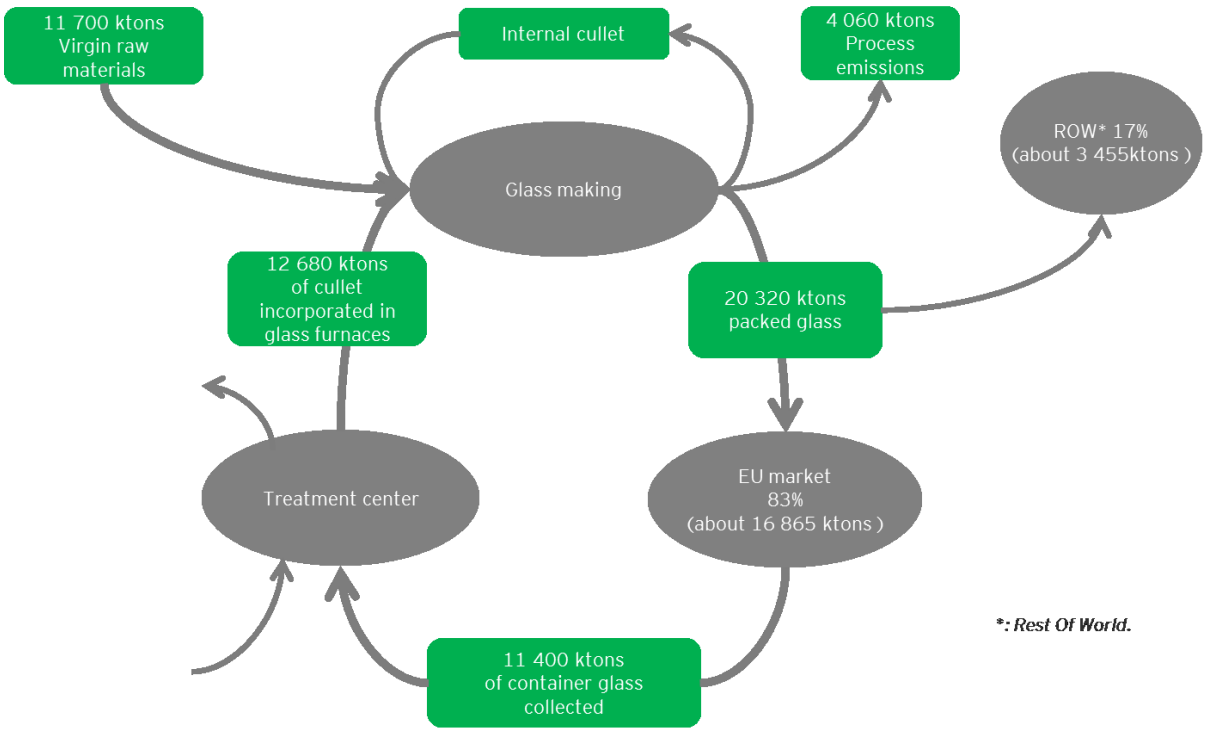

Figure 9 : Container glass life cycle in 2012

The container glass industry has a strong local presence

A dense and homogenous geographical distribution of plants combined with a significant share of production for the European market as well as a relative proximity of the plants to their suppliers and clients makes the container glass industry a key economic player in the EU.

On average, more than 70% of raw materials used in container glass production travel less than 300 km prior to being incorporated into a glass furnace. Likewise, glass plants deliver more than 50% of their products within 300 km.

	EU
Share of raw materials sourced locally	89%
Share of container glass sold to the European market	83%
Upstream transport – Sourcing of cullet and virgin raw materials	
Share of raw materials supplied within a radius of 300 km	74%
Downstream transport - Delivery	
Share of bottles supplied to clients located within a radius of 300 km	56%

Figure 10 : Figures on upstream and downstream transport

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