

# GLASS EXPORT REPORT

February 2023



## Why container glass exports from the south east provide a sound environmental and financially attractive option to waste management operators and local authorities

Container glass recycling to produce new bottles and jars is one of the best examples of the circular economy in action. Container glass is also one of the few packaging materials that can be recycled over and over again.

By using recycled glass cullet, glass furnaces consume less energy. Every 10% of cullet input results in a 2.5% reduction in energy consumption, along with associated reductions in CO<sub>2</sub> emissions. Overall, for every six tonnes of glass that is recycled there is a one tonne reduction in CO<sub>2</sub> emissions<sup>1</sup>.

But where do exports for recycling overseas fit in to the overall picture? Why are they needed and how do they compare environmentally to other options?

As one of the largest handlers of glass in the UK, Day Group sets out the case for why exporting container glass for recycling back into new bottles and jars in mainland Europe can provide the best environmental, as well as financial, solution for waste management companies and Local Authorities based in the south east of England.

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<sup>1</sup> FEVE; The European Container Glass Federation

# Colour Imbalance

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## The colour imbalance between waste glass arisings and glass production in the UK

Nearly all container glass on the market is either green, amber (brown) or clear. Before being used in the production of new glass bottles and jars, these colours must be separated when the glass becomes waste, noting that there is a tolerance for amber glass in green cullet.

Colour sorting is done by either the consumer, when placing the glass into bottle banks, or prior to remelt using automated colour sorting equipment during the manufacture of cullet.

In the United Kingdom, there is an imbalance between the colour of the waste glass packaging generated and what is needed for UK container glass production. This is primarily due to the UK being a large consumer of wine, but producing very little, hence we have a limited requirement for new green glass bottles.

Of the waste container glass generated, around 38% is green, 52% is clear and 10% is amber. However, production of container glass in the UK is approximately 20% green, 62% clear and 18% amber<sup>2</sup>.

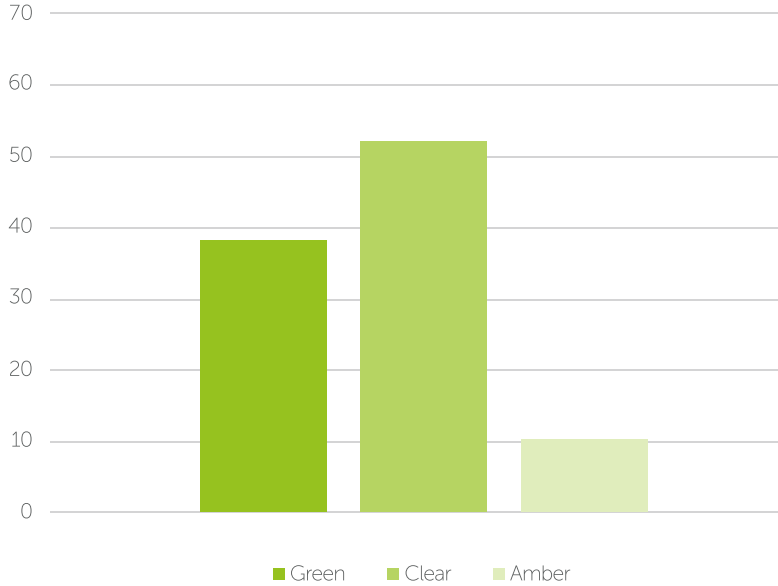
Therefore, the UK has an excess of green glass that must either be exported to countries where there is a shortage of green glass for production, effectively a repositioning of feedstock, or used in non-colour sensitive aggregate applications in the UK.

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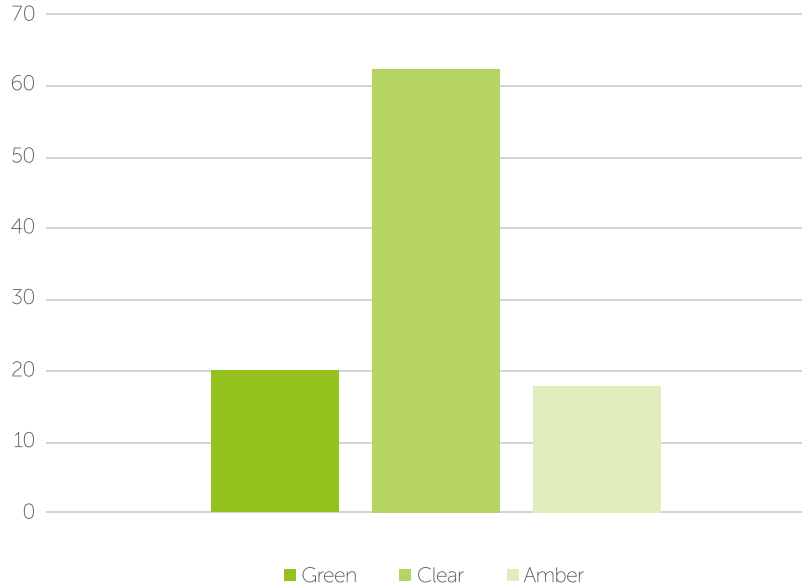
<sup>2</sup> WRAP, Colourite Project – Maximising Cullet Additions in the Glass Container Industry

# Colour Imbalance

Percentage of waste container glass generated in the United Kingdom per colour



Percentage of container glass produced in the United Kingdom per colour



# Remelt Capacity

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## The insufficient remelt capacity for all waste glass packaging collected for recycling in the United Kingdom

Glass cullet from packaging is used in two major remelt applications, the production of new containers and glass fibre (glass wool). The UK has significant capacity to produce container glass and fibre glass at just over 3MT per annum. Allowing downtime for maintenance and mould changes in container glass operations, a maximum output is estimated to be around 2.9MT, if the capacity is fully utilised. However, we also need to consider that virgin materials are required in the manufacturing process to maintain quality of the finished product. The percentage of virgin material used in manufacturing is around 50% for clear and amber container glass, 10% for green container glass, and 25% for glass fibre.

Overall, we estimate that the UK requires just under 1.7MT of recycled glass cullet per annum. In 2021, Environment Agency figures showed that the UK generated nearly 1.9MT of glass for recycling, 200kt more than required by UK glass furnaces. If we consider the colour imbalance

(there is insufficient waste amber glass to feed the theoretical demand) this increases to an excess of nearly 300kt per annum.

Quantity of glass required for recycling compared to the quantity of waste glass generated in the UK



## With the majority of glass remelt capacity in the north of the UK, it makes sense to export excess waste glass packaging from the south east

The vast majority of the glass remelt capacity is located in the north of the UK, with just over 90% of it being in Yorkshire, Merseyside, Cheshire, Scotland and Northern Ireland.

The average weighted distance from Day Group's site in Greenwich to the UK's remelt capacity is around 260 miles, and from the dockside storage site used in Kent is around 290 miles. It makes environmental sense that if the country has an excess of waste glass packaging for recycling, that exports should come from the south of the country (Hampshire, Surrey, Sussex and Kent) where the average distance to UK remelt capacity is furthest, and location to key export markets in Western Europe are typically closest.

Day Group loads waste glass packaging directly onto ships from where it is stored in south east London and Kent. Vessels hold between 2kt to 4kt of glass, which helps to minimise CO<sub>2</sub> emissions per tonne.

Life cycle analysis (LCA) work commissioned by Day Group indicates an average weighted impact per tonne to deliver the glass to its recycling partners in Western Europe to be just under 14kg per tonne. This is a similar impact to one tonne of glass being transported 275 miles by road, assuming there is a 28-tonne payload on the vehicle. This is broadly equivalent to the weighted average distance to UK glass remelt capacity from the Day Group's glass storage sites.

Day Group exports to two main markets, Benelux and Portugal, and commissioned work to investigate the CO<sub>2</sub> impact of shipping glass to these destinations from its sites. To Benelux, the impact was calculated to be 6.6kg of CO<sub>2</sub> emissions per tonne of glass. This is a similar impact to one tonne of glass being transported 130 miles by road, assuming the vehicle had a 28-tonne payload. To Portugal, the impact was calculated to be 17.4kg of CO<sub>2</sub> emissions per tonne of glass, the equivalent to a road trip of around 350 miles.

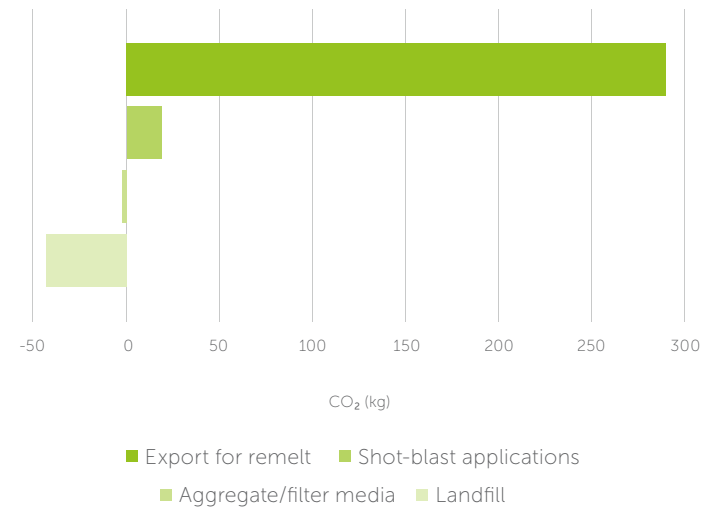
# Summary

## Remelt, whether in the UK or mainland Europe, is environmentally preferable to using glass as an aggregate

Research shows that from a life cycle analysis perspective, it is better to export excess glass to manufacture containers overseas than keep it in the UK and turn it into aggregate. An LCA study carried out by Enviros<sup>3</sup> on the waste processing options for container glass in the UK, measured in CO<sub>2</sub> savings by end use compared to landfilling the material, concluded that the CO<sub>2</sub> benefits when remelting glass in a furnace are much greater than when crushing glass for use in aggregate substitute applications. This is the case even when the glass waste is exported and transport emissions are taken into account.

The study concluded that exporting for recycling in a closed loop system saves 290kg of CO<sub>2</sub> per tonne of glass. This compares to a saving of 19kg of CO<sub>2</sub> per tonne of glass when used in shot-blast applications. In aggregate applications, and when used as a filtration media, there is a net increase in CO<sub>2</sub> emissions compared to landfilling of 2kg of CO<sub>2</sub> per tonne and 43kg of CO<sub>2</sub> per tonne, respectively.

Typical CO<sub>2</sub> savings for each waste processing option in the UK (per tonne)



<sup>3</sup> Glass Recycling - Life Cycle Carbon Dioxide Emissions, A Life Cycle Analysis Report Prepared for British Glass by Enviros Consulting Ltd, November 2003





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