

Comparing The **Environmental Impact of Wine Packaging**



Event Wine
SOLUTIONS



Same **Wine**



Different **Carbon**



Different **Waste**

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Page:

- 3 Environmental Issues**
Exploring the relevant environmental problems and possible solutions.
- 4 The Options**
3 Different packaging options: Glass, PET, and aluminium.
- 5 The PET Options**
There are 4 different types of PET bottle with different environmental impacts.
- 6 The Aluminium Can**
Examining the pros and cons of the aluminium can.
- 7 Embodied Carbon**
Answering the question 'Which vessel's manufacture produces the most carbon emissions?'
- 8 Transport Carbon**
Answering the question 'Which vessel's transport produces the most carbon emissions?'
- 9 Glass Lifecycle Analysis**
Analysing the entire lifecycle of glass packaging, considering both carbon and waste.
- 10 PET Lifecycle Analysis**
Analysing the entire lifecycle of PET packaging, considering both carbon and waste.
- 11 Aluminium Lifecycle Analysis**
Analysing the entire lifecycle of aluminium packaging, considering both carbon and waste.
- 12 The Results**
The packaging options qualitatively rated on the different issues.



Foreword

*The clue is in the name of our company. We are passionate about finding **solutions that enable the Events Industry to deliver impeccable wine to the most demanding of consumers.** There is currently no greater challenge than developing a sustainable product, but also a lack of information to guide event organisers towards making a decision about wine packaging that is right for them and their customers. This information will enable you to choose the best option for every event.*

Paul Scaife - Director, Event Wine Solutions



Carbon

More carbon = more climate change

Every product and its packaging requires energy to make - different materials use different amounts. Generally speaking, the more energy used, the more carbon emissions.

The Solution

Product packaging should be designed from **low carbon materials**, and also **consider their entire lifecycles**. This means considering not only the production of the product but also the transport and end of its life.



Waste

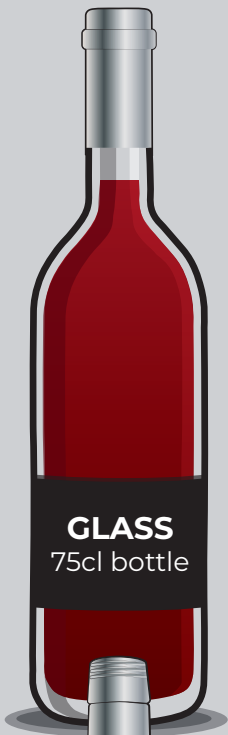
More waste = more pollution

While most materials are recyclable in theory, what actually happens to them usually depends on human behaviour and the infrastructure we have in place to process it.

The Solution

Product packaging should be **made from recycled material** to make use of existing waste, whilst also being **recyclable** at the end of its life. Waste management systems and infrastructure should also be efficient and effortless.





Option 1: THE TRADITIONAL Glass Bottle

This is the most common packaging choice for wine with the shape of the bottle being a synonymous icon for the drink. However we do not sell these, since **they are not safe for events**. Glass bottles can be used as a weapon and even without bad intent they can easily get broken and cause a health a safety risk with sharp shards. **Glass bottles are also not the most environmentally friendly choice as this report shows.**



Option 2: OUR CHOICE Recycled 100% rPET Bottle

This is what we use to package our wine. Keeping the iconic shape but with a bottle that is safe for events, it is also **made from 100% recycled material, low carbon to produce and recyclable at end of life**. As this report shows it is **the most environmentally friendly choice available**.



Option 3: AN ALTERNATIVE Aluminium Can

As an alternative to glass bottles aluminium cans are another choice that is starting to be used more frequently. Without the iconic bottle shape and the small serving size they are a very different wine-drinking experience. **Whilst they have better environmental credentials than the glass bottle, they are not as highly rated as our recycled plastic bottles, as this report shows.**

An important consideration: The Burden Factor

Choosing recycled material over primary sourced 'virgin' material will lessen the 'burden' on our planet's resources, thus saving the need for the carbon intensive extraction processes. rPET has considerably less embodied CO₂e emissions in comparison to even 30 / 50% recycled aluminium. **There is not enough recycled aluminium to meet demand, so using rPET will lessen the burden of primary aluminium mining.**

The PET Options



Not all PET bottles are the same, so we chose the best option.

There are 4 choices, with different environmental impacts. See how they compare below:



Our Choice Of Bottle:
**100% Recycled rPET
Mono Layered Bottle**



Made from recycled rPET
Using 100% recycled material reduces waste, pollution, and demand for virgin resources.



Recyclable at end of life
Being made of only 1 type of rPET with no additional layers makes it very easy to recycle.



Shorter shelf-life
The downside of the single layered construction is reduced shelf-life, increasing chance of spoilage.



Alternative Option 1:
**100%* Recycled rPET
Multi Layered Bottle**



Made from recycled rPET
Using recycled material reduces waste, pollution, and demand for virgin resources.



Unrecyclable at end of life
Multiple layers of rPET, with an added layer of nylon, make it unrecyclable in normal recycling systems.



Longer shelf-life
The multi-layered bottle keeps the wine unspoiled for longer.

***THIS STATEMENT IS MISLEADING: The majority is 100% recycled PET however the added layer of nylon will be virgin plastic**



Alternative Option 2:
**Virgin PET
Mono Layered Bottle**



Made from virgin PET
Using virgin material increases demand for fossil fuels.



Recyclable at end of life
Being made of only 1 type of PET with no additional layers makes it very easy to recycle.



Shorter shelf-life
The downside of the single layered construction is reduced shelf-life, increasing chance of spoilage.



Alternative Option 3:
**Virgin PET
Multi Layered Bottle**



Made from virgin PET
Using virgin material increases demand for fossil fuels.



Unrecyclable at end of life
Multiple layers of PET, with an added layer of nylon, make it unrecyclable in normal recycling systems.



Longer shelf-life
The multi-layered bottle keeps the wine unspoiled for longer.



“Aluminium cans sound like a great option...”



“Made with recycled material”



“Infinitely recyclable at end of life”



“Plastic free!”

These are the 3 main *perceived* benefits, but they are not as advantageous as they seem:



Virgin Aluminium has a high environmental cost

Aluminium comes from bauxite which is most commonly found below the ground in rainforest covered areas. As a result **the mining of bauxite for aluminium is a deforestation driver which does even wider damage to the local ecosystem.**

Extracting the aluminium from bauxite is a very energy intensive process causing large amounts of CO₂ emissions. **As of 2016 Aluminium/bauxite mining comprised 1.4% of all global CO₂ emissions** (Tost et al., 2018).

Using recycled aluminium will still drive virgin material extraction

The available amount of aluminum scrap covers only approx. 30–40% of the demand for aluminum, and hence approx. 60–70% of the demand is inevitably made from primary aluminum (Frees, 2008). So using 100% recycled aluminium will appear to reduce the impact of a single product in isolation, however it simply means that somewhere else products will have to be made from 100% virgin material.

The printed branding on cans is also problem for recycling. *Recycling and reuse of aluminum is not always possible due to painted and anodized aluminum being degraded* (Cooper and Allwood, 2012).

Aluminium cans are not plastic free

Most cans have a plastic lining that stops the contents for reacting with or corroding the aluminium. This can be seen in the video below:



<https://youtu.be/pGZyT9vGraw> q

This lining will not be recycled and instead will be burned off during the recovery of aluminium when the can is recycled.



SOURCES:

1. *Metal Mining's Environmental Pressures*. p.2881, Tost, M Hitch, M., Lutter, S., Moser, P. and Feiel, S.
2. *Crediting Aluminium Recycling In LCA By Demand Or By Disposal*. pp.212-218, Frees, N.
3. *Reusing Steel & Aluminum Components At End Of Product Life*. pp.10334-10340, Cooper, D.R. and Allwood, J.M.



What is it?

The 'cradle to gate' (manufacture to delivery) embodied carbon of a product is **the sum of all the carbon dioxide emitted** during the manufacture and transport of the raw materials, together with the product's production.

What increases it?

Material Choice - Some materials take more energy to produce than others. For example aluminium takes a lot of energy to extract and therefore has a high embodied carbon.

Weight & Density - The more material you use to create a product the higher the carbon cost. Therefore lightweight, low density materials such as plastic tend to have a lower carbon per product.



Since **the can has a different capacity to a bottle** we have calculated the embodied carbon of the packaging required to contain 50cl (500ml) of wine.

Wine Vessels

Different Material Choices

Embodied Carbon g/CO₂e

Cradle to Gate (Production)

100 200 300 400 500



**30% Recycled Content*



**30% Recycled Content*



SOURCES:

1. Conversion Factors. Freighting Goods (Defra 2022)
2. Conversion Factors. Material Use (Defra 2022)



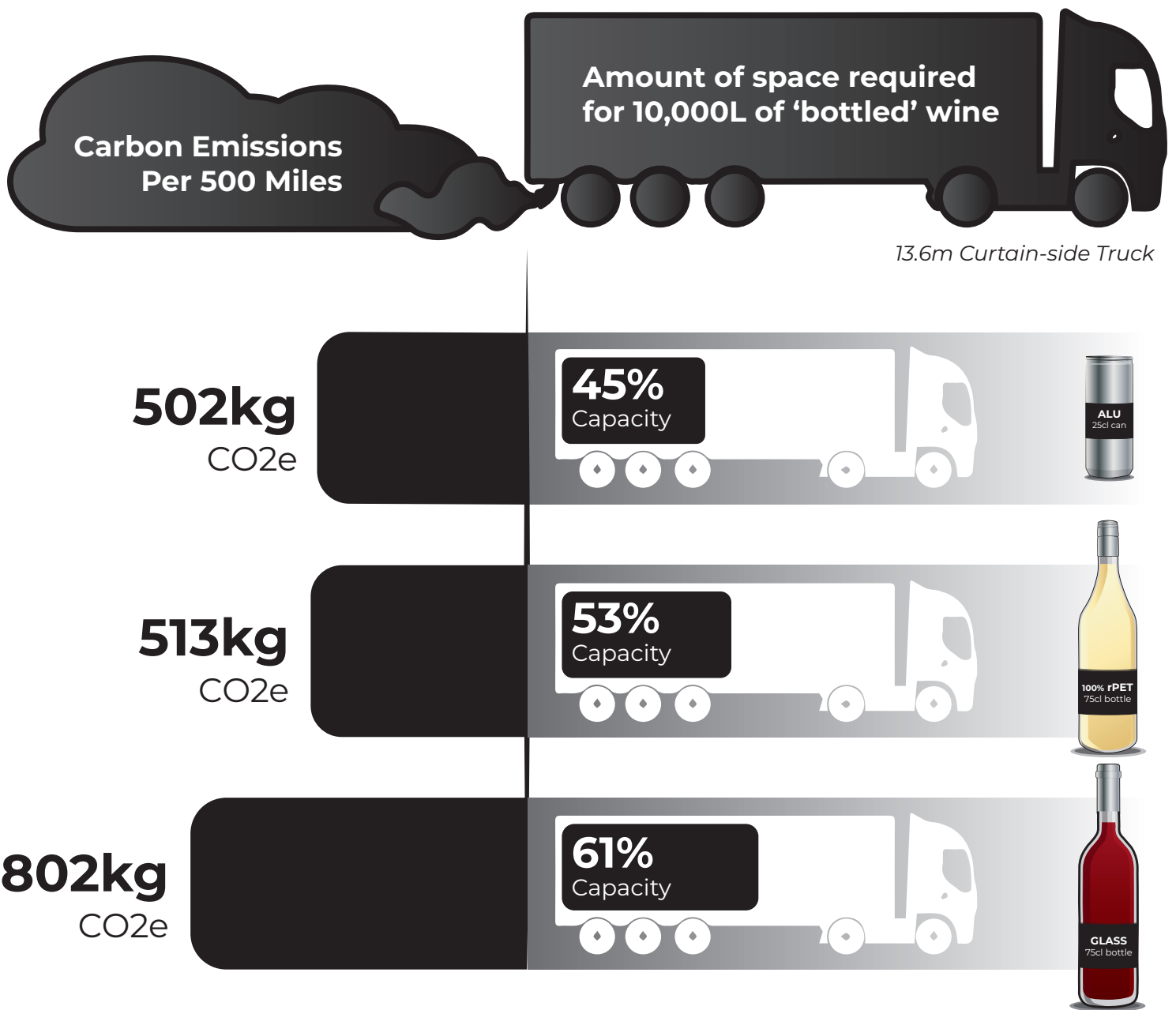
What is it?

Once produced, the 'bottles' of wine need to be delivered to their customers, and then the empty bottles collected for disposal or recycling. Every journey a product makes increases its carbon emissions.

What increases it?

Packaging Efficiency - The shape of a product dictates how well it will stack alongside itself. Shapes that do not stack well together and leave air gaps reduce the amount of products you can fit in a vehicle, and therefore increase the number of vehicles required.

Packaging Weight - The heavier a product is, the more energy it requires to move, thus increasing the carbon emissions.




SOURCES:

1. Conversion Factors. Freighting Goods (Defra 2022)
2. Conversion Factors. Material Use (Defra 2022)
3. Road Transport Emissions Methodology Report. Conversion Factors (Defra 2022)

Lifecycle Analysis



Since a can has a different capacity to a bottle we have calculated the carbon footprint of the packaging required to contain 50cl (500ml) of wine.



Total 419g Lifecycle Carbon Footprint 'Cradle to cradle' (Full lifecycle)

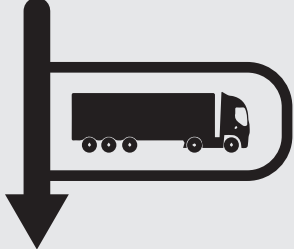


Manufacture
Material Extraction & Production Emissions
+410g



Glass has a low embodied carbon per kg compared with other materials, however the heavy weight of glass products gives them high production emissions.

Delivery
Transport Emissions (50cl - 500 Miles)
+40g



Glass bottles are not very space-efficient, therefore you need more vehicles to transport the wine - so more emissions.

Refrigerated Storage
Carbon Cost Not Included




If you accidentally drop the bottle or it breaks while being transported to you, the wine will be wasted. This has a far higher carbon footprint than the bottle itself.

Collection
Transport Emissions (50cl - 500 Miles)
+40g



Glass bottles are heavy, on average 496g, so they take more fuel to transport and therefore produce more emissions.

Carbon Saved By Recycling
Based on UK average recycling rate of 74%
-71g

74% Recycled

26% Landfilled

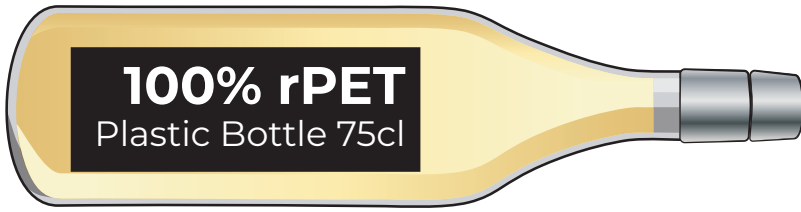
UK Packaging Waste Statistics, Defra (2022)



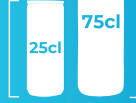
When glass is recycled it saves 41% of the energy, and therefore carbon, taken to produce it.

SOURCES:

1. UK Waste and Recycling Statistics (Defra 2022)
2. Conversion Factors. Material Use (Defra 2022)



Since a can has a different capacity to a bottle we have calculated the carbon footprint of the packaging required to contain 50cl (500ml) of wine.



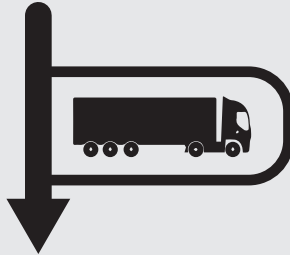
Total Lifecycle Carbon Footprint
151g
'Cradle to cradle'
(Full lifecycle)

Manufacture
Material Extraction & Production Emissions
+111g



Plastic products generally have low manufacturing carbon footprints, and this rPET bottle is no exception. This is because it is so lightweight.

Delivery
Transport Emissions (50cl - 500 Miles)
+26g



Bottles are not very space efficient, therefore you need more vehicles to transport the wine - so more emissions.

Refrigerated Storage
Carbon Cost Not Included



rPET bottles do not break or shatter so it is much harder to waste the wine, therefore the chance of increased carbon footprint due to waste is reduced.

Collection
Transport Emissions (50cl - 500 Miles)
+26g



rPET bottles are lightweight, so they take less fuel to transport and therefore produce less emissions than glass. More bottles can be transported per truck, within permitted weight limits.

Carbon Saved By Recycling
Based on UK average recycling rate of 75%
-12g

75%
Recycled

25%
Landfilled

UK Household Plastics Collection Survey 2021, Recoup (2021)



When PET is recycled it saves 23% of the energy, and therefore carbon, it took to produce it.

SOURCES:

1. Conversion Factors. Material Use (Defra 2022)


2. UK Household Plastics Collection Survey (Recoup 2021)

3. UK Waste and Recycling Statistics (Defra 2022)

Lifecycle Analysis



Since a can has a different capacity to a bottle we have calculated the carbon footprint of the packaging required to contain 50cl (500ml) of wine.



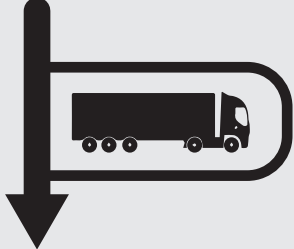
Total 109g Lifecycle Carbon Footprint 'Cradle to cradle' (Full lifecycle)

Manufacture
Material Extraction & Production Emissions
+147g



Virgin aluminium has very high embodied carbon due to the high energy requirements of refining it.

Delivery
Transport Emissions (50cl - 500 Miles)
+25g



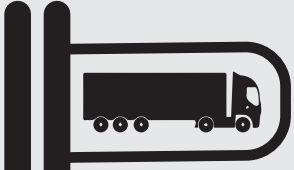
Aluminium cans are pretty space efficient, therefore you need fewer vehicles to transport the wine - so less emissions.

Refrigerated Storage
Carbon Cost Not Included




The demand for aluminium far outstrips the supply of its recycled material - as a result, the average recycled content is a maximum of 30% across all aluminium products. This means that demand for aluminium products relies largely upon virgin material which has a very high energy and carbon cost.

Collection
Transport Emissions (50cl - 500 Miles)
+25g



Aluminium cans are light, so they take less fuel to transport and therefore produce less emissions.

Carbon Saved By Recycling
Based on UK average recycling rate of 82%
-73g

82% Recycled

18% Landfilled

UK Packaging Waste Statistics, Alupro (2021)



When aluminium is recycled it saves 89% of the energy, and therefore carbon, taken to produce it. Material extraction requires high energy but remelting does not.

SOURCES:

- 1. Metal Packaging Europe Report. MPE (Eunomia 2013)
- 2. Conversion Factors. Material Use (Defra 2022)

- 3. Alupro - UK Packaging Waste Statistics (2021)
- 4. UK Waste and Recycling Statistics (Defra 2022)



High Embodied Carbon

Glass bottles have thick walls and therefore require a lot of material to make. More material = more carbon.



High Recycling Rate

Glass is infinitely recyclable and commonly recycled. Bottles in the UK are often made with a high recycled content.



High Transport Carbon

Glass bottles are heavy and not very space efficient, meaning delivery vehicles burn more fuel and can fit less wine in a single journey.



Health & Safety

Smashed glass can cause accidental harm underfoot or be used as a weapon for deliberate harm. Bottles are heavy, causing harm if thrown.



Medium Embodied Carbon

Virgin aluminium is a high carbon material, making recycling essential. Recycling reduces the lifecycle carbon but virgin material will always be needed due to high demand.



High Recycling Rate

Aluminium is infinitely recyclable and saves 95% of its production energy if recycled. So it is good news that it has a high recycling rate, provided events have effective aluminium collection methods in place.



Low Transport Carbon

Cans are lightweight and space efficient, so transport vehicles use less fuel to fit more wine in a single journey.



Health & Safety

Cans can be sharp when crushed or ripped which could harm people, however the risk is much lower than with glass.



Low Embodied Carbon

Plastic bottles have thin walls and therefore require less material to produce. Less material = less carbon. 100% recycled also significantly reduces carbon emissions



High Recycling Rate

Although plastic is not infinitely recyclable, at the moment, our bottles are 100% recyclable. Plastic bottles have a high recycling rate in the UK.



Low Transport Carbon

Lightweight, resulting in less fuel consumed by the vehicle. Not fragile, so easy to pack efficiently.



Health & Safety

Plastic bottles are lightweight and do not have sharp edges however they are treated, making them the safest option.