

## BULK IMPORTS OF WINE: QUANTIFYING THE NET BENEFITS

### Introduction

WRAP has been encouraging wine suppliers and purchasers to switch from importing wine in bottles to importing in bulk and bottling in the UK. This has two aims:

- to reduce the transport emissions associated with New World wine by reducing the weight of wine shipments; and
- to facilitate recycling by reducing the imbalance between the green cullet arising from imports and the relatively low demand for UK green glass production.

The strategy appears to be working:

- Australia's bulk wine exports have increased by 51% in the last five years, despite a major blip in 2007-08:

Financial Year	Litres	Value AUD
2006-07	226 015 594	\$ 231,093,779
2007-08	154 792 067	\$ 189,244,406
2008-09	255 459 164	\$ 286,462,534
2009-10	312 407 457	\$ 300,267,878
2010-11	341 642 661	\$ 335,024,142

- In 2005, some 32% of South Africa's wine exports left the country in bulk format, and in 2011 export in bulk is projected to exceed 45%.

Bulk imports have shifted jobs and carbon emissions from the New World to the UK, and this paper sets out to quantify the global environmental benefits to weigh against the social and economic disruptions that have resulted.

### The global environmental benefits

WRAP's March 2007 report, *The life cycle emissions of wine imported to the UK*, examined the potential benefits arising from (a) bulk transport and (b) lightweighting the bottles used for moving wine from Australia and Bordeaux to the UK.

For transport from Australia, using the average Australian bottle weight of 502g (in 2007), bulk shipment would reduce CO<sub>2</sub> emissions by 38% per bottle. However, this relates only to transport emissions: when the emissions from producing the wine, manufacturing the packaging, bottling and consumption are taken into account, the overall carbon saving from importing wine in bulk comes down to 10.7%.

Meanwhile, lightweighting the 502g bottle to 400g would reduce the CO<sub>2</sub> emissions from transport by 6.2% per bottle and overall emissions by 6.4%. A 300g bottle would save 20.6% in transport emissions and 12.7% overall.

The sea journey from Cape Town to the UK is significantly shorter than from Adelaide to the UK. Reducing large container-ship emissions pro rata while leaving the other transport emissions unchanged, would translate into a saving of **36%** from importing South African wine in bulk:

- 314.1g CO<sub>2</sub> per 502g bottle when bottled at source
- 200.2g CO<sub>2</sub> per 502g bottle when bottled in the UK after import in bulk

*The 114g of CO<sub>2</sub> equivalent saved is equivalent to the emissions generated by the production and distribution of 200g of (uncooked) East Anglian potatoes.*

Taking all lifecycle emissions into account (assuming the same values for the packaging, viticulture and viniculture, bottling and consumption as for Australian wine), would result in an overall saving of 6.5% from importing in bulk.

Assuming the same percentage savings from lightweighting, reducing the weight of South African wine bottles from 502g to 400g would reduce the CO<sub>2</sub> emissions from transport by 6.3% per bottle and overall emissions by 4.5%. A 300g bottle would save 20.7% in transport emissions and 12.9% overall.

In fact, South African screw-top bottles have already been lightweighted from over 500g in 2006 to 350g in 2010, while bottles sealed with cork have been lightweighted from 570g to 460g. With screw-top bottles now representing more than 65% of South Africa's wine production, we assume that the average weight of the bottles exported is around 390g.

On the above assumptions, average CO<sub>2</sub> emissions from transport and packaging per 390g bottle would be 546g. This suggests that a saving of around **16.1%** in emissions from transport and packaging has already been achieved – and that the transport savings from import in bulk have come down from 36% to about **30%**.

If all lifecycle emissions are taken into account (with the same assumptions as before), the results would be an overall saving of **5.1%** from importing in bulk.

*The 65g of CO<sub>2</sub> equivalent saved is equivalent to the emissions generated by the production and distribution of less than 2g of lamb or about 30g of broccoli.*

Meanwhile developments in the shipping industry will reduce the savings from bulk transport of wine still further:

- According to the *Sunday Times* (24 July 2011), the shipping companies have responded to rising fuel costs by reducing speeds, and this has generated a big reduction in their carbon emissions. Hapag-Lloyd found that slowing some of its vessels by just 5 knots, or 20%, led to a fuel saving of about 50%. Maersk's "slow steaming" policy resulted in a 12.5% reduction in CO<sub>2</sub> emissions per container between 2007 and 2009, and the company is aiming for a 25% reduction by 2020.
- On 15 July the International Maritime Organization voted to introduce the first system to regulate ship emissions: all ships weighing more than 400 tonnes and built after 2013 must improve their efficiency by 10% by 2020, rising to 20% by 2024 and by 30% thereafter.

## **The social impacts in South Africa**

The South African packaging manufacturer Consol Glass has pointed out the loss of jobs that bulk exports entail, in a country that already has a 40% unemployment rate:

- SA Wine Information Systems (SAWIS) estimates that for every 10 million litres of wine shipped in bulk, just over 107 jobs are lost. Thus, the rise of 65.3 million litres in direct exports over the last six years implies a loss of nearly 700 jobs.
- Unilever SA has estimated that 22 people depend on every full-time job in the formal economy for at least part of their livelihood. Thus, more than 15,000 people are directly affected by the shift to bulk exports. And that doesn't include the wider loss to the South African economy from the reduced spending power of those 15,000 people.

In the 12 months to May 2011, bulk wine exports increased by 13.6% and bulk wine exports increased by 13.6%. This resulted in 43 million bottles and the associated closures, labels, cartons and partitions not being manufactured in the wine-growing region, a loss of R 341 million (about £31 million).

Two packaging co-operatives which were previously in the top 10 of packaged wine exporters to European destination have recently ceased operations completely. They have mothballed their packaging lines, making more than 200 people redundant, and the 40 million 75cl bottles they previously produced have been entirely replaced by bulk exports.

The question is, does the 65g of CO<sub>2</sub> equivalent emissions per bottle saved by importing wine in bulk, and an increase in bottle-to-bottle recycling in the UK in place of lower-value treatment of surplus green cullet, justify the social damage resulting from this policy?

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## APPENDIX I: THE ENVIRONMENTAL SAVINGS FROM BULK IMPORTS

WRAP's March 2007 report, *The life cycle emissions of wine imported to the UK*, examined the potential benefits arising from (a) bulk transport and (b) lightweighting the bottles used for moving wine from Australia and Bordeaux to the UK.

When bottled at source, 10,584 litres of wine is typically shipped per container, whereas a single-trip polyethylene flexitank can hold 24,000 litres per TEU (Twenty-foot Equivalent Unit).

### Australia

For transport from Australia, using the average Australian bottle weight of 502g (in 2007), this equates to a CO<sub>2</sub> saving of 38% per bottle:

- 432.5g CO<sub>2</sub> per 75cl bottle when bottled at source
- 268.7g CO<sub>2</sub> per 75cl bottle when bottled in the UK

Meanwhile, lightweighting would yield the following savings:

AUSTRALIA	502g bottle	400g bottle		300g bottle	
	CO <sub>2</sub> emissions per bottle	CO <sub>2</sub> emissions per bottle	CO <sub>2</sub> saving per bottle	CO <sub>2</sub> emissions per bottle	CO <sub>2</sub> saving per bottle
Transport	432g	405g	6.2%	343g	20.6%
Packaging	361g	288g	20.3%	216g	40.2%
<b>Total</b>	<b>793g</b>	<b>693g</b>	<b>12.6%</b>	<b>599g</b>	<b>29.5%</b>

Emissions unaffected by bulk transport or lightweighting are

	CO <sub>2</sub> emissions per bottle
Viticulture and viniculture	331g
Bottling	54g
Consumption	347g
<b>Total</b>	<b>732g</b>

Thus:

- total emissions of 1525.5g CO<sub>2</sub> per 502g bottle when bottled at source
- total emissions of 1361.7g CO<sub>2</sub> per 502g bottle when bottled in the UK

– an overall saving of 10.7% from importing in bulk.

Lightweighting generates the following overall savings:

AUSTRALIA	502g bottle	400g bottle		300g bottle	
	CO <sub>2</sub> emissions per bottle	CO <sub>2</sub> emissions per bottle	CO <sub>2</sub> saving per bottle	CO <sub>2</sub> emissions per bottle	CO <sub>2</sub> saving per bottle
Transport	432g	405g	6.2%	343g	20.6%
Packaging	361g	288g	20.3%	216g	40.2%
Other emissions	732g	732g	-	732g	-
<b>Total</b>	<b>1525g</b>	<b>1425g</b>	<b>6.4%</b>	<b>1331g</b>	<b>12.7%</b>

## South Africa

The distance by sea between Cape Town and Rotterdam (11,369 km) is 33% less than between Adelaide and Antwerp (17,346 km). Reducing large container-ship emissions pro rata while leaving the other transport emissions unchanged, would translate into a saving of **36%** from importing in bulk:

- 314.1g CO<sub>2</sub> per 502g bottle when bottled at source
- 200.2g CO<sub>2</sub> per 502g bottle when bottled in the UK after import in bulk

*The 114g of CO<sub>2</sub> equivalent saved is equivalent to the emissions generated by the production and distribution of 200g of (uncooked) East Anglian potatoes.*

Taking all lifecycle emissions into account (assuming the same values for the packaging, viticulture and viniculture, bottling and consumption as for Australian wine):

- total emissions of 1383g CO<sub>2</sub> per 502g bottle when bottled at source
- total emissions of 1293g CO<sub>2</sub> per 502g bottle when bottled in the UK

– an overall saving of **6.5%** from importing in bulk.

Assuming the same percentage savings from lightweighting, reducing the weight of South African wine bottles would result in the following savings:

SOUTH AFRICA	502g bottle	400g bottle		300g bottle	
	CO <sub>2</sub> emissions per bottle	CO <sub>2</sub> emissions per bottle	CO <sub>2</sub> saving per bottle	CO <sub>2</sub> emissions per bottle	CO <sub>2</sub> saving per bottle
Transport	290g	272g	6.3%	230g	20.7%
Packaging	361g	288g	20.3%	216g	40.2%
<b>Total</b>	<b>651g</b>	<b>560g</b>	<b>14.0%</b>	<b>446g</b>	<b>31.5%</b>

Or, taking all lifecycle emissions into account:

SOUTH AFRICA	502g bottle	400g bottle		300g bottle	
	CO <sub>2</sub> emissions per bottle	CO <sub>2</sub> emissions per bottle	CO <sub>2</sub> saving per bottle	CO <sub>2</sub> emissions per bottle	CO <sub>2</sub> saving per bottle
Transport	260g	272g	6.3%	230g	20.7%
Packaging	361g	288g	20.3%	216g	40.2%
Other emissions	732g	732g	-	732g	-
<b>Total</b>	<b>1353g</b>	<b>1292g</b>	<b>4.5%</b>	<b>1178g</b>	<b>12.9%</b>

In fact, South African screw-top bottles have already been lightweighted from over 500g in 2006 to 350g in 2010, while bottles sealed with cork have been lightweighted from 570g to 460g. With screw-top bottles now representing more than 65% of South Africa's wine production, we can assume that the average weight of the bottles exported is around 390g.

On the above assumptions, average CO<sub>2</sub> emissions from transport and packaging per 390g bottle would be 546g. This suggests that a saving of around **16.1%** in emissions from transport and packaging has already been achieved – and that the transport savings from import in bulk have come down from 36% to about **30%**.

If all lifecycle emissions are taken into account, (with the same assumptions as before), the results would be:

- total emissions of 1278g CO<sub>2</sub> per 390g bottle when bottled at source
- total emissions of 1213g CO<sub>2</sub> per 390g bottle when bottled in the UK after import in bulk

– an overall saving of 5.1% from importing in bulk.

*The 65g of CO<sub>2</sub> equivalent saved is equivalent to the emissions generated by the production and distribution of 114g of (uncooked) East Anglian potatoes.*

## APPENDIX II: TRANSPORT EMISSIONS UNDER VARIOUS SCENARIOS

**Table 1: Bottling at source**

Process	Australia: CO <sub>2</sub> emissions per bottle (WRAP 2007)	South Africa: CO <sub>2</sub> emissions per bottle ( <i>transport distances adjusted from WRAP 2007</i> )	South Africa: CO <sub>2</sub> emissions per bottle ( <i>current bottle weights and transport distances adjusted from WRAP 2007</i> )
Transport of wine to bottling plant	22.3g	22.3g	22.3g
Transport of empty bottles to bottling plant	5.1g	5.1g	5.1g
Transport of containerised filled cases from filler to (Adelaide/Cape Town) docks	2.5g	2.5g	2.5g
Shipping of container from Adelaide to Antwerp via large container vessel (17,346 km)	343.6g		
Shipping of container from Cape Town to Rotterdam via large container vessel (11,369 km)		225.2g	203.8
Shipping of container from Antwerp/ Rotterdam to Bristol via feeder vessel (936 km)	49.0g	49.0g	44.4g
Transfer of container to distribution centre	0.4g	0.4g	0.4g
Transport of cases to retail outlet	9.6g	9.6g	9.6g
<b>Total</b>	<b>432.5g</b>	<b>314.1g</b>	<b>288.1g</b>

**Table 2: Bulk hauling**

<b>Process</b>	<b>Australia: CO<sub>2</sub> emissions per bottle (WRAP 2007)</b>	<b>South Africa: CO<sub>2</sub> emissions per bottle (transport distances adjusted from WRAP 2007)</b>	<b>South Africa: CO<sub>2</sub> emissions per bottle (current bottle weights and transport distances adjusted from WRAP 2007)</b>
Transport of empty flexitank from manufacturer to winery	0.6g	0.6g	0.6g
Transport of filled flexitank from winery to (Adelaide/Cape Town) docks	13.0g	13.0g	13.0g
Shipping of flexitank from Adelaide to Antwerp via large container vessel (17,346 km)	198.9g		
Shipping of flexitank from Cape Town to Rotterdam via large container vessel (11,369 km)		130.4g	130.4g
Shipping of flexitank from Antwerp/ Rotterdam to Bristol via feeder vessel (936 km)	28.4g	28.4g	28.4g
Transfer of flexitank to bottling plant	1.4g	1.4g	1.4g
Transfer of empty bottles to bottling plant	15.2g	15.2g	15.2g
Transfer of cases from bottling plant to distribution centre	1.6g	1.6g	1.6g
Transport of cases to retail outlet	9.6g	9.6g	9.6g
<b>Total</b>	<b>268.7g</b>	<b>200.2g</b>	<b>200.2g</b>