



Measuring the carbon footprint of cellar door sales

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Backgrounds



Our preference of wine and travel

- Over 40 million wine tourist arrivals in 2016 in eight-leading wine producing countries
- Over 1.8 million international wine tourists to Australia, the fifth largest wine producing countries

Wine tourism can be defined as “visitation to wineries and wine regions to experience the unique qualities of contemporary Australian lifestyle associated with the enjoyment of wine at its source – including wine and food, landscape and cultural activities”.

by Australian Grape and Wine Inc

Economic benefits of developing wine tourism



- wine tourist spending totaled \$9.2 billion in 2014-2015 in Australia.
- wine-related tourism has increased by 12.5 per cent in the two years from 2014–15 to 2016–17.
- nearly 90 per cent of wineries in Australia have a cellar door, with this channel accounting for up to half of all direct to consumer (DTC) sales
- the smallest wineries have the greatest reliance on DTC sales, with wineries producing fewer than 1000 cases making 68 per cent of their revenue from DTC sales.
- cellar door sales grew by 4~8% annually.

The 50 million Package

\$50 million government investment over four years (2017–2020) to grow Australia's wine exports and showcase the nation's wine tourism

- targeted marketing campaigns in China and the USA
- wine tourism grants

Australia's Export and Regional Wine Support Package

A \$50 million funding package to help transform the Australian wine industry and drive demand for Australia's wine exports.



\$3m

CREATING CHINA-READY BUSINESSES

Investment in export and tourism capability building, wine export grants scheme for current and new exporters to facilitate increased exports and secure further sales, particularly in China.

\$32.5m

ACCELERATING GROWTH IN INTERNATIONAL DEMAND

Increase the perception of, and demand for, Australian wine and wine tourism in key markets through:

1. Print, broadcast, online and social media campaign
2. Key influencers engagement and events
3. Consumer and trade education

\$0.5m

TRANSFORMING CIDER BUSINESSES

Develop an Australian cider brand proposition

\$10m

CAPTURING GROWTH IN WINE REGIONS

Offer state-based and competitive grants to strengthen regional tourism by helping to develop exciting wine tourism experiences.

\$4m

ADMINISTRATION



Aussie wine features in Super Bowl ad as part of \$36 Million campaign.

“At home, this investment will help to attract up to 40,000 additional international tourists to visit our world-renowned wine regions by 2019–20, delivering an estimated \$170 million to the economy.”

by Assistant Minister for Agriculture and Water Resources

How about the impact on the emission?

The background of the slide features a close-up photograph of wine-related items. In the foreground, a clear wine glass is partially filled with a light-colored wine. To its right, another glass containing a darker wine is visible. In the background, a bunch of green grapes is partially obscured by the glasses. The entire scene is set against a light, neutral background.

“No one is skeptical about global warming in the wine industry”

- Global warming of 2 degrees Celsius would wipe out 56 percent of current wine-growing land; increase that to 4 degrees and an estimated 85 percent of grapes won't be viable (Morales-Castilla, et. Al, 2020).
- Expansion of viticulture into new areas can lead to a decrease in biodiversity and an increase in water use for irrigation (Van Leeuwen, et al, 2013).

Study purpose



- To evaluate the carbon footprint of cellar door sales in Australia
- To compare the carbon footprint of distribution channels: export vs wine tourism
(case study: cellar door sales to U.K. wine tourists in Australia to wine shipped from wineries in Australia to consumers in the U.K)

Distribution channel



The proposed method

Calculate total
trip emissions
of wine
tourists



Allocate a
proportion of
trip emissions
to cellar door
sales



Calculate
emissions per
bottle
purchased at
cellar door



The proposed method



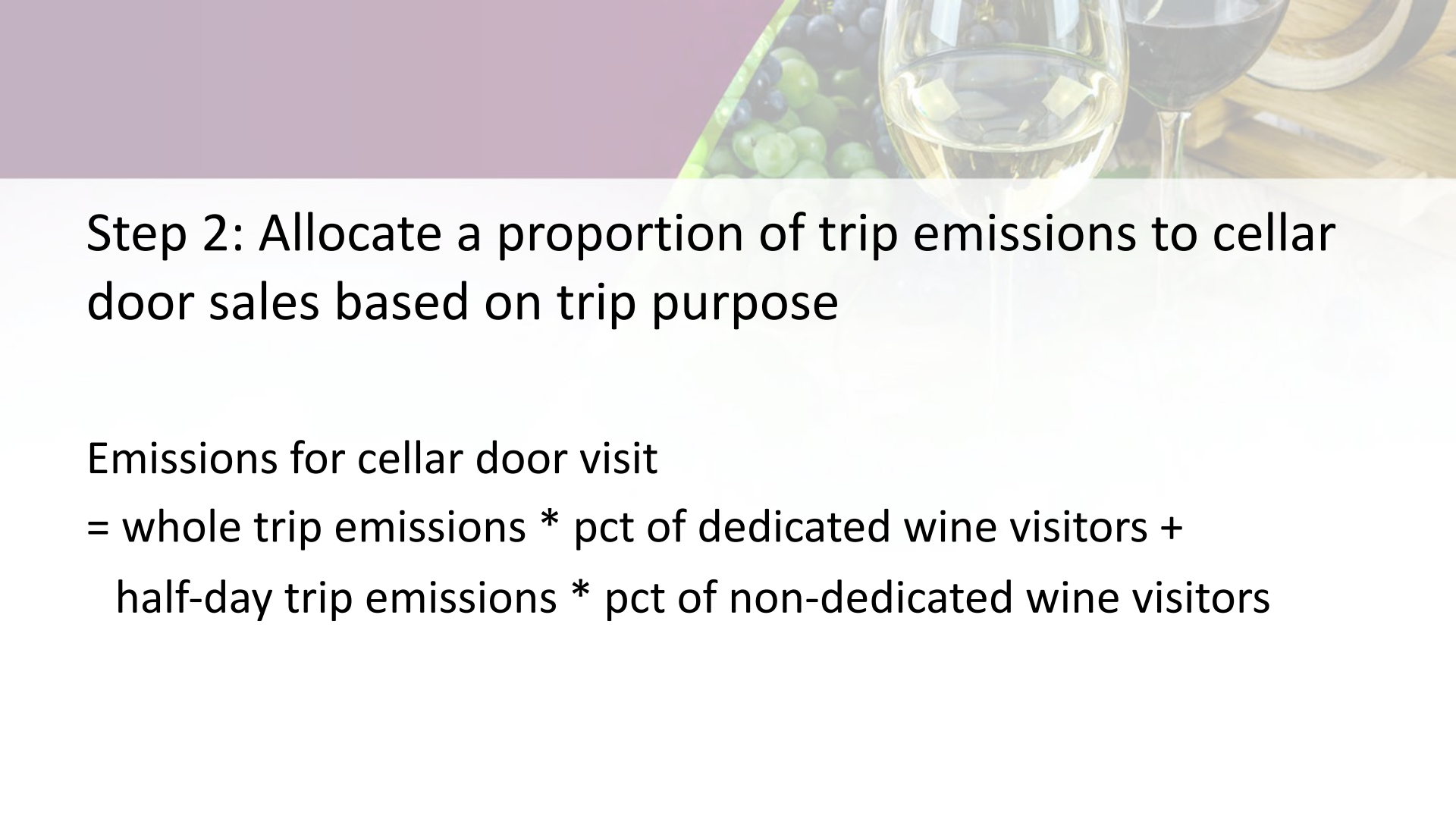
Step 1: Calculate total trip emissions of wine tourists through the consumption-based approach

Trip emissions

= CO₂ by international aviation + CO₂ by consumption within Australia

= miles between two gateway airports * emission coefficient per mile

+ $\sum_{i=1}^n \text{spending}_i * \text{emission coefficient per dollar}_i$



Step 2: Allocate a proportion of trip emissions to cellar door sales based on trip purpose

Emissions for cellar door visit

= whole trip emissions * pct of dedicated wine visitors +
half-day trip emissions * pct of non-dedicated wine visitors

The background of the slide features a photograph of wine-related items. In the upper right, there are two wine glasses, one containing white wine and the other red wine, resting on a wooden surface. To the left of the glasses, there is a cluster of green and purple grapes. The top left corner of the slide is a solid purple color, which transitions into a white background for the text.

Step 3. Calculation of trip emissions per bottle purchased at cellar door

$$\text{Emissions per bottle purchased} = \frac{\textit{emissions for cellar door visit}}{\textit{average bottles purchased}}$$



Results 1

the carbon footprint of cellar door sales

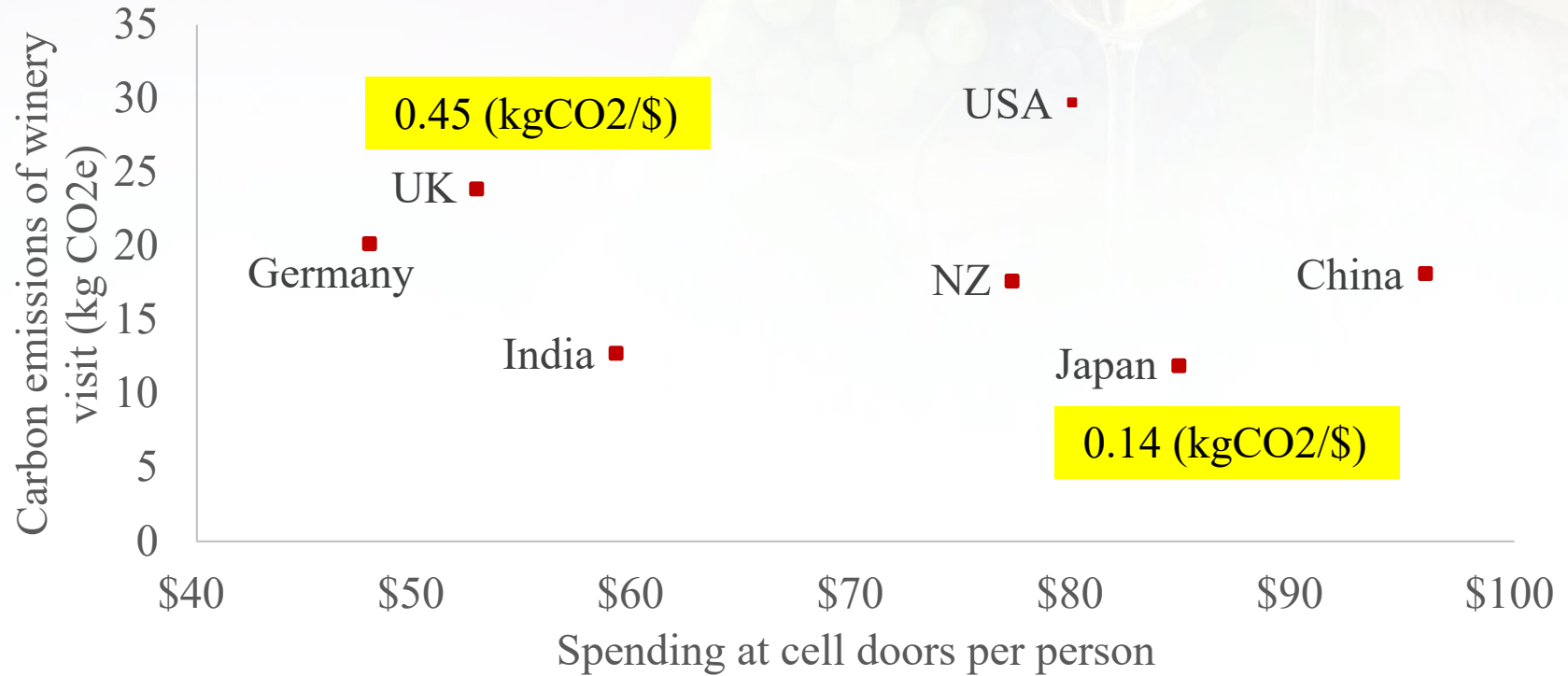
Travel behaviours of wine tourists

Per person	Domestic overnight wine tourists	Domestic day trip wine tourists	International wine tourists
Total spending (AUD)	\$1,041	\$145	\$5,041
Expenditure on wine at wineries	\$99	\$69	\$58
Average length of stay (days)	4.8	1.0	38.0
Type of wine visitors			
Dedicated wine visitor	16%	16%	1%
Interested/accidental wine visitor	84%	84%	99%

Carbon footprint of wine tourism in Australia

Per person (kg CO ₂ -e)	Domestic overnight wine tourists	Domestic day trip wine tourists	International wine tourists
Step 1: Total trip carbon emissions	108	16	1,334
Step 2: Attribution of responsibility to cellar doors	27	9	50
Step 3: Carbon emission per bottle			
Average bottles purchased	4.0	2.8	2.1
Emissions per bottle of wine purchased (kg)	2.8	2.9	16.3

Environmental and economic aspects of wine tourists by segments



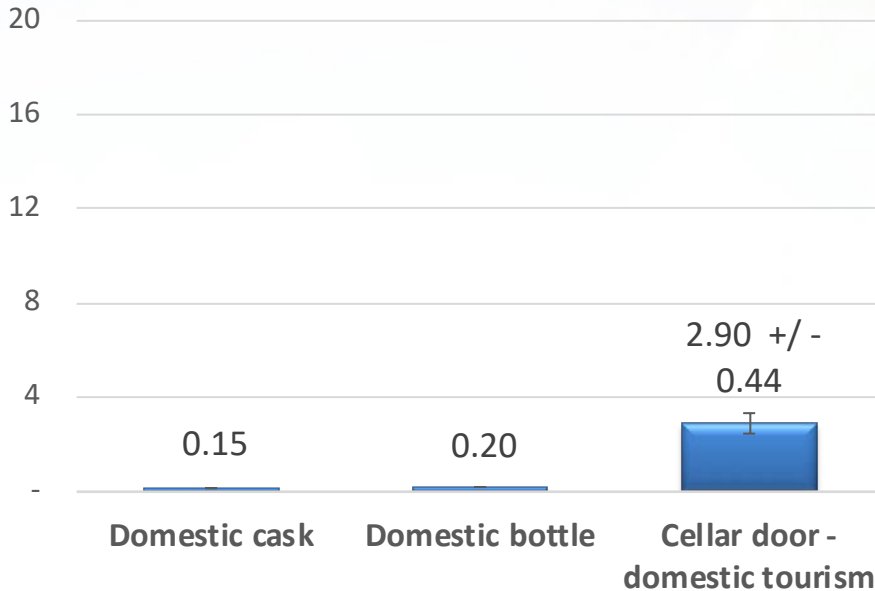
A photograph of wine glasses and grapes on a wooden tray, with a white semi-transparent overlay containing text. The image shows a close-up of a wine glass filled with white wine, a glass of red wine, and a bunch of green and blue grapes on a wooden tray. The background is a dark purple color.

Results 2

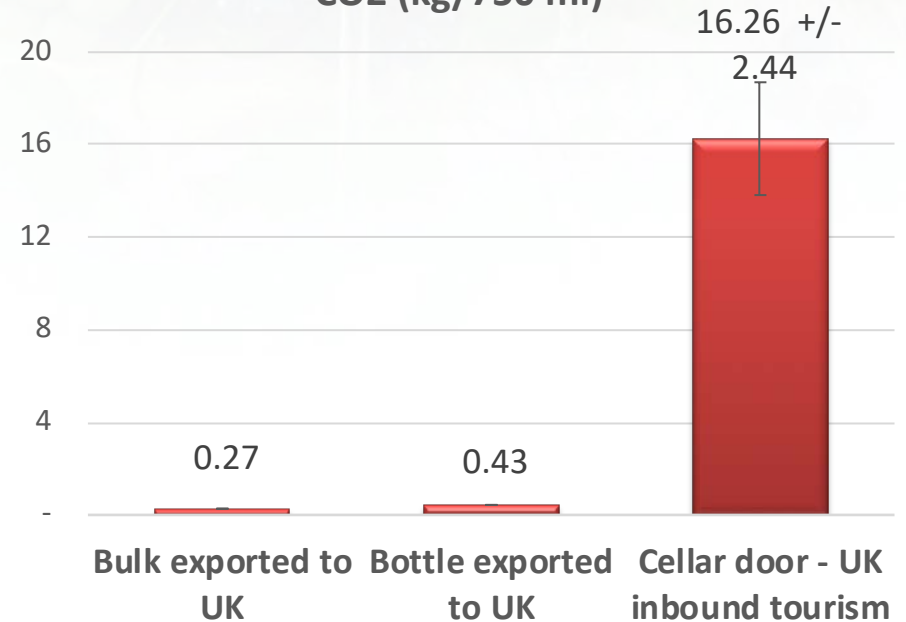
To compare the carbon footprint of
distribution channels: export vs wine
tourism

Comparison of distribution channels

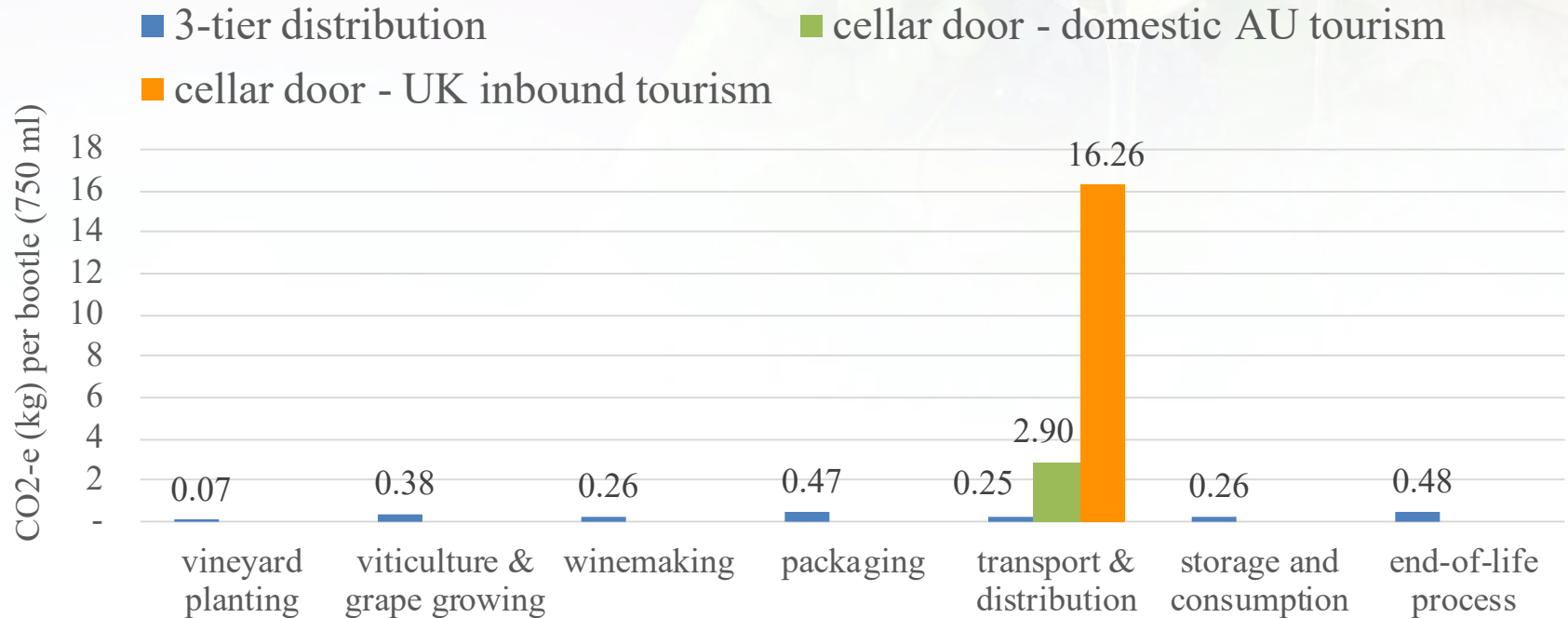
Domestic distribution - Transport CO2
(kg/750 ml)



International distribution - Transport
CO2 (kg/750 ml)



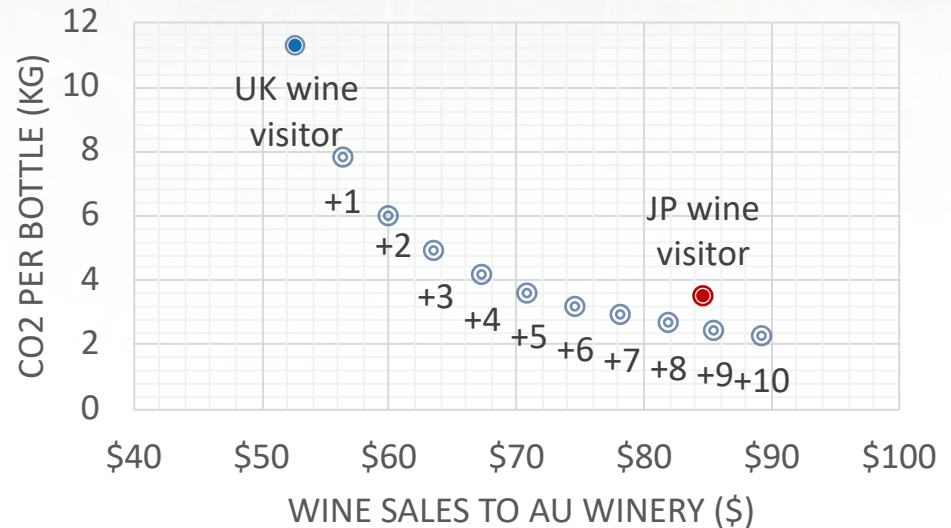
Cellar door vs. other life cycle stages



Rugani, B., Vázquez-Rowe, I., Benedetto, G., Benetto, E., 2013. A comprehensive review of carbon footprint analysis as an extended environmental indicator in the wine sector. *Journal of Cleaner Production* 54, 61-77.

Implications for policy

- Avoid developing long-haul tourism segments
- Capacity building for converting wine tourists into royal customers (the current rate is 1%) who opt for direct order through small package carriers
- Develop regional tourism destinations with agglomerated wineries that encourage multiple cellar door visits and multiple bottle purchase behavior





Thank you.

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