

Carbon Plan analysis – Impact on the wine sector: November 2011

Summary

Given the number of unknowns involved in the carbon plan arrangements at present, the impact on the wine sector is very difficult to ascertain, and will likely be highly variable between businesses. Added to this difficulty is understanding the impact relative to other beverage and food manufacturing operations and the retail and hotel sectors, and the resulting effect on customer behaviour.

The most greenhouse-emissions-intensive activities per unit of product in the wine supply chain include: electricity use in the winery, fuel use in the vineyard and for wine transport, emissions associated with glass and cardboard manufacture and emissions from the use of nitrogen fertiliser. Whilst a figure on the actual impact of the plan on wine costs is not available and may be highly variable, it is worthwhile noting that data on the carbon footprint of the wine supply chain indicates that a figure of approximately 1.3 kg of carbon dioxide is emitted per bottle. At a carbon price of \$23/tonne, this equates to 3 cents per bottle. However, there is a non-linear relationship between the carbon impost and actual cost outcomes such that 3 cents should be considered an estimate of the minimum cost impact of the carbon plan.

Wine businesses are placed below the threshold of needing to pay for carbon pollution directly, but additional costs to the sector will arise through increases in the cost of inputs across the supply chain. Of these, the most significant are electricity in the vineyard and winery and stationary fuels in the winery. The exclusion of agricultural fuel use and fertiliser manufacture and support for glass manufacturers means that the actual carbon plan impost on the sector will be lower than a direct payment per carbon emitted in producing wine. Many of the greenhouse gas emissions associated with the production of wine are actually out of the hands of the wine producer; for example, whilst a winery can attempt to reduce electricity consumption, unless it can utilise alternative energy sources on site it will be lumbered with the emissions intensity of the state's power grid. The same applies for packaging manufacture and transport where non-winery controlled operations will make the choices that result in the level of exposure to a passed-on carbon price.

Cost impact estimates of the carbon plan on the sector can be calculated using information available on the carbon plan program or, where that is not spelt out for a particular activity, by using the estimated emissions intensity of that practice to fill the gaps. Nevertheless it is difficult to ascertain how supply chains will respond to the plan, how customers will react to increasing costs being passed on and how government support packages will buffer impacts across the supply chain and to consumers.

Political and policy considerations

The carbon plan package became law on 9 November 2011 and elements of the carbon package will be well under way by the next Federal election in the latter half of 2013.

Political manoeuvring about the carbon plan has been intense, with claim and counter-claim on many aspects a reality of dealing with the nebulous world of complex economic and climatic modelling and predictions. A few certainties seem to be that the earth's surface is slowly warming, man-made emissions are rising, and Australia has close to the highest emissions per capita in the world, yet makes a relatively small contribution to total global emissions.

Now that the plan has been passed by both Houses of Parliament and become law, the next flash point will be the commencement of the carbon price system in July 2012. The Coalition has announced plans to go to the next election (in the second half of 2013) to seek a mandate to repeal the plan, but other issues of contentious policy difference are likely to have emerged by that time. Repealing the plan would be likely to require a double dissolution election to follow the normal election, and some commentators have claimed that it would be costly to reverse the current program and then commence an alternative program. The Coalition seems to be in the difficult position of needing to talk down the business climate to maintain voter awareness. On the other hand, the Government will face difficulties differentiating the true effect of, and need for, the carbon plan against a backdrop of rising electricity prices due to infrastructure needs, a strong currency that disfavors manufacturing and export, and a worsening International economic outlook.

Part 1: Overview of the Government's carbon package

The carbon program is not actually a tax; in terms of costs there are three main mechanisms.

1. Carbon prices and carbon credits

From July 2012 companies that exceed a certain amount of greenhouse gas emissions per year from a site will be required to account for those emissions by paying a carbon pollution price for those emissions, purchasing carbon credits or a combination of the two. The carbon price is set to commence at \$23/tonne, scaling up to \$25 in July 2014, and then moving to a floating price (with upper and lower limits) from 2015. The cost will vary during the floating price phase according to market forces within a lower limit of \$15 and a higher limit of \$20 over the expected price (\$45 at the commencement of the

floating price). Between July 2015 and 2020, businesses will be able to purchase international carbon credits to meet up to 50% of their requirements, and 100% after 2020. Hence price variation during the floating price period will depend on the demand for permits and the availability of carbon credits from both the domestic and International carbon markets.

The current European economic crisis and poor prospects for rapid recovery have seen the EU and NZ carbon permit prices fall from AU\$23 to around \$12.50 during the year due to an oversupply of carbon permits. A slow recovery of the EU and NZ market would place downward pressure on the Australian price during the floating phase (from 2015) as businesses will preferentially purchase international credits below the \$15 lower limit. However, by that time the UK will also be looking to source carbon credits, with a £16 carbon floor price on electricity generators set to commence in April 2013 (scaling up to £70 by 2030).

For clarity, the carbon price charged on greenhouse gas emissions could be expressed as purchasing a 'permit' to release greenhouse gasses from the Government. From July 2012 an unlimited amount of permits will be available for purchase (by the high-emission operations that are required to hold them) until the permit cost is floated. From that point no new permits will be made available, the system will effectively become a 'cap and trade' process, and the number of permits in circulation will become a ceiling on GHG emissions from high-emission companies. Business growth among high emissions operations will still be possible but will need to factor in the cost of purchasing either permits or carbon credits to account for the additional emissions, with the effect of driving a need for carbon credits.

The Carbon Farming Initiative (CFI) is a national system for recognising and endorsing processes to generate carbon credits for trade in the domestic carbon market. Carbon credits gained under the CFI can be sold to companies that need to demonstrate accountability for their emissions as an alternative to buying permits from the Government. It is interesting to note that the fall in the NZ carbon permit price below NZ \$18 as a result of oversupply in the EU market has apparently priced New Zealand forest growers (the major NZ credit providers) out of the market.

2. Fuel cost increases

In addition to the carbon permit system, some uses of liquid and gaseous fossil fuels will become more expensive through changes to the fuel tax credits and excise arrangements that will effectively add the carbon emissions of the fuel to the fuel cost at a similar rate as the carbon permit cost. The inclusion of fuels for heavy road transport in the carbon plan arrangements was not agreed to by the Government's Multi-Party Climate Change Committee; however it is proposed that they will be included from July 2014. Burning 1 litre of diesel releases 0.0027 tonnes of carbon dioxide directly, and the supply chain in getting the diesel out of the ground and to an outlet releases 0.0002 tonnes of carbon dioxide.

Applying a \$25/t carbon price to this figure indicates a cost of 7.3 cents/litre. The fuel uses that will attract the higher cost are stationary fuel use and heavy commercial transport (scheduled to commence in July 2014). The affected fuels and excise changes are provided in tables 1 and 2 below (from Government material). From July 2015, the additional cost will be set twice a year, and based on the average carbon price during the preceding 6 months.

Table 1: Fuel cost changes by usage category

Excise changes will apply to:	Excise to remain same:
<ul style="list-style-type: none"> Domestic aviation 	<ul style="list-style-type: none"> Fuel used by households for transport
<ul style="list-style-type: none"> Domestic shipping 	<ul style="list-style-type: none"> Light on-road commercial vehicles
<ul style="list-style-type: none"> Rail transport 	<ul style="list-style-type: none"> Ethanol, biodiesel and renewable diesel
<ul style="list-style-type: none"> Off-road transport use of liquid and gaseous fuels (except in agriculture, forestry, fisheries) 	<ul style="list-style-type: none"> Gaseous fuels used for on-road transport Off-road fuel use by the agriculture, forestry and fishing industries
<ul style="list-style-type: none"> Non-transport use of liquid and gaseous fuels 	<ul style="list-style-type: none"> Transport fuels when used as lubricants and solvents.

Table 2: Additional cost of fuels used for activities in the left hand column of table one, in cents/litre.

Fuel	2012-13	2013-14	2014-15
Petrol	5.52	5.796	6.096
Diesel and other liquid fuels	6.21	6.521	6.858
LPG (cents/kg)	3.68	3.864	4.064
LNG & CNG	6.67	7.004	7.366

3. Broader impacts of 1 and 2

The effect of the permit system will be to increase the cost of activities that cause emissions, and hence make actions to reduce emissions more profitable than currently (for example by reducing the cost recovery time for investing in more efficient machinery). Many operations that pay for permits will need to pass on to customers the cost of their products. In this way the carbon permit system acts like a tax on products and services with a high-emission footprint across the broader economy; the case for this is based on incentivising energy efficiency by reducing the time for return on investment in new high-efficiency systems and products.

The energy generation sector is a key part of the economy that will need to pay for carbon permits, and it will be costs passed on from electricity generators that will have the earliest effect on the broader economy, with domestic electricity prices expected to go up by 10% (or 2 cents/kWh). Some high-emission manufacturing operations that are considered to be threatened by adverse trade exposure associated the carbon permit costs are eligible for Government support; this will include packaging manufacturers and is described in the packaging section below.

Revenue raised by the Government (from the sale of carbon permits and reduced fuel rebates) will be channelled into projects to support the development and uptake of low emissions technology and electricity generation, an increase in the tax-free threshold and the instant asset write-off for small business.

Tree farming remains one of the most straight-forward mechanisms to gain carbon credits. Depending on demand for locally sourced carbon credits, the impact of the CFI may increase the relative profitability of tree farming thus altering the balance of land use, and demand for land in some areas. However it should be noted that the cost of producing carbon credits in Australia is likely to be much higher than in developing countries, hence the prospects for Australian credit production systems beyond full integration with International markets may be limited to multiple-use areas and avoided emission situations (abatement).

Part 2: Calculating impacts on the wine sector

The carbon emissions associated with the production of wine are reasonably well understood, so a simple assessment would be to define the carbon emissions for wine production across the supply chain and multiply that by the carbon permit cost per tonne (\$23). A more complex assessment can examine the actual proposed government measures and assess the likely cost impact per emissions exposure and associated regulatory instrument.

Finally the result from the previous analysis can be considered in relation to the likelihood and degree of compensation from the Government that is likely to occur within the supply chain to provide a third cost estimate.

1. Electricity

The average electricity price rise as a result of the carbon price has been modelled by Treasury to be about 9-10% for domestic use. Given that wineries are significant customers, many have negotiated supply contracts below domestic rates, so a more useful figure for businesses is an expected price increase of 2 cents per kilowatt hour.

Electricity use in the winery includes wine temperature management, space temperature management, lighting, pumps, compressors, bottling plant and wastewater treatment. In the vineyard, uses include irrigation pumps, shed temperature control, water heating, lighting and some product refrigeration.

As a proportion of total operational greenhouse gas emissions (Scope 1 and 2), electricity accounts for roughly 75% of greenhouse emissions from winemaking and 25% of vineyard emissions. Depending on the scope and efficiency of the operation, large wineries could face an electricity bill increase of around \$450,000, medium sized operations \$60,000 and small operations \$15,000. Given electricity use is much lower in the vineyard (higher reliance on liquid fuels) cost increases are more likely in the order of \$500 to \$3,500. It should be noted that whilst the Australian Energy Regulator is attempting to remove incentives for over-capitalisation in the transmission sector, generation and infrastructure upgrades to the supply grid are predicted to continue to place double digit upward pressure on electricity costs.

Cost increases for individual operations will be based on the extent of cost pass through from energy suppliers, which in turn will interact with existing contracts and competition on supply agreements.

Cost pass through from electricity generators and transmission companies may be mitigated by the Government's \$5.5 billion 'Energy Security Package', which will be delivered as permits and cash payments to the most emissions-intensive generators. Additionally, the \$10 billion Clean Energy Finance Corporation, which will provide finance to drive investment in renewable and clean energy technology, may have implications for energy generation and transmission.

2. Fuel and transport

Agricultural vehicle use is not included in the carbon plan and freight will not be included until July 2014 at the earliest. Therefore the initial impact to winery operations of the carbon plan on fuels is likely to be associated with the use of LPG or LNG in boilers.

Cost increases for stationary use of these fuels will be via the excise system, and phased in between 2012 and July 2015. In 2015 they will reach their full excise rate, which will be benchmarked on the petrol/diesel excise rate and adjusted for the lower energy content of the gaseous fuels, with a further 50% discount. As an example, a medium-sized winery using 17,000 litres per annum of LNG might expect to pay an extra \$1,190 per year in late 2015.

Freight activities in the sector include moving fertiliser, manure/mulch, grapes, vineyard machinery, bulk wine and juice, marc and packaged wine.

The implications of price rises in transport operations will vary between transport operators and routes, as the efficiency of the vehicles used, traffic and road conditions will impact on the amount of fuel used per transport operation, and hence the relative cost of fuel within the overall freight cost. The amount of competition between transport companies for your business may also be a consideration in the degree to which price increases are passed on. The Transport Workers Union (TWU) estimates an impost per 'truckie' in the range of \$150-200/week; and is lobbying to ensure that the cost is passed on. The TWU weekly cost estimate provides a means for wineries to gauge their potential exposure to increasing transport costs in terms of driver/weeks for road transport needs. Dividing the \$200 TWU figure by 7.5 cents suggests a weekly fuel use of 2,667 litres, which seems high.

3. Packaging

Packaging greenhouse gas emissions are the largest component of the carbon footprint of wine, given that the manufacture of metal, glass and cardboard materials is very energy intensive. The two large glass manufacturers (O-I and Amcor) fall into the 'emissions intensive trade exposed' category and will qualify for assistance in meeting the direct carbon permit cost from the Government's \$9.2 billion 'Jobs and Skills Package' in the form of free emission permits equivalent to 66% of those required. Screw cap manufacture will potentially receive up to 94.5% of the required permits for free under this package. The actual cost impact on these manufacturers will vary over time, assistance percentages are set to drop by 1.3% pa, whilst the carbon permit cost increases to \$25 over two years, then reverts to market demand (perhaps dropping as low as \$15 or going as high as \$45). It is unclear to what degree packaging manufacturers would pass on costs to wineries given the competition between one another and the risk of strengthening the trend for exporters to conduct in-market bottling, or potentially the use imported bottles or alternative packaging. Australian packaging manufacturers may be able to increase the efficiency of their operations with the help of Government co-investment grants.

Estimates indicate that about 1.3 kg of CO₂e (including all freight) is emitted from the production of 1.0 kg of glass at \$23/tonne, a cost increase of 2.5 cents per kilogram would result. Removing freight and then applying the 66% carbon price relief brings the price down to 0.6 cents/kg at the commencement of the carbon price and 1.1 cent in 2015 (including freight and a reduced assistance rate). Other packaging cost estimates include: alloy screw cap 0.12 cents, cardboard cartons or shippers, 1.4 c per 12 bottle case.

4. Vineyard operations

The carbon price will not apply to agricultural emissions from the use of on-farm machinery, fertilisers and livestock. However vineyard operators will see higher costs in the use of electricity and in the transport of grapes and materials. The impost of these costs will relate to the inputs required and the stage of the operation. Establishing a new vineyard will be more expensive as the necessary materials (such as trellis wires) become more expensive. The cost of water may also increase to the degree that electricity is used in the provision of irrigation water, such as with pre-pressurised water.

Electricity costs alone will vary significantly depending on the operation, but an average figure of \$11/Ha could be used as a reference point. Individual operations should work on an addition of 2 cents/ kWh to indicate exposure. The commencement of fuel excise changes for freight will increase the cost of grape transport by around \$2.50 per 50 km for a loaded truck. If agricultural fuel excise is reduced in line with other fuel uses in the future, this will increase the cost to vineyard operations from the current \$11/Ha estimate based largely on electricity usage to \$20/Ha with the addition of an on-farm fuel cost (based on 125 litres of diesel/Ha).

The Carbon Farming Initiative may provide a mechanism for some vineyard operations to gain tradeable carbon credits by reducing greenhouse emissions (such as through nitrogen fertiliser use that minimises nitrous oxide emissions), known as 'avoidance', or by storing carbon on the land, through increasing the carbon content of soils (by adding biochar or organic material) – known as 'sequestration'. Operations that have spare cleared land also may be interested in establishing a long-term tree farming project.

5. Winery business effects

(a) Estimating the effects – the Australian Wine Carbon Calculator and Entwine Australia membership

Entwine Australia was established in 2009 as an initiative of the Winemakers' Federation of Australia. From its commencement, the Australian Wine Carbon Calculator (AWCC) was included as a reporting requirement for the operational (on-site) winery carbon emissions. The AWCC covers other aspects of the supply chain, including vineyards, packaging and transport.

The AWCC can be used as a guide for estimating the business exposure to the carbon plan by summing the emissions from affected activities and multiplying by the carbon price. Coupled with benchmark reports from Entwine Australia membership (available early in 2012), wineries will be able to assess their on-site carbon footprint relative to industry averages for a quick assessment of relative operational carbon-efficiency.

(b) Electricity and fuel use

The impact of rising electricity and fuel costs will increase interest in energy audits, monitoring and redevelopment of equipment and processes to reduce electricity consumption. As an example, recent work at Cape Mentelle winery in WA has resulted in a 30% cut to the electricity bill. Similar opportunities for efficiency gains are possible in wineries where practices and processes are inefficient now. A comprehensive audit should result in a hit list of progressively more challenging opportunities to reduce consumption, ranging from switching the lights off when not needed to installing an integrated refrigeration and water heating system.

Wineries may be interested in applying to the Government 'Clean Technology Investment Program' (\$150 million has been allocated to food and beverage manufacturers) for 25% of the cost of energy efficiency or pollution-reducing upgrades, but will need access to capital for co-investment at a time of poor profitability and restricted credit access. At this stage it is not possible to judge how accessible the grants will be or how receptive they will be to the wine sector in relation to other sectors.

Opportunities for reducing fuel and electricity in the vineyard are likely to be limited to ensuring vehicles and equipment are operating at maximum efficiency. Equipment such as multi-row spray rigs may reduce fuel consumption. Some vineyard operators are likely to need to investigate the trade-off between water efficiency and energy efficiency when considering irrigation systems.

(c) Packaging decisions

The carbon plan may encourage wineries to take a second look at lighter wine bottles and alternative wine packaging, such as plastic bottles, tetra packs and casks. Rising glass manufacturing costs could also incentivise the reuse of wine bottles. The disincentive with any of these initiatives would be the likely need for significant spending on research, implementation and marketing.

The carbon plan is likely to increase the attractiveness for exporting wine companies of undertaking in-market bottling of wine (in or near the export destination country) as this process reduces the emissions intensity and thus the exposure to carbon costs of activities in Australia. Glass bottle manufacture in Australia could become uncompetitive relative to imported bottles.

(d) Wine sales

Domestically, wine businesses that can drive down their electricity and fuel use will be at a financial advantage compared to those that can't. Imported wine from companies with no equivalent carbon system will be placed in a slight cost of production advantage compared to Australian wines.

Internationally, the implementation of the carbon plan in Australia is likely to raise the profile of Australia in environmental terms and may add to perceptions of wine quality and purity. Working groups of the EU (with an operating emissions reduction scheme) have considered a tariff on imports from countries that don't have an equivalent system. When the Australian permit system moves to a floating price it is likely to align to the European price through the trade in international credits, thus making the Australian system equivalent and guaranteeing carbon-tariff-free trade with EU members.

Export into countries that have no equivalent carbon mechanism will face a new relative cost of production disadvantage. Trade into highly price-segregated markets may become more challenging as price mark-ups (calculated on a higher base price that includes the carbon price) come to bear and may push the wine into higher price bracket that would result in a lower volume of sales and a consequent drop in profitability.

(e) Marketing and tourism

The application of a carbon price within the Australian economy is likely to be of interest to some international wine consumers and commentators. It should be noted that the application of a carbon price will not mean that all Australian wines are carbon neutral, rather that the wine supply chain has met additional costs associated with the emissions-intensity of each process and item. If this was expressed in a marketing sense, a statement could potentially be made along the lines of 'for every bottle sold the winery has contributed x cents to a combination of initiatives that will reduce the emissions intensity of the Australian economy and direct carbon abatement and sequestration projects'.

Carbon neutrality is a step beyond that requires an independent analysis of the winery's full supply chain to identify the requisite carbon credits. These must then be purchased or generated, and the neutrality claim verified through an appropriate independent audit.

Domestic air travel will become slightly more expensive under the carbon plan (Qantas has predicted an average increase of \$3.50 per flight). Whilst this is a small additional impost, coupled with a high Australia dollar and the increasing cost of consumer goods it may add to the incentive for Australians to leave Australia for holidays and reduce the travel extent of foreign visitors.

6. Grants and opportunities available to the wine sector and rural communities

Whilst the eligibility criteria and the likely financial arrangements are not finalised, the Government assistance measures to soften the blow of the carbon plan may be beneficial to wine sector businesses.

(a) Winery operations

Food and Foundries Investment Program: A six-year project commencing in early 2012 with \$150 million to help food and beverage processing operations to improve energy efficiency and reduce greenhouse gas emissions. Funds will be available on a co-investment basis of \$1 from Government per \$3 from business, with a minimum total project cost of \$100,000. Any winery operation that could upgrade to a more efficient process may be able to partake in this program; areas to consider include temperature management activities, pumps, compressors, renewable energy and the efficiency of wastewater management systems.

Clean Technology Program (Clean Energy Investment Program): A seven-year project commencing in early 2012 with \$800 million in grants for energy efficient capital equipment, technology, processes and products for businesses that use more than 300 megawatts of electricity per year (most medium and all larger wineries should be eligible). Funding requirements for co-investment are as above.

Clean Technology Program (Clean Technology Innovation program): \$200 million for competitive grants to support investment in R&D in renewable energy, low-emission technologies and energy efficiency. A dollar-for-dollar, grant-based program running over five years to support business to co-invest with Government in research and development of renewable energy and energy efficient technology. This program may represent an opportunity for wineries to collaborate with researchers to identify efficiency-enhancing opportunities and trial solutions.

Small Business Instant Asset Write-off: A proposal that is partially dependent on the Resources Rent Tax will increase the tax write-off for small business assets to \$6500.

Carbon Farming Initiative: program to credit greenhouse emissions avoidance or capture and storage activities; options for wineries may exist in wastewater management (methane capture), supplying tannin-rich cattle feeds, and in conversion of organic wastes to stable storage as biochar.

(b) Rural communities

Clean Energy Finance Corporation: a \$10 billion program to invest in renewable energy and low pollution technology that will likely be focused in regional areas.

\$330 million in a *Low Carbon Communities program*, with Local Governments able to apply for grants to improve energy efficiency.

Regional and Community Support Programs: \$200 million to support regions affected by repercussions of a carbon price, such as through the cessation of power plants or coal mining operations, potentially relevant in the Hunter wine region and parts of Victoria.

Small Business Instant Asset Write-off: A proposal that is dependent on the Resources Rent Tax will increase the tax write-off for small business assets to \$6500.

Income-based personal finance arrangements: the Government is predicting that lower income earners may be better off under the carbon tax on the basis of topping-up government social welfare assistance arrangements and increasing the tax-free threshold.

\$1.95 billion in other funding may also flow for investment in regional communities via the following projects: Biodiversity Fund, \$946.2 million; Regional Natural Resource Management, \$44 million for climate change regional planning; Carbon Farming Futures, \$429 million program to help farmers and other landholders to access and benefit from carbon and the Carbon Farming Initiative; Indigenous Carbon Farming Fund, \$22.3 million; non-Kyoto Carbon Fund, \$250 million for activities including re-vegetation and soil carbon projects.

7. The price of wine and consumer behaviour

The Government predicts that 'prices of most household purchases will barely be affected by the carbon price – for almost everything other than electricity and gas, the estimated price impact is likely to be less than 1%.

Taking electricity and gas into account, the overall impact on the Consumer Price Index is expected to be around 0.7% in 2012–13.' The expected minimum cost of the carbon tax expressed per bottle is in the order of 2 to 3 cents (the lower figure with 66% support to manufacturing and no freight impact, and the higher includes full packaging costs and transport). As a comparison, at full cost pass on, milk is anticipated to rise in price by 1.5 cents/litre, bread 2 cents and a leg of lamb 11 cents.

The per-bottle cost consideration also needs to add cost recovery of restructuring for energy efficiency across the supply chain, and a per-bottle attribution of the increased operational costs of alcohol retailers and on-site premises. Whilst the context of price rises for most consumer goods means that conditions will now be favourable for an increase in the price of wine for customers, businesses should note that the ACCC has advised that price changes will be scrutinised for evidence of profiteering.

However the continuing climate of over-supply restraining wine price rises relative to CPI and competition within price points may mean that businesses are forced to bear additional costs associated with the carbon price for some product/market combinations (particularly in the highly 'price categorised' UK) or risk market failure.

Assuming full pass on of supply chain operating costs to consumers, CPI increases are expected to be buffered for lower income earners, meaning that an increase in the cost of goods associated with the carbon plan will be offset by greater disposable income. Among higher income earners, higher CPI without an increase in disposable income may lead to some change in consumer behaviour.

Consumer behaviour advice from Larry Lockshin, Professor of Marketing Science and the University of South Australia, suggests that if the price increase is only a few per cent, even up to 10%, we will see fewer purchases in the short term (maybe for a few weeks) then most consumers will adjust to the higher prices and buy normally. However, consumers may stick to preferred price purchasing behaviour, with a possible result of falling sale volumes for wines that increase in price above certain thresholds.

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Appendix

1. UK Carbon floor price http://www.hm-treasury.gov.uk/consult_carbon_price_support.htm
 2. NZ Carbon price commentary: <http://af.reuters.com/article/commoditiesNews/idAFL4E7MAOP320111111?pageNumber=2&virtualBrandChannel=0&sp=true>
 3. The Australian Wine Carbon Calculator can be downloaded from the Entwine Australia website: <http://wfa.org.au/entwineaustralia>
 4. Programs available to the sector – for information visit the websites below or contact AusIndustry on 13 28 46 or email hotline@ausindustry.gov.au
- 6a Food and Foundries Program: <http://www.innovation.gov.au/Industry/CleanEnergyFuture/Pages/CleanTechnologyFoodandFoundriesInvestmentProgram.aspx>
- 6a Clean Technology Investment Program: <http://www.innovation.gov.au/Industry/CleanEnergyFuture/Pages/CleanTechnologyInvestmentProgram.aspx>
- 6a Clean Technology Innovation Program: <http://www.innovation.gov.au/Industry/CleanEnergyFuture/Pages/CleanTechnologyInnovationProgram.aspx>
- 6a Instant asset write-off: <http://www.ato.gov.au/taxprofessionals/content.aspx?doc=/content/00286865.htm&pc=001/005/054&mnu=51998&mfp=001&st=&cy=>
- 6a Carbon farming initiative: <http://www.climatechange.gov.au/cfi>