

The **Allen Consulting** Group

Emissions Trading and the Packaging Industry

Assessment of the economic impact on the Australian packaging manufacturing industry of the proposed Carbon Pollution Reduction Scheme

7 November 2008

Report to the Packaging Council of Australia Inc.

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Suggested citation for this report:

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Executive summary

Background

This report is an assessment of the effect on the Australian packaging industry of the Government's proposed Carbon Pollution Reduction Scheme (CPRS), as set out in its Green Paper of July 2008. The analysis contained in this report is for the packaging industry as a whole. Individual companies within the industry may be affected quite differently, depending on their circumstances. In particular, the effect of the CPRS on companies that are vertically integrated (for example, companies that make packaging materials as well as packaging itself) may be quite different from the effect on the packaging industry as such.

As a response to climate change the Australian Government will introduce an emissions trading scheme

According to the latest Assessment Report of the Intergovernmental Panel of Climate Change (IPCC), there is a greater than 90 per cent chance that climate change is human-induced. One of the Australian Government's policy responses to this challenge is to introduce a national emissions trading scheme, the CPRS. Businesses covered by the Scheme will be obliged to buy a permit for each tonne of greenhouse gases they release into the atmosphere. This additional cost should provide them with incentives to reduce their emissions.

'Severely affected' industries, such as emissions-intensive trade-exposed industries, will receive assistance under the proposed scheme

Recognising that there will be adjustment costs for businesses as they move to a low carbon-economy, the Government has proposed to assist those businesses that will be most severely affected. It will do so, for instance, by providing free permits to emissions-intensive trade-exposed (EITE) industries. Eligibility criteria for such assistance will need to be chosen carefully as they are decisive in triggering the desired outcomes of the CPRS. While it appears that the eligibility criterion should be primarily based on the degree to which a business activity is trade-exposed (the reason being that in this case, businesses will not be able to pass any additional costs through to the consumer), emissions intensity momentarily remains the most significant criterion for an entity to meet in order to qualify for assistance.

The Australian packaging industry will be affected by the introduction of a carbon price — but is unlikely to qualify for assistance

As the carbon price represents a new cost for the packaging and other Australian industries, it will — to some extent — affect their profitability, and consequently production and investment decisions. The question is whether the packaging industry will be eligible for receiving free permits under the EITE assistance program that would help smooth the impacts. The industry is trade-exposed as some packaging products are being imported into the Australian market, while Australian companies also export products to foreign markets. However, none of the industry's key output production processes is emissions-intensive enough to make the threshold for EITE assistance.

No significant adverse effects on production costs, market shares and production processes (e.g. recycling) are to be expected

The results of our analysis suggest that the introduction of the CPRS and its EITE assistance program will not bring about significant resource misallocations that would lead to major market distortions. There is a chance though that, due to disparate production cost increases, some packaging products may be favoured (e.g. plastic and aluminium products may be promoted ahead of glass and paper). Recycling activities do not seem to be discouraged and substituted by increased uses of ‘virgin’ materials. Overall, the CPRS seems to encourage the use of less emissions-intensive products.

Chapter 1

Introduction

1.1 Climate change and Australia's Carbon Pollution Reduction Scheme

According to the latest Assessment Report of the Intergovernmental Panel of Climate Change (IPCC), there is a greater than 90 per cent chance that climate change is human-induced, i.e. primarily due to combustion of fossil fuels, agriculture and land-use changes (IPCC, 2007). As a social and economic response, the Australian Government has decided to limit the national emission of greenhouse gases by introducing a Carbon Pollution Reduction Scheme (CPRS). The CPRS will place a limit (or cap) on the amount of greenhouse gases industries can emit. Affected businesses will be required to buy a 'pollution permit' for each tonne of carbon they release into the atmosphere, thus having an incentive to reduce their emissions.

In order to facilitate the transition to a low carbon economy, the Government — in its Green Paper released in July 2008 — proposes to assist those 'industries that will be most severely affected by the introduction of a carbon constraint' (Commonwealth of Australia 2008, p. 297). These are mainly those industries that involve a significant degree of international trade and whose production processes are highly emissions-intensive.

Selecting the most appropriate form and level of assistance as well as the beneficiaries of assistance is a most critical task. The goal of the assistance program must be to provide incentives for reducing carbon emissions while, at the same time, not leading to significant market distortions.

1.2 Our analysis of the impacts on the Australian packaging industry

For the Australian packaging industry, to be able to adequately plan for the future, it is important to know:

- whether the industry is eligible for assistance under the proposed CPRS
- how a price on carbon (e.g. \$20/tonne) will affect production costs
- whether imported packaging will have a significant advantage over domestically produced packaging
- whether the CPRS will cause market distortions within the Australian packaging industry, e.g. by advantaging some packaging materials over others
- whether production from 'virgin' materials will be advantaged over recycling as a result of assistance provided under the CPRS.

This report summarises the findings of the research and analysis conducted by the Allen Consulting Group. It provides a brief overview of the Australian packaging industry in Chapter 2. Chapter 3 highlights the provisions made by the Green Paper on the introduction of the Carbon Pollution Reduction Scheme and the assistance program proposed for emissions-intensive trade-exposed industries and those severely affected for other reasons. The extent to which the packaging industry is trade-exposed and emissions-intensive — and whether it therefore qualifies for assistance under the CPRS — is discussed in Chapters 4 and 5, respectively. Chapter 6 summarises the findings of our modelling as regards the implications of a carbon price for production costs and recycling.

Chapter 2

The Australian packaging industry

2.1 Overview of the Australian packaging industry

The major packaging materials used and produced in Australia are glass, aluminium, steel, solid paperboard, corrugated paperboard, flexibles and plastics.

Paperboard packaging is the largest single material constituting about 36 per cent of total Australian packaging. Plastics is the second largest sector (around 30 per cent). Flexibles comprise around 10 per cent of the packaging market. Metal packaging accounts for twenty per cent of the market, and glass for around ten per cent (Frost 2005). Based on industry estimates, the Australian packaging industry had a turnover of around \$10.5 –11 billion in 2007 and 20 000 employees (MS2 and Perchards 2008).

Around 60–70 per cent of packaging is used by the food and beverage sector. Broadly speaking, packaging serves three main purposes:

- packaging which constitutes a sales unit to the final user or consumer at the point of purchase — known as consumer packaging or primary packaging
- packaging which constitutes a grouping of a certain number of sales units, whether the latter is sold as such to the final user, or consumer, or whether it serves only as a means to replenish the shelves at the point of sale — known as grouped packaging or secondary packaging
- packaging designed to facilitate handling and transport of a number of sales units or grouped packaging in order to prevent physical handling and transport damage — known as transport packaging or tertiary packaging (Frost 2005).

Packaging is a unique product in that it is not demanded for itself but rather because of demand for other products. Packaging gets products safely from the producer to the consumer.

Less than 60 per cent of packaging consumed in Australia is recycled. From 2002 to 2007, total packaging consumption increased 3.5 per cent while total recycled packaging increased 45 per cent (MS2 and Perchards 2008).

2.2 Where is the packaging industry located?

The Australian packaging industry is located throughout Australia but is highly concentrated in the sense that it is dominated by a handful of companies. This is not unique to Australia, the manufacture of consumer products is an increasingly global business. The largest users of Australian packaging are, increasingly, multinational companies or Australian based companies with significant export markets. This has led to rationalisation of the manufacture and purchase of packaging.

Paper and cardboard

Manufacturing and converting facilities for paper and cardboard in Australia include:¹

- three Amcor Fibre Packaging facilities in Victoria, two in New South Wales (NSW), one in Queensland and one in South Australia (SA);
- three major Visy Board facilities in Victoria, two in Queensland, two in NSW one in SA and one in Western Australia

Glass

There are five major glass packaging companies in Australia:

- Owens–Illinois (O–I) and Amcor account for all domestic glass packaging manufacturing at five sites around Australia, with one O-I plant each in NSW, Queensland, SA and Victoria, and one Amcor Glass facility in SA (MS2 and Perchards 2008).

Aluminium

Aluminium production in Australia is dominated by two companies:

- Aluminium beverage cans are produced by Amcor Beverage Cans in Victoria and Visy Beverage in NSW and Victoria.
- Alcoa Australia Rolled Products is Australia's only manufacturer of aluminium rolled products, including the rigid container sheet for beverage cans (MS2 and Perchards 2008). Alcoa's facility at Yennora NSW is Australia's largest recycler of aluminium products, recycling about 70,000 tonnes per year, including 550 million cans. Recycled material accounts for around 90 per cent of aluminium fabricated at Yennora (MS2 and Perchards 2008).

Plastic

There are five major plastic manufacturers in Australia:

- Principal PET bottle manufacture and blowing occur at two Visypak facilities in NSW.
- Principal plastic bag and film manufacturing facilities include Amcor Flexibles in WA, Poly Products in SA and Shorko Australia Pty Ltd in Victoria.
- A variety of smaller companies manufacture other plastic packaging, as well as packaging- related closures and transport packaging.

¹ Different facilities exist for the manufacture of paper, which is not an activity analysed in this report.

2.3 How does the industry perform?

Table 2.1 presents the main market characteristics of a sample of packaging products manufactured in Australia — metal containers; solid paperboard; corrugated paperboard; pulp, paper and paperboard and glass and glass product packaging. This sample is not meant to be representative of the entire industry, but provide a snapshot of certain segments of the industry in terms of revenue, gross product, number of establishments and enterprises, employment and total wages. For two of these segments — pulp, paper and paperboard manufacturing and glass product manufacturing — figures provided represent the entire industry, not specifically the packaging component of that industry.

Table 2.1 shows that each industry segment varies considerably in terms of revenue, gross product, employment and so forth. Of the four industry segments presented, the highest revenue and gross product is found in the pulp, paper and paperboard sector. The number of establishments and enterprises, wages and employment is highest in the glass manufacturing industry.

Table 2.1

MARKET CHARACTERISTICS OF CERTAIN SEGMENTS OF THE PACKAGING INDUSTRY

Industry	Metal container manufacturing (2005-06)	Solid paperboard container manufacturing in Australia (2006-07)	Corrugated paperboard container manufacturing in Australia (2006-07)	Pulp, paper and paperboard manufacturing in Australia (2006-07)	Glass and glass product manufacturing in Australia (2006-07)
Major products and services	<ul style="list-style-type: none"> • Metal can manufacturing • Other metal container manufacturing 	<ul style="list-style-type: none"> • Milk, other beverage and food • Printed foil and film lamination • Electrical and electronic equipment, and automotive parts • Books and stationery • Tobacco • Clothing and footwear 	<ul style="list-style-type: none"> • Standard corrugated paperboard containers • Customised corrugated paperboard containers 	<ul style="list-style-type: none"> • Packaging and industrial papers • Pulp (mechanical and chemical) • Printing and writing papers • Newsprint 	<ul style="list-style-type: none"> • Glass containers (bottles, jars etc) • Flat glass (window glass and glass walls) • Household and scientific glass (ie. kitchenware) • Other glass products
Revenue	\$1414 million	\$744 million	\$2024 million	\$2993 million	\$1665 million
Gross Product	\$467	\$258 million	\$654 million	\$1013 million	\$600 million
Number of establishments	135 units	51 units	38 units	58 units	425 units
Number of enterprises	108 units	40 units	24 units	20 units	400 units
Employment	3600 units	2746 units	4700 units	3980 units	5450 units
Total wages	\$224 million	\$171 million	\$319 million	\$312 million	\$350 million

Source: IBISWorld 2008a-e.

2.4 Implications of government policies and regulations for the packaging industry

Government intervention in the packaging industry has been focused on policies relating to packaging waste minimisation.

There are two major features to government policy on waste minimisation: (1) the use and consideration of a waste hierarchy in decision-making (ie. policies that avoid waste are given the highest preference and policies that encourage disposal are given the lowest preference), and (2) the sharing of responsibility for waste minimisation between industry and the community (Productivity Commission 2006).

Most waste minimisation strategies refer to extended producer responsibility (ie. when producers take responsibility for a product beyond the post-consumer stage of the product's life cycle) and product stewardship (when all members of the community share responsibility for the waste of a product over its life cycle).

The most significant government policy affecting the packaging industry was the introduction of the National Packaging Covenant in 1999 — a regulatory arrangement between stakeholders in the packaging supply chain and government, designed to minimise the environmental impacts arising from the disposal of used packaging. The Covenant built upon the National Waste Minimisation and Recycling Strategy in 1992 whose objective was to encourage the non-wasteful use of resources, to reduce hazards to health and the environment posed by pollution (CEPA, 1992) and the National Kerbside Recycling Strategy (discussed below).

The National Packaging Covenant

The National Packaging Covenant (Covenant) is a regulatory arrangement between key stakeholders in the packaging supply chain and all levels of government - Federal, State, Territory and local. The Covenant, based on the principles of shared responsibility through product stewardship, is designed to (1) minimise the environmental impacts arising from the disposal of used packaging; (2) conserve resources through better design and production processes; and (3) facilitate the re-use and recycling of used packaging materials (Department of Environment 2008). It was launched in August 1999 and extensively reviewed in 2004.

A new Covenant became effective in 2005, incorporating changes made to achieve better performance. There are now over 600 signatories, of which the majority are companies and industry associations in the packaging supply chain. All governments (with the exception of Northern Territory) are signatories to the Covenant (Department of Environment 2008). It has a term of five years (2005–10) and incorporates a number of changes designed to provide a more rigorous compliance and enforcement process.

The objective is to reduce environmental degradation arising from the disposal of used consumer packaging and conserve resources through:

- better product design
- increased reduction, re-use and recycling of used packaging materials
- reduced use of non-recyclable materials
- reduced amount of used packaging materials going to landfill

- reduced incidence of packaging being littered.

More than \$19 million of joint funds was provided to local governments across Australia under the original Covenant for such activities as kerbside services, and major events. Funding under the second phase is focused on non-home recycling and glass and paper/cardboard recycling. Targets for 2010 include:

- a recycling rate for packaging of 65 per cent
- no increased land filling above the 2003 baseline
- a 25 per cent recycling rate for 'non-recyclable' packaging.

National Waste Minimisation and Recycling Strategy and National Kerbside Recycling Strategy

The National Waste Minimisation and Recycling Strategy (NWMRS) was established by the Australian and New Zealand Environment and Conservation Council (ANZECC) in 1992. The strategy was designed to encourage the ecologically sustainable non-wasteful use of resources, reduce potential hazards to human health and the environment posed by pollution and wastes and to maintain or improve environmental quality (CEPA, 1992).

As part of this project, ANZECC endorsed the National Kerbside Recycling Strategy (NKRS), which included a range of voluntary recycling targets for the major packaging industries. Australia became one of the first countries to have a national voluntary recycling plan giving commitments at all levels of industry.

State and Territory waste minimisation strategies

Although no longer current policy, the NWMRS and NKRS have been influential in the future development of national, state and territory policies (Productivity Commission 2006). Using the NWMRS and NKRS, many States and Territories have implemented their own waste minimisation strategies. Table 2.2 below summarises major policies and legislation.

States and Territories have also set targets for waste minimisation as summarised in Box 2.1 below.

Table 2.2

KEY LEGISLATION AND SELECTED WASTE MINIMISATION STRATEGIES IN AUSTRALIAN STATES

	Waste minimisation strategies	Legislation
New South Wales	Waste Avoidance and Resource Recovery Strategy 2003 Waste Reduction and Purchasing Policy Used Packaging Materials Industry Waste Reduction Plans	Protection of the Environment Operations Act 1997 Waste Avoidance and Resource Recovery Act 2001
Victoria	Towards Zero Waste Strategy 2005 Environmental Sustainability Framework 2005	Environment Protection Act 1970
Queensland	Waste Management Strategy for Queensland 1996	Environmental Protection Act 1994 The Environmental Protection (Waste Management Policy) 2000
Western Australia	Statement of Strategic Direction for Waste Management in WA 2004	Environmental Protection Act 1986 Environmental Protection (Landfill Levy) Act 1998
South Australia	SA's Waste Strategy 2005-2010	Environmental Protection Act 1993
Tasmania	Guide to Industrial Waste Management	Environmental Management and Pollution Control Act 1994 Litter Act 1973
Australian Capital Territory	No Waste by 2010 Waste Pricing Strategy for the ACT	Environment Protection Act 1997 Waste Minimisation Act 2001 Litter Act 2004
Northern Territory	Litter Abatement and Resource Recovery Strategy 2003	Waste Management and Pollution Control Act 1998

Source: Productivity Commission 2006

Box 2.1

STATE AND TERRITORY TARGETS FOR WASTE

NSW (by 2014)

- 66 per cent recovery of municipal solid waste
- 63 per cent recovery of commercial and industrial waste
- 76 per cent recovery of construction and demolition waste

VIC (by 2014)

- 1.5 million tonne reduction in the projected quantity of waste generated
- 75 per cent of solid waste recovered for reuse, recycling and/or energy recovery
- 25 per cent improvement in littering behaviour
- 65 per cent recovery of solid waste in the municipal sector
- 80 per cent recover of solid waste in the commercial and industrial sector
- 80 per cent recovery of solid waste in the construction and demolition sector

SA

- 25 per cent reduction in municipal solid waste to landfill by 2014
- 75 per cent recycling of all municipal solid waste material presented at kerbside by 2010
- 30 per cent increase in the recovery and use of construction and demolition materials by 2010

ACT

- Aims to achieve a waste free society by 2010

Source: Productivity Commission 2006

Implications of recycling policies

As a result of policies to encourage and promote recycling, Australian recycling rates have risen over recent years. Table 2.3 shows that around 56 per cent of packaging product was recycled in 2007. These figures are based on National Packaging Covenant Council estimates.

Table 2.3

AUSTRALIAN PACKAGING RECYCLING RATES

Material	2003 base line	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
Paper/Cardboard (%)	64	49	53	57	63	65
Glass packaging (%)	35	28	28	34	35	46
Plastics (%)	21	21	21	22	31	31
Steel cans (%)	44	36	42	38	38	38
Aluminium cans (%)	63	63	63	71	71	70
Overall rate (%)	48	40	42	46	52	56

Source: MS2 and Perchards 2008

In a report to the Packaging Council of Australia, consultants MS2 and Perchards estimated that recycling of packaging products in 2007 delivered an annual net benefit equal to 6.6 million m³ of land fill space saved; 1.5 million tonnes CO₂-equivalent (t CO₂-e) saved; 357 000 cars removed from roads; and 19 331 Olympic pools worth of water savings. They concluded that when the environmental benefits of recycling are considered, Amcor and Visy yield net energy and water savings.

Chapter 3

The Green Paper and emissions-intensive trade-exposed industries

3.1 Assistance to emissions-intensive trade-exposed industries

Another government intervention is soon to come that will have implications for Australia's packaging industry. The Government, in its Green Paper released in July 2008, proposes the introduction of a Carbon Pollution Reduction Scheme (CPRS), i.e. an emissions trading scheme that will put a price on carbon. This carbon price represents a new cost for domestic and international entities operating within Australia that will be covered by the scheme² — a cost that potentially impacts profitability and, consequently, production and investment decisions including whether or not an entity continues production, or moves production offshore to a market unconstrained by a carbon cost.

The Government proposes to provide assistance for entities operating within the industries that will be most severely affected by the implementation of the CPRS — such as the emissions-intensive trade-exposed (EITE) industries. EITE entities 'either are exporters or compete against imports... and produce significant emissions in their production of goods' (Commonwealth of Australia 2008, p. 508).

EITE assistance aims to smooth the transition between the present economy without a carbon price and a future carbon-constrained economy. The aim is to prevent carbon and production leakage. Carbon leakage occurs when a firm 'chooses to reduce, close or relocate production to a country with less stringent climate change policies' in order to avoid the carbon cost associated with an emissions trading scheme. Alternatively, production leakage is 'the loss of economic activity from Australia to another country as a result of increases in costs caused by... a carbon cost' (Commonwealth of Australia 2008, p. 506 and 514).

Options for the provision of EITE assistance include allocating free permits to EITE industries, exempting EITE industries from the CPRS, making border adjustments to the price of imports and exports, and providing cash payments to EITE industries (Commonwealth of Australia 2008, p. 298). The Government's preferred position is to provide assistance to EITE entities through the free allocation of permits, in order to offset the cost imposition of the CPRS. Free permit allocation would be contingent on continued production and therefore provide an incentive for entities to continue operating EITE activities in Australia — thus avoiding production and carbon leakage.

² The sectors initially covered by the CPRS are: transport, stationary, energy and waste, as well as fugitive emissions and industrial processes.

The Government's preferred position is to allocate free permits at the beginning of each compliance period. There are two suggested methods for calculating the amount of free permits to be allocated: (1) Permits could be allocated on a *'forecast' basis*. This would necessitate an administratively intense balancing process at the end of each compliance period to adjust for discrepancy between allocated and required permits. (2) Free permit allocation may alternatively be based on an entity's *previous output*. In this case, the calculation could be based either upon an entity's output from the previous year, or upon the average level of production over an as yet undetermined number of previous years (Commonwealth of Australia 2008, p. 329). Free permit allocations will be made on the basis of continued production. Therefore, when an entity ceases an EITE activity it will likely be required to return permits unused within the compliance period.

At the start of the scheme, free permit allocations will total up to 30 per cent of total permits under the CPRS, of which up to 20 per cent of scheme permits will be made available for assistance to EITE activities. The remaining 10 per cent will provide assistance for agricultural activities, upon the inclusion of agriculture in the CPRS (Commonwealth of Australia 2008, p. 319).

EITE assistance falls into two phases — from scheme establishment currently planned for 2010 until 2020, and post-2020. EITE assistance will be completely phased out over time, however, this is unlikely to occur in the first phase unless comparable carbon constraints are imposed on Australia's competitor economies, perhaps through the establishment of an effective international climate agreement (Commonwealth of Australia 2008, p. 338). While the total pool of permit will be reduced over time in line with the national emissions trajectory and economic growth, EITE assistance will also be reduced to ensure that the proportion of assistance provided to EITE activities does not increase over time (Commonwealth of Australia 2008, p. 333).

3.2 Determining the basis of assistance — activities

The Government proposes to provide assistance to entities on the basis of emissions from an EITE activity — not on the basis of industry, company, or facility emissions. Tying assistance to emissions generated by specific EITE activities targets assistance to the most emissions intensive processes and minimises distortions between entities arising from different corporate structures.

There are two options for EITE assistance distribution — initial assistance for a limited number of EITE activities, or limited assistance for a wide range of EITE activities (Commonwealth of Australia 2008, p. 318). The Government's preferred position is the second option, providing assistance to a wide range of EITE activities. Once the range of EITE activities are determined (based on emissions intensity of each activity), the quantum of assistance will be determined via a threshold approach. EITE activities will receive assistance totalling either 60 per cent or 90 per cent of the carbon cost imposed by the CPRS if they meet established emissions intensity thresholds.

The Government does not consider it desirable to provide assistance amounting to the entire carbon cost imposed on EITE entities by the CPRS. Subsidising the entire carbon cost would provide no incentive for EITE entities to reduce emissions, and would increase the emissions reduction burden on non-EITE entities and households.

Once an activity is recognised as EITE, an average industry emissions intensity will be determined and applied to all entities undertaking that activity. The industry average would take into account both the direct and indirect emissions from electricity associated with that activity. Entities will receive assistance based on their performance relative to the industry average, which would provide incentives for the least-efficient entities to reduce emissions in line with the industry average. It is suggested that industry baselines be determined on 2006-2007 and 2007-2008 data (Commonwealth of Australia 2008, p. 326-327).

Individual entities within the packaging industry may find some activities to be eligible for EITE assistance, although it is likely that many activities associated with the packaging industry will not be.

In order to determine what activities are eligible for EITE assistance, the information of relevance is:

- description of potential EITE activities;
- direct emissions of each activity;
- indirect emissions arising from electricity of each activity;
- quantity of the output produced by each activity; and
- domestic and international market price of the output of each activity (Commonwealth of Australia 2008, p. 339).

3.3 Eligibility for assistance — emissions intensity

The metric used to determine the emissions intensity of different activities must ‘enable a comparable assessment of the carbon cost impact’ and be calculated ‘in a transparent and robust way across different types of activities’ (Department of Climate Change, p. 2). The Government’s preferred position is to use a revenue-based metric to determine emissions intensity. However, some industries have argued for a value-added metric.

There are three broad types of emissions that may be included in a measure of emissions intensity — direct emissions associated with the activity and covered by the scheme, indirect emissions from electricity generation, and indirect emissions from sources other than electricity. It is the Government’s preferred position to include direct emissions and indirect emissions associated with electricity generation when determining activities eligible for EITE assistance. Indirect emissions from sources other than electricity will only be considered if the cost impost of the emissions is material, carbon costs associated with the emissions are passed through the supply chain, and measurement is transparent and consistent (Commonwealth of Australia 2008, p. 306-307).

Revenue-based metric

The Government prefers the revenue-based metric for calculating emissions intensity, as it considers emissions per unit of revenue (t CO₂-e/\$m revenue) to be the most ‘transparent and comparable indicator of the materiality of the carbon cost impact across different traded industries’ (Commonwealth of Australia 2008, p. 311). Emission intensity per unit of revenue is determined by dividing the emissions associated with an activity by the total value of production generated by that activity.

Using the revenue-based metric, a 60 per cent level of EITE assistance will be granted to activities with emissions intensities between 1500t CO₂-e/\$m revenue and 2000t CO₂-e/\$m revenue. A 90 per cent level of assistance will be granted to activities with emissions intensities greater than 2000t CO₂-e/\$m revenue. The Green Paper provides a preliminary revenue-based analysis of activities within the packaging industry that may be eligible for EITE assistance under this metric (see below).

Value-added based metric

In response to public engagement and stakeholder feedback on the Green Paper, the Government released the discussion paper *Assessing Emissions Intensity Using a Value-Added Metric* on 7 October 2008. In the Green Paper, the Government indicated a preference for a revenue-based metric to determine emissions intensity. The industries most likely to benefit from this method are those with relatively low input costs and high value-add production – for example, petroleum and coal products (Department of Climate Change, p. 8). Particularly low-margin industries, however, believe that the proposed assistance program is biased against them. Some industries unlikely to be eligible for EITE assistance using the revenue-based metric are more likely to be eligible for such assistance under the value-added metric. The paper processing industry, for example, is such a low-margin industry that may not qualify for assistance calculated on a revenue basis even though it is likely to experience a cost increase that represents a considerable proportion of its profit margin. The Government discusses the value-added metric (t CO₂-e/\$VA) and explores the differences between revenue-based and value-added in the October paper. Emission intensity per unit of value-added is determined by dividing the emissions associated with an activity by the total value added by that activity.

At the company level, value-added is the wealth created by an entity, and is defined as the earnings of an entity less the costs of bought-in goods and services. An entity’s value-added can therefore be derived from its profit and loss statement. However, while value-added is relatively easy to calculate at the company level, EITE assistance will be provided at the activity level. Calculating value-added at the activity level is more difficult. Indeed, an estimate or proxy of value-added for EITE activities will be required. Two such proxies have been suggested:

- revenue (or earnings) less the cost of the most significant non-labour non-capital inputs used in the production of the output of the activity; and
- earnings before interest, tax, depreciation and amortisation for the activity plus direct labour costs for the activity (Department of Climate Change, p. 4).

If a value-added based metric is used, the Government favours the more transparent ‘revenue less costs’ approach (Department of Climate Change, p. 6).

Using the value-added metric, a 60 per cent level of EITE assistance will be granted to activities with emissions intensities between 4500t CO₂-e/\$VA and 6000t CO₂-e/\$VA. A 90 per cent level of assistance will be granted to activities with emissions intensities greater than 6000t CO₂-e/\$VA. The Discussion Paper provides a preliminary valued-added analysis of several activities within the packaging industry that may be eligible for EITE assistance under this metric (see below).

3.4 Eligibility for assistance — trade exposure

Trade-exposed entities are the most exposed to a carbon price. These entities compete in the international market with other entities not constrained by a carbon price. Unlike domestic industries, such ‘price-taker’ industries are not able to increase prices, thus passing on much of the increased the costs imposed by the CPRS through to consumers.

Assessing trade exposure requires identifying which Australian industries are ‘price takers’ on world markets and would be constrained in their ability to pass on carbon costs by actual or threatened international competition. Such industries are said to be ‘trade exposed’.

The Green Paper outlines three options for assessing the trade exposure of an industry or activity:

- examining trade shares (the proportion of exports and imports relative to domestic production)
- estimating the price elasticities of individual products
- examining correlations between relevant global and domestic prices for goods produced in Australian industries, appropriately adjusted for exchange rates.

However, the Government does not believe it possible to develop an accurate and transparent methodology for measuring trade exposure. Therefore, all industries will be recognised as trade exposed, with the exception of those industries that produce exclusively for the domestic market and face physical barriers to trade (for example, electricity generation) (Commonwealth of Australia 2008, p. 310).

Due to this broad concept for assessing trade exposure, emissions intensity of an activity remains the most significant criteria for an entity to meet in order to qualify to be eligible for EITE assistance.

3.5 Strongly affected industries

The Australian entities most likely to be strongly affected by the CPRS are those which may reasonably expect a reduction in profitability that leads to a large reduction in their asset values (Commonwealth of Australia 2008, p. 342). The most affected entities, which will receive EITE assistance, are those that have both emissions-intensive and trade-exposed activities (Section 3.3). However, it is possible for other entities without such EITE activities to be strongly affected by the CPRS. Such entities are likely to have high emissions intensity but may not be trade-exposed.

The Green Paper does not analyse the packaging industry against the criteria for strongly affected industries. Entities eligible for consideration as strongly affected industries are required to fulfil certain criteria. Strongly affected entities must be:

- *emissions intensive* — as discussed in Section 3.3, the Green Paper proposes a revenue-based metric to measure emissions intensity for strongly affected entities, however, if the value-added metric suggested in the October Discussion Paper were implemented, this metric would also be used to identify strongly affected industries;
- *not trade-exposed* — trade-exposed entities with high emissions intensity are required to meet the criteria for EITE assistance;
- *unable to pass on costs* — the Government proposes the same assistance eligibility threshold for trade-exposed and non trade-exposed industries, although the latter — which may be able to pass on costs as there is no international competition — may be required to meet further criteria. The availability of substitute products is a key indicator of the ability of an industry to pass on costs, and may impact elements of the packaging industry;
- *have significant sunk capital costs* — long-lived capital investments are an example of sunk costs that may impact an industry's ability to move offshore or pass on costs to consumers, particularly when such sunk costs are unable to be utilised to produce other products. A production plant suitable only for paper recycling may be such a sunk cost; and
- *have significant economically-viable abatement opportunities* — only entities that are unable to cheaply and efficiently reduce their emissions intensity are eligible to be categorised as strongly-affected (Commonwealth of Australia 2008, p. 342-345).

Chapter 4

Trade exposure of the packaging industry

4.1 Trade of packaging products

Australian production of packaging products is mainly consumed and used in Australia. Imports are a small proportion of the domestic consumer market. Similarly, exports are a small proportion of total domestic production. The trade exposure of the packaging industry is variable depending on the type of packaging product — some products are more trade exposed than others.

Table 4.1 shows that in value terms, Australia exports and imports the most pulp, paper and paperboard products followed by glass and glass products, then metal containers. In all segments, Australia imports more than it exports.

Table 4.1

TRADE EXPOSURE OF CERTAIN SEGMENTS OF THE PACKAGING INDUSTRY³

Industry	Metal container manufacturing (2005-06)	Solid paperboard container manufacturing in Australia (2006-07)	Corrugated paperboard container manufacturing in Australia (2006-07)	Pulp, paper and paperboard manufacturing in Australia (2006-07)	Glass and glass product manufacturing in Australia (2006-07)
Revenue	\$1414 million	\$744 million	\$2024 million	\$2993 million	\$1665 million
Exports	\$65 million	\$29 million	\$7 million	\$817 million	\$110 million
Imports	\$246 million	\$42 million	\$24 million	\$2230 million	\$516 million
Domestic Demand	\$1596 million	\$757 million	\$2042 million	\$4406 million	\$2071 million
Proportion of domestic demand produced in Australia	85 per cent	94 per cent	99 per cent	49 per cent	75 per cent

Source: IBISWorld 2008a-e.

Preliminary figures under the National Packaging Covenant indicate that most packaging is sourced locally, with Australian sources accounting for 92 per cent of packaging reported (MS2 and Percharls 2008). While precise figures on trade in packaging products are scarce, the following section provides an overview of certain types of packaging and the proportion of goods exports and imported

³ As discussed in Chapter 2, the market segments provided in Table 4.1 are merely a representative sample and do not constitute the entire industry. In the cases of pulp, paper and paperboard manufacturing, and glass and glass product manufacturing, they represent the whole sector not just the packaging component.

Solid paperboard container market

International trade accounts for a small part of activity in the Australian solid paperboard container market. This is because, due to the low value of the products, transportation over long distances is not cost effective. During 2006–07 the industry recorded exports totalling \$28.8 million (2.5 per cent of industry revenue), while imports totalled \$41.5 million (5.5 per cent of domestic demand) (IBISWorld 2008b).

Major import sources include China (around 18.9 per cent of import value in 2006–07), New Zealand (15.5 per cent of import value) and Hong Kong, China (7.7 per cent) (IBISWorld 2008b).

Imports are predicted to rise at an average annual rate of 8.4 per cent to \$70.7 million over the five years to June 2013. As a share of domestic demand, imports are forecast to rise from 6.6 per cent in 2009–10 to 8.1 per cent by 2012–13. Despite a predicted weakening of the Australian dollar during the period, imports from China are likely to continue to remain price competitive in the Australian market and they are predicted to continue strong growth. However, such increases will be partially offset by rapid declines in imports from countries with higher cost structures such as NZ and the US.

Major destinations of exports include New Zealand (accounting for an estimated 33.8 per cent of import value in 2006–7), China (11.3 per cent) and Hong Kong, China (7.7 per cent) (IBISWorld 2008b).

Exports of solid paperboard containers from Australia are expected to rise at an average annual rate of 5.9 per cent to \$39 million by 2013 (IBIS World 2008b). This is expected to be driven by an anticipated cyclical downturn in the Australian dollar and strong demand from China. Exports are expected to account for 4.4 per cent of industry revenue during 2008–09 and 4.7 per cent by 2012–13.

Corrugated paperboard container manufacturing in Australia

During 2006–07, the Australian Corrugated Paperboard Container Manufacturing industry recorded exports totalling \$6.5 million, or an estimated 0.3 per cent of revenue. Imports totalled \$24.2 million, or an estimated 1.2 per cent of domestic demand.

Major import sources include China (49.2 per cent of import value in 2005–06), Malaysia (10.6 per cent) and Indonesia (9.4 per cent). Imports of corrugated paperboard containers into Australia are forecast to rise at an average annual rate of 7.2 per cent over the five years to June 2013, to \$24 million. Imports from China and other Asian countries will substantially increase during the period, due to the lower cost structures and emerging paperboard container production capacity in these countries. However, these increases will be partially offset by lower imports from New Zealand and the United States as products from these countries are unlikely to remain price competitive. Imports will be partially hampered by the effect of a weakening Australian dollar during the period.

Major destinations of exports include New Zealand (48.6 per cent of import value in 2005–06), Philippines (19.4 per cent) and New Caledonia 5.2 per cent). Most corrugated paperboard products sold by Australian producers overseas will be manufactured closer to these markets in order to reduce transport, importation and labour costs. Most of these are likely to be high growth markets in Asia such as China. Australian exports will be advantaged by a cyclical decline in the value of the Australian dollar over the period, making them comparatively cheaper globally. Exports of corrugated paperboard containers are forecast to rise at an average annual rate of 2.8 per cent to \$7.8 million during the five years to June 2013. However, exports will continue to remain relatively insignificant, estimated to account for approximately 0.3 per cent of industry revenue during 2012–13.

Metal container manufacturing in Australia

Imports and exports of metal cans are relatively small in relation to production and domestic sales, respectively. The combination of bulkiness and relatively low value limits the trade potential for empty metal containers. Additionally, the transportation of ‘air’ or empty containers significantly adds in distribution costs, which limits the amount of international trade. The industry faces a limited, although increased level of competition from imports, which amounted to \$283 million in 2006–07. Imports have trended up over recent years, and now account for around 17.6 per cent of industry revenue (9.9 per cent in 2001-02). The top five countries to import into Australia are China (19.5 per cent of industry imports), USA (10.1 per cent), New Zealand 7.4 per cent and Singapore 6.3 per cent. These top five countries account for over 63.4 per cent of total industry imports. Imports from China are growing rapidly. In 2000–01, Australia imported \$21.2 million worth of Chinese imports, while in 2005–06 Australia imported \$50 million.

Exports of metal containers generated between 4 per cent and 6 per cent of industry revenue. The value of exports totalled around \$61 million in 2006–07. Major export destinations in 2005–06 included New Zealand (18.4 per cent of industry exports) Papua New Guinea (17.5 per cent), USA (13.2 per cent), Japan (9.2 per cent) and New Caledonia (5.8 per cent). These top five export destinations accounted for around 64.1 per cent of industry exports.

Glass container manufacturing in Australia

The glass container segment of the glass industry constitutes about 45 per cent of industry activity.

Glass and glass product manufacturing imports (including glass containers, flat glass, household and scientific glass and other glass products) account for around 25-35 per cent of domestic demand. Glass containers used for packaging cannot be separated from this figure. Import penetration has grown rapidly since the mid to late 1990s, due in part to a lack of duty and low tariffs. While the lack of duty and low tariffs allow relatively high levels of imports in the glass and glass products industry, high shipping costs to Australia provide natural protection from import competition to some extent.

Industry exports account for about 7-8 per cent of industry earnings showing a downward trend since its 16 per cent peak in 2000-01. Exports are primarily in Australian automotive glass products, glassware and specialist products – comprising of minimal glass containers and packaging. Overall exports fell from \$198.9 million in 2000-01 to \$110.2 million in 2006-07.

Chapter 5

Emissions intensity of the packaging industry

5.1 Emissions intensity of the packaging industry according to the Green Paper

The Green Paper analyses 115 industry sectors based upon the emissions per unit of revenue — calculated as the direct and indirect electricity emissions associated with each industry per million dollars of revenue. Table 5.1 compares the revenue- and value-added based emissions intensities of several industries relevant to the packaging industry in Australia. It is essential to note that this analysis is based on 2001-2002 industry — not activity — data. Analysis using more current activity data will reflect changes in emissions, production and commodity price data since 2001-2002, and may therefore more accurately reflect eligibility for EITE assistance (see section 5.2).

Table 5.1

EMISSIONS INTENSITY — REVENUE AND VALUE-ADDED METRICS

Industry	Per unit of revenue (t CO ₂ -e / \$m revenue)	Assistance per unit of revenue	Value added (t CO ₂ -e / \$VA)	Assistance per value added
Aluminium	7 357t	90 per cent assistance > 2000t CO ₂ -e/\$m revenue	86 070t	90 per cent assistance > 4500t CO ₂ -e/VA
Pulp, paper and paperboard	1 133t	Not eligible	4 392t	Not eligible
Glass and glass products	645t	Not eligible	1 296t	Not eligible
Paper containers and products	201t	Not eligible	—	—
Sheet metal products	89t	Not eligible	—	—
Plastic products	80t	Not eligible	—	—

Sources: Department of Climate Change 2008, p. 8; Commonwealth of Australia 2008, pages 498-501. Note: Industry sectors are classified according to the ABS Australian National Accounts Input-Output Tables. Analysis is based on data from 2001-2002. The Department of Climate Change does not provide an analysis of value-added emissions intensity for 'paper containers and products', 'sheet metal products' and 'plastic products'.

Note: Calculations from the Green Paper indicate that the emissions intensity of the pulp, paper and paperboard industry will be 1133 t CO₂e/\$m revenue and 4392 t CO₂e/\$m value added taking it very close to EITE thresholds. In instances where pulp, paper and paperboard manufacturing activities are vertically integrated with the production of cardboard packaging products, the emissions intensity of entire manufacturing process will be much higher than has been represented above.

The industry sectors analysed in the Green Paper and Discussion Paper are classified according to the ABS Australian National Accounts Input-Output Tables. The packaging industry includes paper, glass, plastic and can products. Industry sectors of relevance to the packaging industry that appear in Table 5.1 include (but may not be limited to):

- aluminium — disaggregated from the basic non-ferrous metal and products industry;
- pulp, paper and paperboard — including pulp, paper and paperboard manufacturing;
- glass and glass products — including glass and glass product manufacturing;
- paper containers and products — including solid paperboard container manufacturing, corrugated paperboard container manufacturing, paper bag and sack manufacturing, and paper product manufacturing;
- sheet metal products — including metal container manufacturing and sheet metal product manufacturing; and
- plastic products — including plastic blow moulded product manufacturing, plastic extruded product manufacturing, plastic bag and film manufacturing, plastic product rigid fibre reinforced manufacturing, plastic foam product manufacturing and plastic injection moulded product manufacturing (ABS Australian National Accounts: Input-Output Tables 2004-2005 Cat. 5209.0.55.001 August 2008).

5.2 Emissions intensity of the packaging industry according to ACG analysis

Although the Green Paper gives an indication of the relative emissions intensity of various industries, it acknowledges that the data it applies is old (2001-02 ABS-sourced input-output data) and aggregated. Industries (and activities) may be more or less emissions-intensive than indicated by the Green Paper analysis — and some EITE activities may not even be represented because the ABS does not report information at that level of detail.

The Allen Consulting Group has undertaken analysis on the EITE status of the packaging industry and its elements. This analysis is based on recent confidential company data supplied to ACG. The results of this analysis are more current and tailored to the specifics of the packaging industry than the analysis reported in the Commonwealth's Carbon Pollution Reduction Scheme Green Paper.

On the basis of the data provided, the packaging industry is unlikely to meet the requirements for emissions-intensive, trade-exposed (EITE) status. Neither emissions/\$ million of revenue and emissions/\$ million value added are high enough to trigger EITE support. Figure 5.1 illustrates the gap between the (lower) threshold for EITE status under each metric and the emissions intensity of the packaging industry and its elements.

Key assumptions used to develop these measures are listed in Appendix A.

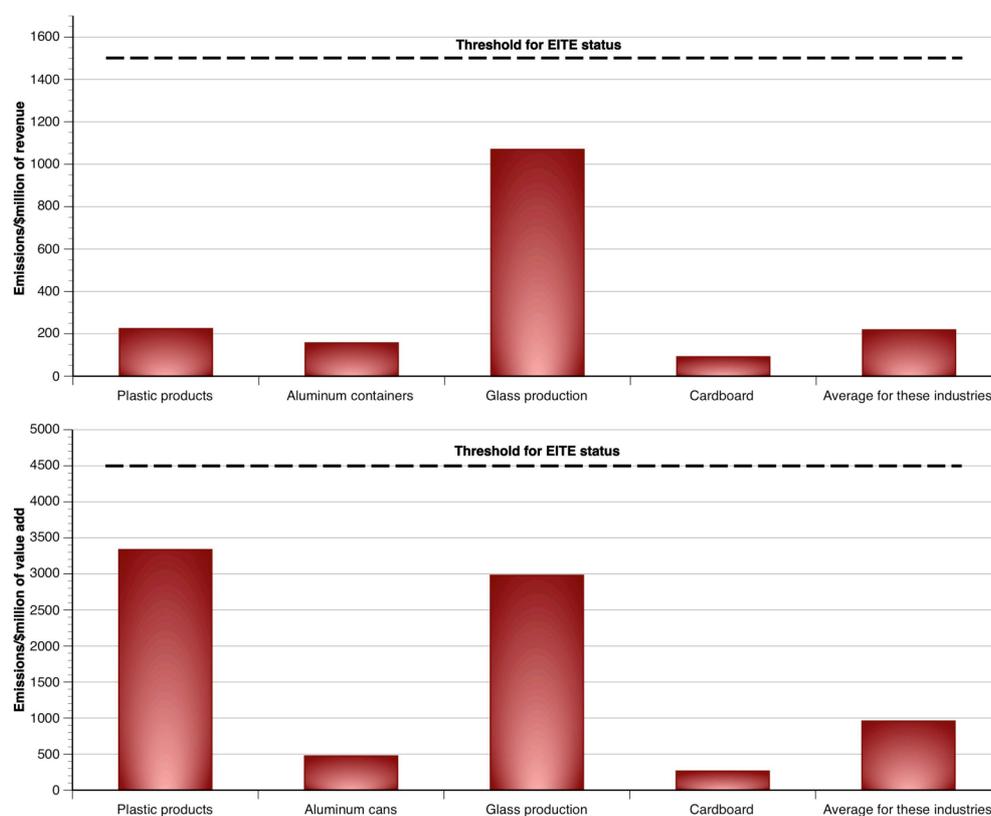
Analysis of available data suggests that the industry overall, and key outputs such as plastic bottles, aluminium cans and cardboard, are well below the proposed lower bound EITE threshold (i.e. 1500t CO₂-e/\$m revenue). At a little over 1000t CO₂-e/\$m revenue, only glass packaging comes close to having EITE claims.

We note that most aluminium used for packaging in Australia comes from recycled material — which has a much lower energy requirement than aluminium made from virgin materials.

A similar result is exhibited under a value-added EITE measure (as favoured by some in industry), but with plastic products joining glass products as a ‘near EITE’ contender (according to the data provided, plastics and glass score 3300 and 3000t CO₂-e/\$m VA respectively, against an EITE threshold of 4500).

Figure 5.1

PROXIMITY OF PACKAGING INDUSTRY TO LOWER BOUND EITE THRESHOLD



Source: ACG analysis of confidential company information

Importance of embodied emissions

As noted in Chapter 3, the Commonwealth’s Green Paper proposal for emissions-intensive, trade-exposed activities (EITE) is to apply Scope 1 (direct) and Scope 2 (electricity-related) emissions in the calculation of emissions intensity on an *activity* basis. However, analysis was also conducted to determine the percentage of indirect (or Scope 3) emissions associated with the packaging industry.

Generally, such indirect emissions represented only a small increment to the product-specific emissions signature calculated on the basis of Scope 1 (direct emissions, eg. combustion related) and Scope 2 (electricity-related). Even if Scope 3 emissions were included in calculations of the emissions intensity of the packaging industry, and the thresholds remained at their current levels, most activities of the packaging industry would still not achieve EITE status. This is true for all products under the EITE ‘income’ test, and for all except plastics under the EITE ‘value added’ test.

Table 5.2 summarises the emissions intensity of the packaging industry and its key elements when Scope 3 emissions are included (the relative importance of Scope 3 emissions for key packaging lines is shown in Table 5.3). However, as noted previously, if Scope 3 emissions were included, the EITE thresholds would need to be adjusted upwards, in any case.

Table 5.2

EMISSIONS INTENSITY INCLUDING ‘UPSTREAM’ (SCOPE 3) EMISSIONS

	Emissions/\$million of revenue	Emissions/\$million of value added
Plastic products	302.3	4500.7
Aluminium containers	239.2	722.8
Glass production	1189.9	3316.2
Cardboard	276.0	795.2
Total Industry	330.9	1450.2

Source: ACG analysis of confidential company information

Table 5.3

SCOPE 1, 2 & 3 GREENHOUSE EMISSION CONTRIBUTIONS

	Emissions kg CO ₂ -e/\$ of production		Scope 3 as a % of total emissions
	Scope 1 + 2	Scope 3	
Plastic products	0.24	0.08	26%
Aluminium containers	0.23	0.12	34%
Glass production	1.67	0.19	10%
Cardboard	0.14	0.28	67%
Total Industry	0.28	0.14	34%

Source: ACG analysis of confidential company information

Chapter 6

Implications of the proposed Carbon Pollution Reduction Scheme

6.1 Cost impacts

The metrics and thresholds for EITE eligibility are currently fluid — with a preference by government officials (at present) for an ‘emissions per \$m of revenue’ test, although ‘emissions per \$m of value added’ has not been totally discounted. Under either test, the Commonwealth seems committed to a two-tier subsidy structure — one which offsets 60 per cent of carbon costs impacting on eligible lower-tier EITE activities, and the other which offsets 90 per cent of carbon costs (for EITE activities assessed as being in the higher tier).

Clearly, these different levels of subsidy (spanning zero for activities that do not make the EITE cut, and a 60 and 90 per cent offset for those that do) can have a significant impact on relative costs, sales and production choices. Of course, a fundamental aim of the emissions trading system (and the carbon price) is to drive these changes. However, the somewhat arbitrary (and exploratory) nature of the EITE design as it stands poses a significant risk to efficient resource allocation objectives. And these risks are magnified in cases where significant environmental spillovers attach to the activities being affected.

Based on information provided for this study, the following relative cost changes are expected for key packaging materials, based on feasible and foreseeable permit prices (see Table 6.1). These bear comparison with the estimated carbon cost offset for key materials based on their EITE status (under currently proposed EITE formulations, aluminium and steel products are likely to attract subsidies designed to partially offset carbon price impacts associated with direct and electricity-related emissions).

Table 6.1

PRODUCTION COST IMPLICATIONS OF CARBON PRICES

Packaging products	Potential % cost increase due to carbon costs (\$X per tonne CO ₂ -e)		EITE status	Likely effective % cost increase	
	X=\$20	X=\$40		X=\$20	X=\$40
Plastic products	0.7%	1.3%	0%	0.7%	1.3%
Aluminium cans	2.4%	4.7%	90%	0.7%	1.4%
Steel cans	No info		60%	No info	
Glass production	3.7%	7.4%	0%	3.7%	7.4%
Cardboard	0.9%	1.7%	0%	0.9%	1.7%
Total Industry	1.2%	2.4%	—	0.9%	1.7%

Source: ACG analysis of confidential company information

The emissions-intensity analysis conducted above highlights the scope for significant disparities in cost impacts across a range of packaging materials. Based on data provided, under an unadjusted carbon pricing arrangement, relative emissions intensities would see (at a cost of around \$40 per tonne of CO₂-e) an increase in production costs of about 1.3 per cent and 4.7 per cent for plastic and aluminium containers, and almost 8 per cent for glass. All other things being equal, this would tilt production and packaging decisions away from glass in favour of these lower priced substitutes (in cases where the scope for substitutability was high). Carbon pricing also drives a mild incentive for substitution of plastic products for paper and cardboard (due to relative cost increases of 1.3 per cent and 1.7 per cent respectively).

With the subsidies flowing from EITE provisions in place (e.g. a 90% carbon cost offset for original aluminium production), aluminium becomes a more attractive substitute for glass packaging and faces an overall cost increase that is slightly less than that expected for paper and cardboard.

As noted, this — on its own — is not necessarily a consequence of the CPRS that would concern policymakers. What is of policy concern is when the CPRS design structure leads to shifts in demand and production that drive costs (including environmental costs) higher than they need to be in order to achieve a particular national greenhouse target, or when it increases the risk of substantial emissions leakage (i.e. loss of production in favour of overseas suppliers with a greater emission intensity).

In the cases highlighted above (and in the absence of information on steel packaging options), the effect of the carbon price (even with EITE provisions in place) appears to be broadly in line with the intention of the policy designers — it discourages the use of more emissions-intensive products and materials, and promotes a price-based preference for less emissions-intensive materials.

Glass production and use of glass is clearly disadvantaged under the Government's proposed settings, and plastics are promoted ahead of paper — but this is in line with the emission and energy data provided to us. Even for aluminium, which is the key beneficiary of the EITE provision at an industry level, the packaging industry's use of recycled aluminium (at a significant saving to energy and emissions) means that the 'playing field' stays reasonably level across the choice of packaging materials even after emission prices and subsidies are applied.

6.2 Implications for recycling

Concern has been raised that the EITE subsidies on steel and aluminium production will result in these activities becoming more economically viable than steel and aluminium recycling. Under the current proposal and current technology this is unlikely. Aluminium recycling requires only about 5 per cent of the initial energy needed to manufacture aluminium from bauxite. As such, even with a 90 per cent subsidy on the carbon footprint of aluminium in place, the aluminium recycling industry will still face about half the carbon liability falling on producers of 'virgin' aluminium. This means that the carbon price and EITE settings work to the advantage of aluminium recycling — although the advantage is much smaller than if the EITE policy was not in place, and the full impact of carbon prices (and emissions) fell on aluminium production.

Similar outcomes pertain to recycling of paper and plastics. Though access to company-level data has been limited (and that which has been obtained for this exercise remains confidential), analysis suggests that private practices in this area align reasonably well with published experience.

For paper (according to US sources⁴), recycling:

- uses only 58% of the energy to produce (relative to virgin material)
- produces 63% of the carbon dioxide emissions (of virgin material)
- generates 54% of the liquid waste and
- generates 51% of the solid waste.

Virgin paper might have a higher emissions profile than recycled, if the wood pulp needed to produce paper is sourced from non-sustainably managed forests, and these remained outside the (optional) credit-liability arrangements proposed under the national emissions trading system. However, our understanding is that sustainable forest management practices characterise the paper production and packaging sector. Carbon liabilities and crediting arrangements (where these apply) can impact on cash flow and supply and demand over time, but this are unlikely to be significant influences on the economics of recycling versus virgin production in the near to medium term (e.g. over the next 5-10 years).

Information on plastics recycling also suggests that its economics stands to be marginally enhanced by the CPRS (and EITE arrangements). According to public data, plastic recycling requires about 80 per cent less energy than virgin production — and under current arrangements the raw materials or plastics (i.e. gas and oil) will not receive EITE status, and hence face a full carbon price impact for the emissions associated with producing these commodities.

⁴ See <http://www.greenpressinitiative.org/documents/recycledfiberfactsheet-EPN.pdf>

Chapter 7

Conclusions

The introduction of an emissions trading scheme in Australia — the Carbon Pollution Reduction Scheme — is planned for the year 2010. It will introduce a price on carbon, thus having an effect on those businesses that will be obliged to buy a permit for each tonne of greenhouse gas emissions released into the atmosphere in the course of their production processes.

From an economic efficiency perspective, our analysis has revealed no significant adverse affects, e.g. in terms of resource misallocations, for the Australian packaging industry to be brought about by the proposed Carbon Pollution Reduction Scheme. However, at a cost of around \$40 per tonne of CO₂, there is a chance that glass production will be declining and be increasingly substituted by plastic and aluminium products as a consequence of disparate production cost increases. Plastic products may be promoted ahead of paper. Furthermore, concerns that EITE assistance for aluminium and steel productions will result in increased use of ‘virgin’ materials and reduced recycling were not supported by our analysis. Overall, the effect of the carbon price (even with EITE provisions in place) seems to be encouraging the use of less emissions-intensive products thus contributing to the Government’s overarching objective of reducing national emissions.

The criteria for targeting industries eligible for assistance under the EITE program are decisive in triggering the desired outcomes of the CPRS: reducing Australia’s emissions while avoiding carbon and production leakage. Given that the rationale for assistance under the EITE assistance program primarily relates to trade-exposure, it would appear that a criterion for assistance should be based on the degree to which a business or an activity is trade-exposed. However, it is the Government’s position that it is too difficult to assess the level of trade exposure, and it therefore decided to consider all industries as trade-exposed that have no physical barriers to trade. We believe, however, that more emphasis could be placed on this criterion when it comes to assessing eligibility for assistance. It is not difficult for many industries to demonstrate trade-exposure, so that all industries qualify for assistance that either export products to markets in which no carbon constraints exist, or compete directly with imports for domestic sales.

Under the current Green Paper proposal, however, emissions intensity of an activity remains the most significant criteria for an entity to meet in order to qualify for EITE assistance.

The results of our modelling suggest that none of the packaging industry's key output production processes (e.g. for plastic bottles, aluminium cans, cardboard) are emissions-intensive enough to reach the threshold for EITE status. This is true whether emissions intensity is calculated on the basis of emissions/\$ million of revenue or value added. Based on the revenue-based metric, the activity that comes closest to the threshold of 1500t CO₂-e/\$m is glass production. Under the value-added based metric, both glass and plastic products come relatively close (compared to other packaging products) to the threshold of 4500t CO₂-e/\$m. It may be worth investigating further into the emissions intensity of glass production activities, such as whether trade in low value glass 'precursors' triggers EITE criteria. This would imply, however, that these can be sensibly unbundled from the 'full process' information we had on hand for this analysis.

The packaging industry may further find it worthwhile analysing whether and under what conditions it would qualify:

- as a 'strongly affected industry', so that it would be able to access funding targeted at those industries (Commonwealth of Australia, p. 341-390)
- assistance under the Climate Change Action Fund which the government has proposed in order to assist businesses more broadly. 'This Fund will focus predominantly on those industries not receiving free permit allocation, but which nevertheless need assistance to adjust to the carbon price' (Commonwealth of Australia, p. 422).

Appendix A

Methodology and results

A.1 Methodology used to determine EITE status

The analysis of the emission intensity of the packaging industry is based on data from several sources. Initially, data was sought from companies that manufacture packaging material. The information request sought data by packaging product on companies':

- energy use (electricity, gas, coal, LPG and diesel)
- key inputs used (steel, aluminium, plastic products, paper products, glass and transport services)
- total costs and revenue
- production quantity.

Five responses were received.

Not all companies provided data on their costs and revenue. Where revenue information was not supplied, revenue from other companies was scaled using electricity consumption as a proxy for size. Where total costs were not supplied, general ratios of value add to revenue were applied to estimate these. The ratios were sourced from the *IbisWorld* industry reports that most closely approximated the packaging product in question. Table A.1 provides a breakdown of the value add ratios used.

Table A.1

REVENUE TO VALUE ADD RATIOS USED

Product	Value add ratio	Source
Glass	35.88%	IBISWorld 2008e, <i>Glass and Glass Product Manufacturing in Australia</i>
Aluminum and steel containers	33.09%	IBISWorld 2008a, <i>Metal Container Manufacturing in Australia</i>
Cardboard	34.71%	IBISWorld 2008b, <i>Solid Paperboard Container Manufacturing in Australia</i>

The company information was then aggregated using weighted averages to develop a standardised representation of each element of the packaging industry. This information was then used to build emissions profiles.

Emissions factors, sourced from the *National Greenhouse Accounts Factors*, were applied to each type of energy use. Emissions from energy use were assumed to account for the majority of direct emissions and indirect emissions from the generation of electricity. Table A.2 provides a breakdown of the emissions factors used.

Table A.2

EMISSIONS FACTORS APPLIED TO ENERGY SOURCES

Energy source	Unit of measure (UOM)	t CO ₂ -e/UOM
Electricity*	MWh	0.990
Gas	GJ	0.052
Black coal*	GJ	0.09
LPG	ML	1600
Diesel	ML	2700

Source: Department of Climate Change 2008 *National Greenhouse Accounts (NGA) Factors*, Commonwealth Government of Australia, Canberra

*Denotes weighted average

This methodology provided all of the necessary information to calculate the emissions intensity by revenue and value added for the following products:

- plastic products
- aluminium containers
- glass products
- cardboard.

Note: not enough information was supplied to determine the emissions intensity of steel containers or paper products using this methodology. A more generalised methodology, using publicly available information was not pursued. It was deemed that to pursue a generalist approach in this area would simply duplicate what has already been produced in the Green Paper.

Table A.3, which corresponds to Figure 5.1 in the main body of the report, provides the results of these calculations.

Table A.3

EITE EMISSIONS INTENSITY

	Emissions/\$million of revenue	Emissions/\$million of value added
Plastic products	224.1	3336.1
Aluminium containers	156.7	473.4
Glass production	1069.4	2980.4
Cardboard	91.3	263.1
Total Industry	218.3	957.0

Source: ACG analysis of confidential company information

A.2 Methodology used to determine the impact of scope 3 emissions

Further analysis was conducted to determine the relative importance of scope three emissions on the packaging industry. This involved calculating the carbon emissions of key inputs. The emissions factors associated with these key inputs were sourced from the triple bottom line analysis conducted for the Australian Government. Table A.4 provides a breakdown of the emissions intensity of the key inputs.

Table A.4

EMISSIONS INTENSITY OF INPUTS

Product	t CO ₂ -e/\$m consumed
Transport	365.97
Plastic products	649.045
Aluminum	3996.4
Paper, pulp and paperboard	3182.86
Glass	970.74

Source: CSIRO and the University of Sydney 2005, *Balancing Act: A Triple Bottom Line Analysis of the Australian Economy*, Commonwealth Government of Australia, Canberra.

Not all companies provided information on the cost of key inputs. Where this was the case an average cost was applied using the data supplied by the other companies.

This methodology provided all the additional information necessary to analyse the impact of including scope three emissions in emissions intensity calculations (Table 5.2 and Table 5.3).

A.3 Methodology used to determine the cost impacts

Carbon prices of \$20 and \$40 per tonne of carbon dioxide equivalent (t CO₂-e) were tested. For both energy and other key inputs it was assumed that the entire cost of the carbon price would be borne by the consumer.

*Appendix B***List of Acronyms**

ACT	Australian Capital Territory
ANZECC	Australian and New Zealand Environment and Conservation Council
CPRS	Carbon Pollution Reduction Scheme
EITE	Emissions-intensive trade-exposed
FY	Financial Year
NKRS	National Kerbside Recycling Strategy
NSW	New South Wales
NWMRS	National Waste Minimisation and Recycling Strategy
t CO ₂ -e	Tonnes of carbon dioxide equivalent
SA	South Australia
VA	Value added
VIC	Victoria
WA	Western Australia

Appendix C

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