

Final Report

The Status of Packaging Sustainability in Australia

Prepared for Packaging Council of Australia
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Message from the Packaging Council of Australia President and CEO

We have great pleasure in presenting our first report entitled “The Status of Packaging Sustainability in Australia”.

Sustainability has quickly become a “mainstream” issue for the packaging industry. Many brandowners and other users of packaging now want “sustainable” packaging and are requiring their packaging manufacturers to provide it. Consumer concerns regarding the environment have undoubtedly increased.

Sustainability is now the major issue discussed by the Board of the Packaging Council of Australia. In May 2007, the PCA Board adopted a vision statement and framework, *“Towards Sustainable Packaging”*, which outlined the need for industry leadership in defining and addressing sustainability in an Australian context, and committing the PCA to a leading role in improving the packaging supply chain's performance.

As part of this commitment, the PCA also commissioned MS2 and Perchards to develop the first annual report on the state of packaging sustainability in Australia to assist in benchmarking packaging industry performance and to provide valuable feedback to the industry and the broader community.

The authors were instructed to prepare an open, honest and transparent account of Australian packaging and its sustainability record. We wanted it to be rigorous, accurate and relevant. It was not to be a “greenwash” and nor was it to be simply a list of achievements with the negatives either ignored altogether or glossed over. If the report was to have credibility, we recognised that it needed to document strengths and weakness, successes and failures, as well as highlight areas for improvement and make clear, specific recommendations for future action.

In our view, a pro-active and upfront examination of the issues will have real benefits for our industry. Overall, the industry has a solid record of achievement on a range of environmental matters over several decades. It needs to build on that record and demonstrate publicly that it is making a determined effort on sustainability.

We view this report as an important statement and benchmark for the industry. The demand for sustainable packaging will be a driving force for years to come.

Sustainability is relevant to all companies in the packaging supply chain. Companies that ignore sustainability do so at their peril. The time has come for sustainability to work for, rather than against, the industry.

We would welcome your comments and thoughts on this report.

Mike McKinstry
President
Packaging Council of Australia

Gavin Williams
CEO
Packaging Council of Australia

1.0 Executive Summary

The Australian packaging supply chain is at a critical juncture on the path towards sustainability. Industry leaders have adopted more sustainable approaches and are benefitting through reduced production costs, greater supply chain engagement, improved ability to anticipate future risks and opportunities, and improved staff satisfaction. However, these efforts are being hampered by ongoing scepticism surrounding the packaging industry's efforts, data gaps, fragmented industry responses and evolving commercial considerations.

In May 2007, the Packaging Council of Australia (PCA) adopted a vision statement and framework, *Towards Sustainable Packaging*. The vision outlined the need for industry leadership in defining and addressing sustainability in an Australian context, and committing the PCA to taking a leading role in improving the packaging supply chain's performance. The PCA has commissioned MS2 and Perchards to develop this first annual report on the state of packaging sustainability in the Australian packaging industry to assist in benchmarking performance and to provide feedback to the industry and the broader community.

To help frame key issues and opportunities and to compile baseline data, MS2 conducted stakeholder consultations across Australia, including packaging manufacturers, retailers and brand owners, as well as governments, community organisations, media and peak industry bodies. Consultations have been supplemented with secondary research on international best practice to produce this report and additional input was sought on a draft prior to finalisation.

Packaging Sustainability in Context

The Australian packaging manufacturing industry employed approximately 20,000 people in 2007. Total Australian packaging industry turnover was approximately \$10.5 – 11 billion in 2007, representing 1.2% of total Australian GDP (in comparison, packaging manufacturing represented around 0.7% of total UK GDP in 2006). Other social and economic aspects of packaging sustainability have not been compiled in a meaningful way across the packaging supply chain, and were not available for this report. Virtually all other sustainability indicators for packaging focus on its environmental aspects rather than social or economic issues. Improved data collection and reporting of sustainability indicators across the packaging supply chain are required.

The social aspects of packaging in Australia relate to three key areas: (1) Performance of packaging manufacturers - HR policies, safety, community engagement etc; (2) Performance of the packaging itself – health and nutrition, delivery of product to consumers, lifestyle choices, freedom and flexibility; and (3) End use and disposal of packaging – consumption patterns, littering, reuse, recycling etc.

Assessing sustainability of packaging is complex given the wide variety of packaging on the market, lack of agreement on what sustainability actually entails, and due to complex interactions with the packaged products themselves. For example, due largely to packaging, food wastage is 2-4% in industrialised countries compared with 50% or more in developing countries. In the Australian food and grocery supply chain, primary production is 100 times

more water intensive than most processing and packaging. Around 85% of greenhouse gas emissions in the Australian dairy industry are farm-related, while packaging accounts for 4%. However, packaging is often targeted as it is an especially visible symbol of consumerism, and will remain so for the foreseeable future.

Debates on issues such as recycling rates, container deposit legislation (CDL) and plastic bags have detracted from addressing packaging sustainability more broadly and generated substantial pressure for regulatory intervention. Brand owners and industry associations consulted feel that industry as a whole has failed to respond effectively to these issues by not identifying potential risks well enough in advance, lacking the data to respond effectively and/or failing to steer the debate by mounting comprehensive effective responses. As a result, a great deal of time and money has been wasted on issues that represent only a small fraction of packaging sustainability. Organisations that take a comprehensive approach to sustainability are better placed to keep an eye out for such issues and respond accordingly.

Waste minimisation is a part of environmental sustainability, but only a part. For packaging and packaged goods, the questions to focus on now are:

- where are the biggest social, economic and environmental impacts and opportunities? and
- what can be done to reduce these impacts, while maximising economic benefits?

The biggest issues are climate change and greenhouse gas emissions on the one hand, and depletion of the earth's natural resources on the other. Whereas all industrial activities are implicated in greenhouse gas emissions, the packaging and packaged goods industry is under attack specifically as an unnecessary user of materials.

National Packaging Covenant (NPC)

Since 1999, the National Packaging Covenant has been the primary policy instrument for reducing the environmental impacts of packaging. Whilst the Covenant embodies a life cycle approach across the packaging supply chain, implementation has focused overwhelmingly and unevenly on packaging recycling rates and targets.

The majority of stakeholders consulted for this report support NPC efforts to date and feel that the additional reporting under Covenant MkII has been useful; however, many feel that people are unaware of industry successes. Again, waste and recycling have overshadowed the broader sustainability and life-cycle aspects of the Covenant. Strong support exists for broader awareness of case studies and the Covenant itself, as the Covenant has not been communicated effectively. A more comprehensive approach is now necessary to build on progress to date.

This report provides a preliminary sustainability reporting framework and implementation plan for addressing sustainability, as well as recommendations for expanding and strengthening the Covenant to encompass sustainability more broadly. This recommended framework for 'Covenant MkIII' incorporates broad stakeholder engagement, expansion of the Environmental Code of Practice for Packaging (ECoPP) to further assist packaging decision-making and collaboration across the packaging supply chain and with other key stakeholders to better measure and report progress on sustainable packaging.

Environmental Impacts of Packaging

Data on certain desired key performance indicators (KPIs) for packaging manufacturers were not available through the Covenant's Industry Data Aggregation System (IDAS) or from some manufacturers due to low response levels and application of inconsistent measurement frameworks. Confidential data has been aggregated for packaging manufacturers representing virtually all domestic paper/cardboard, glass and flexible packaging, however data for some plastic packaging and miscellaneous items is not reliably available.

Water consumption for domestic packaging is estimated in the order of 7.2 million kL of water, or 7.2 GL, representing just under 0.04% of total Australian water consumption in 2005-06. In comparison, agriculture and household use represent 65% and 11%, respectively.

Energy consumption for domestic packaging in 2005-06 is estimated in the order of 21.8 million GJ of energy. In 2005-06, domestic packaging manufacturing generated around 3.7 Mt CO₂-equivalent, or less than 0.7% of total Australian greenhouse gas emissions. Energy and industrial processes accounted for 70% and 5%, respectively, of Australia's net greenhouse gas emissions in 2005 and agriculture 16%. Packaging was responsible for around 2% of total greenhouse gas emissions in the 15 countries in membership of the EU in 2001 (EU-15).

Significantly improved and more consistent data collection methodologies and reporting approaches would be necessary to estimate environmental performance throughout the packaging supply chain, particularly for transport, and environmental performance of the packaged products themselves would need to be taken into account.

National Pollutant Inventory (NPI)

A total of 56 packaging manufacturing and converting facilities reported 24 different toxic substances under the NPI during 2005-06. All facilities were ranked under NPI as low emitters for each substance reported, except for O-I's Adelaide glass plant, the highest facility emitter in Australia for organo-tin compounds.

Recycling and Recyclability

Following significant debate about packaging recycling rates, the National Packaging Covenant Council (NPCC) has revised earlier estimates of Australian packaging recycling rates. The revised data is based on applying consistent methodologies to historic data and more narrowly defining packaging consumption and recycling for paper/cardboard and glass packaging. Summary figures are shown by material type in Table 1-1 and compared against the tentative 2003 estimates which were used as a 'baseline' for establishing the NPC's overall recycling rate target of 65% by 2010. When these estimates were compiled, the assumptions made and limitations of the data were made clear, but these figures were ultimately used in the absence of anything more robust, thus highlighting the problematic nature of using limited, inconsistent data approaches. Australia's progress toward the NPC's 65% target is even more significant given the lower than expected actual baseline for 2003.

Table 1-1: 2003 ‘Baseline’ and Revised NPCC Recycling Rates by Material Type

Material	2003 ‘Baseline’	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%

Under New Zealand’s Packaging Accord, New Zealand’s packaging recycling rate is estimated at 57%, consumption is just over 160 kg per capita and recovery is just over 80 kg per capita. Comparable data for the EU-15 for 2005 (Table 1-2) shows lower per capita consumption rates, closer to New Zealand’s figures than Australia’s, and higher recycling rates for paper/cardboard and glass packaging than in Australia. However, Australia’s recycling rates are based on the output from reprocessors, while the EU’s are based on tonnages delivered to a reprocessor. In the worst cases EU reported recycling tonnages could be overstated by up to 25% due to contamination in the packaging waste collections.

Table 1-2: Summary EU-15 Performance Data for 2005

Material Type	Total Consumption t/yr	Total Recycling t/yr	Recycling Rate %	Kg / Capita Consumption	Kg / Capita Recycling
Paper/Cardboard	27,654,406	20,781,372	74.9%	71	54
Glass Packaging	14,517,106	9,117,272	62.8%	37	24
Plastics Packaging	12,364,314	3,150,510	24.7%	32	8
Metal Packaging	4,390,566	2,793,041	63.6%	11	7
Total	58,926,392	35,842,195	60.8%	152	95

Australia’s packaging recycling in 2007 delivered an annual net benefit equal to 6.6 million m³ of landfill space saved; 1.5 million tonnes CO₂-equivalent saved; 357,000 cars removed from roads; and 19,331 Olympic pools worth of water savings (Table 1-3). Negative water savings values for HDPE and PET result from relative water intensities of the recycling processes.

Table 1-3: Indicative Environmental Benefits for 2007 Packaging Recycling

Material Type	Amounts Recycled t/yr	Landfill Space Saved 1,000 m ³	Greenhouse Benefits 1,000 t CO ₂ eq/yr	Cars Permanently Removed from Roads 1,000 cars	Water Savings ML	Water Savings Olympic Swimming Pools
Paper/ Cardboard	1,720,000	5,558	688	165	40,764	16,308
Glass	410,700	738	144	35	821	329
Aluminium	34,300	29	520	125	7,999	3,200
Steel cans	34,760	99	28	7	38	15
HDPE	67,524	129	33	8	-702	-281
PET	49,630	95	75	18	-601	-240
Total	2,258,012	6,649	1,488	357	48,320	19,331

When the environmental benefits of recycling are considered, Amcor and Visy, two large companies that both manufacture and recycle packaging, yield net energy and water savings.

Key Impacts, Risks and Opportunities

The essence of good regulation is that compliance or non-compliance should be transparent, and the requirements should be enforceable. Jurisdictions that have opted for legislation as the main instrument to drive improved environmental performance in the packaging sector have therefore concentrated on the issues that are easiest to regulate rather than those that might matter most.

The pursuit of sustainability involves so many trade-offs and choices that it cannot be micromanaged by legislation. It needs to be built into everybody's expectations throughout the supply chain and become part of consumer behaviour. Thus, moving beyond regulation requires a consensus that things need to happen.

Strong stakeholder support now exists for the Australian packaging industry to be proactive on packaging sustainability, including stakeholder engagement, annual public reporting and greater transparency. The industry needs to regain a leadership role, speak with a more united voice and take decisive action.

Most stakeholders feel that the packaging industry has not been effective in engaging other stakeholders or in demonstrating clear commitment to sustainability in line with increased community expectations. Industry progress is being stymied by past attitudes and behaviours, as well as fragmented responses to date. Strong distrust of packaging industry efforts to reduce environmental impacts remains. As a result, various community organisations and governments have been successful in fostering perceptions of 'wasteful' packaging, imposing targets for packaging recycling and increasing pressure to implement producer responsibility approaches such as CDL, packaging taxes and/or takeback requirements across all packaging types.

Past packaging supply chain behaviour, exclusionary decision-making and a general lack of stakeholder engagement have generated significant mistrust and scepticism that the packaging industry is serious about sustainability (though it is also fair to say that some emotive and inaccurate NGO statements have not exactly encouraged a partnership approach). The supply chain must provide clear, verifiable evidence that progress is being made. Amcor, Visy and other prominent packaging manufacturers are increasingly open and transparent in reporting against environmental performance indicators. However, collective reporting of industry efforts has been hampered by the lack of data and inconsistent data collection methodologies.

Packaging has an essential role in getting goods to consumers. However, political and regulatory influence on packaging could result in preferred packaging approaches becoming more expensive or forcing the industry away from technically optimal approaches. Stringent performance standards could also be applied to effectively ban certain packaging types; indeed, the Australian Government is already applying energy efficiency standards to eliminate incandescent light globes in favour of compact fluorescent light globes.

While consumer concerns about sustainability have undoubtedly increased, they do not exert much influence on specific decisions surrounding packaging. This could be due to a lack of knowledge concerning packaging impacts and/or possibly due to people placing greater emphasis on other issues such as climate change and water conservation. It could also be due to consumer comfort with the packaged products they purchase and the view that product quality, price and safety will continue to outrank packaging as considerations in purchasing.

Some companies are receiving more questions about environmental performance of their products, but not specific environmental complaints. Some consumers are increasingly concerned about sustainability and want to know what they can do to help, including understanding the impacts of their packaging decisions. Information on environmental performance is further tangled in the mass clutter of divergent information consumers are often confronted with. To make matters more complex, the packaging industry is currently being confronted by activists and ‘eco- marketing’ of competing products.

Stakeholders to date have stated almost unanimously that the packaging industry needs to address carbon accounting; however, key players are at vastly different levels of understanding and determining carbon footprint, and a range of measures are currently being undertaken (where they are undertaken at all). The industry should strongly resist pushes for carbon labelling, which could lead to over-simplistic and misleading consumer information. Rather, industry should facilitate / develop consistent measurement and reporting frameworks through a comprehensive approach that would also allow ‘drill-down’ of carbon footprint assessment information so that manufacturers can assist brand owners directly. (Chapter 8.3 shows dangers of using carbon footprint methodologies not related to life-cycle assessment standards.)

Government concerns and influence of multinationals have been, and will likely remain, significant drivers of packaging sustainability. Key packaging manufacturers and brand owners feel that implementation of a comprehensive approach to defining and measuring packaging sustainability in an Australian context provides significant commercial opportunities in addition to relieving regulatory and consumer pressure. Many of these stakeholders say that they see value in putting packaging in context with other environmental issues (including impacts of the packaged products themselves) and highlighting wider concerns other than waste and recycling.

Packaging’s presence and visibility means there will be continued pressure to ‘do something’. Stakeholders disagree about whether packaging recycling rates will continue to overshadow other sustainability issues until reliable, verifiable data demonstrates world-class packaging recycling rates in Australia. The Covenant’s 65% packaging recycling rate target is already overshadowing other sustainability aspects of the Covenant due to the need to cost-effectively deliver against the target (a key factor in Covenant funding decisions). Although packaging litter and non-recycling related issues can have significant social, economic and environmental trade-offs, the target will still take precedent.

Several stakeholders, especially NGOs, feel that eco-marketing is clearly trumping actual sustainability in packaging design. The Covenant’s ECoPP is clearly stronger and more informative than earlier versions. However, the ECoPP should incorporate more life-cycle information and be made more robust to provide a greater role in packaging decision-making.

Significant concerns exist about biodegradable products and the way in which they send wrong or inconsistent signals to consumers. Current lack of agreed standards has been raised as a concern, although standards are pending and industry has developed guidelines for use of biodegradable products. Specific concerns include conflicts between biodegradable products and existing recycling and composting programs, including backyard composting. An additional concern is the possible perverse incentive for increased littering. Governments also need to be careful about adopting policies based on the supposed superiority of biodegradable products.

Substantial labour savings for retailers have motivated the increased use of shelf-ready packaging (SRP). While the packaging supply chain could see some resulting commercial opportunities, SRP could also result in increased packaging-product ratios, increased bleaching and chemical use for printing. Some stakeholders have also reported increased product damage rates resulting from re-design for SRP. Such impacts could undo years worth of packaging design improvements.

If the Australian packaging industry cannot satisfy supply chain demand, then an increasing proportion of packaging will need to be sourced from overseas suppliers, which could result in a more negative view of packaging sustainability due to concerns about overseas labour/working conditions and difficulties in compiling and verifying sustainability indicators from overseas sources.

Moving Towards Sustainable Packaging

There is no doubt that the requirements of EU environmental law, and to a lesser extent pressure from NGOs and the media, have sharpened up the environmental awareness and performance of European-based brand owners and their packaging suppliers. International packaging and packaged goods companies and beverage container brand owners and suppliers in Australia have also long been targeted and have had to respond. As a result, these companies are in an excellent position to embrace sustainability now that the packaging supply chain is increasingly held accountable for the sustainability of its business practices.

To address the risks and opportunities addressed in this report, MS2 and Perchards recommend that the PCA and the Australian packaging supply chain:

Sustainability and Reporting

- As a priority, convene a Sustainable Packaging Summit with broad representation and workshop formats to evaluate and prioritise key issues and develop a series of commitments and strategies for addressing packaging sustainability.
- As a priority, convene an independent stakeholder advisory panel comprising industry, government, retail, community and other key stakeholders to develop consensus recommendations on packaging sustainability indicators and reporting frameworks in a transparent and accountable manner. Deliberations should focus on joint fact-finding, be open, duly minuted and regularly reported publicly to help ensure member accountability. The advisory panel should also be provided the opportunity for substantive feedback on *Towards Sustainable Packaging* and to recommend revisions to expand and strengthen the National Packaging Covenant ('Covenant MkIII').

- Incorporate water consumption and water intensity for designated product categories in improved data collection and reporting frameworks.
- Continue reporting NPI emissions, observe changes over time and provide some background about chemicals and their usage.
- Undertake more detailed data collection across PCA members to report against the agreed indicators, including economic activity and social influence.
- Conduct annual public reporting on the state of packaging sustainability in Australia and ensure such reporting is readily available on PCA's website.
- Assist in developing standardised methods for calculating and reporting energy use, water use and other sustainability indicators to help address identified gaps in public reporting and data entry for the Covenant's Industry Data Aggregation System (IDAS). Such methods should seek to build on existing state and Commonwealth reporting requirements to provide greater consistency and minimise duplication.
- Strongly resist carbon labelling. Like conventional life-cycle assessment (LCA), carbon footprint measurement is best seen as a way of helping companies benchmark their own progress rather than as a means of comparison.

Improving Environmental Performance

- Continue to try to optimise material recycling rates, which represent the most obvious indicator of sustainability, whilst also addressing other sustainability aspects of the Covenant such as energy use, water use, litter and minimising the environmental impacts of packaging across the supply chain. Given embodied energy and savings in greenhouse gases from recycling, increasing recycling is an obvious way to reduce carbon exposure for most packaging materials. However, recycling should not be the only indicator of sustainability.
- Document the extent of reuse of transport packaging and assess resulting economic and environmental benefits.
- Support public policies that promote accelerated depreciation rates so that companies can invest in energy- and carbon-intensity improvements.
- Assist in creating public policies and carbon crediting schemes that recognise activities that accomplish real and verifiable reductions in atmospheric greenhouse gases.

National Packaging Covenant MkIII

- Commence discussions about the content and structure of a Covenant MkIII in conjunction with an independent stakeholder advisory panel.
- Quantify the amount of packaging avoided through initiatives undertaken as commitments to the Covenant or as part of broader sustainability commitments.
- Update KPIs and IDAS to reflect experience in collecting the data up to now and to address broader sustainability KPIs, consistent with the Covenant's objectives.
- Develop more consistent data collection and reporting frameworks to more effectively report against Covenant KPIs.

- Publicly demonstrate successful application of the ECoPP to the packaging decision-making process for new packaging and reviews of existing packaging.
- Underpin the ECoPP with more robust data to more effectively guide packaging decision-making and make some of the trade-offs in packaging decision-making more transparent.
- Expand representation on the ECoPP Management Committee to make the committee less industry-dominated and more representative.
- Set up a Packaging Standards Sub-Committee to oversee random audits and investigate and adjudicate on complaints about breaches of the ECoPP. The findings should be published whether they are positive or negative, so as to explain why decisions are made as well as to expose bad practice.
- Publicly demonstrate successful application of the ECoPP to the packaging decision-making process for new packaging and reviews of existing packaging.
- Encourage Covenant participation to non-signatories in order to expand coverage.

Once the way forward is clear, industry needs to set up a communications program to help consumers understand not only what industry is doing about packaging sustainability, but also what they can do to change to a more sustainable lifestyle and the role of packaging in such a change. The more consistent the message from industry, government, academics and NGOs, the more effective it will be, so every effort must be made to establish a consensus.

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2.0 Glossary

ABS	Australian Bureau of Statistics
ACCA	Association of Chartered Certified Accountants
ACCC	Australian Competition and Consumer Commission
ACOR	Australian Council of Recyclers
ADF	Advance Disposal Fee
AFGC	Australian Food and Grocery Council
AGO	Australian Greenhouse Office
Ai Group	Australian Industry Group
ANZSIC	Australian and New Zealand Standard Industrial Classification
BOD	Biochemical Oxygen Demand
CCA	Climate Change Agreement
CCL	Climate Change Levy (UK)
CDP	Carbon Disclosure Project
CDL	Container Deposit Legislation
CDS	Container Deposit Systems
CEPI	Confederation of European Paper Industries
CHP	Combined Heat and Power
CIAA	Confederation des Industries Agro-Alimentaires de l'UE
CIPTA	International Confederation of Paper and Board Converters (EU)
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
CO₂	Carbon Dioxide
EC	European Commission
ECOPP	Environmental Code of Practice for Packaging
EEO	Energy Efficiency Opportunity Assessments
EPR	Extended Producer (or Product) Responsibility
EREP	Environment and Resource Efficiency Plans
ETS	Emissions Trading Scheme
EU	European Union
EUROPEN	European Organisation for Packaging and the Environment
FMCG	Fast-Moving Consumer Goods
FSC	Forest Stewardship Council

GDP	Gross Domestic Product
GhG	Greenhouse Gas
GJ	Gigajoules
GL	Gigalitres
GRI	Global Reporting Initiative
IDAS	Industry Data Aggregation System
INCPEN	Industry Council for Packaging and the Environment (UK)
JRC	Joint Research Centre (for the European Commission)
KAB	Keep Australia Beautiful
kg	Kilogram
KL	Kilolitre
KPI	Key Performance Indicator
kWh	Kilowatt-Hour
LCA	Life-Cycle Analysis
LPB	Liquid Paperboard
LULUCF	Land Use, Land Use Change & Forestry
MBI	Market-Based Instrument
MJ	Megajoule
ML	Megalitre
MRF	Material Recovery Facility
MSW	Municipal Solid Waste
MS2	Martin Stewardship & Management Strategies Pty Ltd
NEPM	National Environment Protection Measure
NGER	National Greenhouse and Energy Reporting
NGO	Non-Government Organisation
NLI	National Litter Index
NO_x	Oxides of Nitrogen
NPC or Covenant	National Packaging Covenant
NPCC	National Packaging Covenant Council
NPCIA	National Packaging Covenant Industry Association
NPI	National Pollutant Inventory
NSW	New South Wales
OECD	Organization for Economic Co-operation and Development
OH&S	Occupational Health and Safety

PAC	Packaging Association of Canada
PACIA	Plastics and Chemicals Industries Association Incorporated
PAC NZ	Packaging Council of New Zealand
PAH	Polycyclic Aromatic Hydrocarbons
PCA	Packaging Council of Australia
PCR	Post-Consumer Recycled Content
PEI	Packaging Environmental Indicator
PERN	Packaging Waste Export Recovery Notes
PIQET[®]	Packaging Impact Quick Evaluation Tool
PM₁₀	Particulate Matter 10.0um
PPWD	Packaging and Packaging Waste Directive (94/62/EC)
PRN	Packaging Waste Recovery Note
PRO	Producer Responsibility Organisation
PSF	Packaging Stewardship Forum
Qld	Queensland
RPC	Returnable Plastic Crate
SA	South Australia
SCA	Svenska Cellulosa Aktiebolaget
SPA	Sustainable Packaging Alliance
SPC	Sustainable Packaging Coalition
SRP	Shelf-Ready Packaging
t	Tonne
t/yr	Tonnes Per Year
UK	United Kingdom
UNFCCC	United Nations Framework Convention on Climate Change
US	United States (of America)
Vic	Victoria
VOCs	Total Volatile Organic Compounds
WA	Western Australia
WBCSD	World Business Council for Sustainable Development
WEMP	Water Efficiency Management Plan

3.0 Introduction

The Packaging Council of Australia (PCA) commissioned MS2 and Perchards to develop this first annual report with the primary objectives of:

- Delivering a concise, transparent report on the state of packaging sustainability in Australia; and
- Enabling comparison with international sustainability efforts.

Secondary objectives for this report include:

- Evaluating Australia's strengths, weaknesses and opportunities;
- Assisting the Australian packaging industry to frame the sustainability debate;
- Providing lessons from global experience, tailored to Australian context;
- Ensuring greater stakeholder engagement than in the past;
- Addressing perceptions of key stakeholders outside the industry on sustainability issues affecting packaging;
- Outlining approaches for defining and measuring packaging sustainability;
- Becoming a public document showing an accurate, frank reflection of packaging sustainability and areas for improvement; and
- Enabling broader public dissemination and education.

MS2 has led the project within Australia, facilitated stakeholder engagement and led report development while Perchards have provided support research and reviews based on European experience. Data provided is Australia-specific for the time period 2006-07, unless otherwise indicated. This report is intended to be consistent to the fullest extent possible with reporting principles established by the Global Reporting Initiative's (GRI) Sustainability Reporting Guidelines¹ and reporting principles of the World Business Council for Sustainable Development (WBCSD)². Project methodology, stakeholders consulted and project limitations are outlined in Appendix A.

Confidential performance data was provided by Amcor Australasia (Amcor), Carter Holt Harvey, Huhtamaki and Visy Industries (Visy) in a consistent reporting framework developed by MS2. These companies account for over 1.1 million tonnes of fibre-based packaging and over 600,000 tonnes of food, beverage and other packaging. Estimates were also calculated for O-I Australia (O-I) using publicly available data. These companies account for all domestic paper/cardboard and glass manufacturing in Australia and also for significant volumes of aluminium, plastic and other materials. As such, they are likely to account for the bulk of the Australian packaging manufacturing industry. Packaging on imported finished goods has not been included in these estimates. While attempts were made to ensure the data was Australia-specific, some of this packaging will have been manufactured in Australia and exported, either empty or around products.

3.1 The Australian packaging industry in context

Industry Overview

Based on industry estimates, the Australian packaging industry had around \$10.5 - 11 billion turnover and 20,000 employees in 2007. Around 60-70% of Australian packaging is used by the food and beverage sector. Preliminary figures under the National Packaging Covenant (Covenant)³ indicate that most packaging is sourced locally, with Australian sources accounting for 92% of packaging reported.

Effective duopolies exist for manufacturing the dominant material types by weight, paper/cardboard and glass.

Amcor and Visy account for around 92% of the paper/cardboard market, with Carter Holt Harvey accounting for the remainder. Principal manufacturing and converting facilities for paper and cardboard include:

- Three Amcor Fibre Packaging facilities in Victoria, two in New South Wales (NSW), one in Queensland and one in South Australia (SA);
- Three Visy Board facilities in Victoria, one in Queensland, one in SA and one in Western Australia (WA);
- Two Visy Paper facilities in Victoria, two in NSW and one in Queensland; and
- One Visy Pulp and Paper facility in NSW.

The only cartonboard facility in Australia is Amcor's mill in Petrie, Queensland. Carter Holt Harvey's paper-based production for Australia is imported from New Zealand.

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.

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.

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. Amcor's Food Cans and Aerosol Cans divisions were sold off to Impress in 2007, but were still part of Amcor for the purposes of this report and have therefore been included.

A variety of smaller companies manufacture other plastic packaging, as well as packaging-related closures and transport packaging.

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% of aluminium fabricated at Yennora⁴.

In late 2007, BlueScope Steel withdrew from local manufacture of tinplate for packaging, resulting in a loss of this capacity in Australia.

Packaging consumption and recycling activity for 2007 as recently estimated by the National Packaging Covenant Council (NPCC) and including estimated packaging on imported finished goods, is provided in Table 3-1⁵.

Table 3-1: Summary Performance Data for FY 2007

Material Type	Total Consumption t/yr	Total Recycling t/yr	Recycling Rate %	kg per capita consumption	kg per capita recycling
Paper/Cardboard	2,639,000	1,720,000	65%	124	81
Glass Packaging	893,031	410,700	46%	42	19
Plastics Packaging	585,296	178,351	31%	27	8
Steel cans	92,399	34,760	38%	4	2
Aluminium beverage cans	48,791	34,300	70%	2	2
Total	4,258,517	2,378,111	56%	199	111

Packaging in Context with other Environmental Issues

Key roles of packaging in modern society include⁶:

- Consumer safety and information;
- Product quality, shelf life, integrity and safety;
- Logistical and supply chain considerations such as transport efficiency;
- Protection against contamination;
- Theft prevention; and
- Marketing and sales.

A UK study found that typically, ten times as much energy and materials are locked up in household goods and food than in the packaging around them⁷, which means that under-packaging resulting in product loss is in fact more wasteful than over-packaging.

According to the Australian Food and Grocery Council (AFGC)⁸,

'The most water intensive process in the food and grocery supply chain is primary production, followed by use and consumption in the home. The relative water intensity of these two stages is, respectively, about 100 and 10 times more water intensive than most processing and packaging'

and (from life-cycle work undertaken by Dairy Australia)⁹,

‘About 85 per cent of greenhouse gas emissions are farm related, of which 74 per cent are on-farm emissions. Packaging is estimated to contribute about 4 per cent to total emissions’.

Packaging has supply chain environmental implications. For example, a UK packaging supply chain study¹⁰ found that

‘Environmental gains in other parts of the food chain are often achieved by increasing packaging which itself has a relatively small environmental impact in relation to that of food production and distribution’.

This view was reinforced by a variety of stakeholders consulted that indicated when looking at life-cycle impacts of packaged products packaging is almost negligible, by orders of magnitude. Similarly, packaged foods can often generate less total waste than fresh foods, with resulting resource and greenhouse gas implications. The environmental impact of packaging is relatively small compared to its functions of preventing waste, losses and spoilage.

Packaging’s Role in Reducing Waste and Environmental Impacts¹¹

- Packaging reduces food waste before consumption - to a rate of 2-4% in industrialised countries compared with 50% or more in developing countries.
- When fruit and vegetables are bought fresh and prepared in the home, the consumer discards the peelings which are eventually landfilled (in the absence of home composting); factory processing makes it possible for these wastes to be used beneficially as a by-product, for example for animal feed.
- Packaging’s total environmental impact is eight times less than that of avoidable household food waste going to landfill.

Demographic trends including smaller household size, higher disposable income and other factors such as consumer safety and convenience have direct impacts on packaging that may run contrary to waste reduction. Such factors have led to an 11% increase in the total glass, plastics, metal and paper packaging placed on the market in the EU-15¹² between 1997 and 2005¹³. This is despite the presence of stringent packaging requirements and producer responsibility schemes during that time¹⁴. While producing smaller packages in response to these demographics may result in increased packaging, it can also substantially reduce food waste even further.

3.2 Drivers for sustainability

Demand

In 1987 the Brundtland Commission on Environment and Development defined ‘sustainable development’ as *‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’*. And now WWF reports that if the

whole world consumed like Europeans, we would need the resources of three planets to sustain us – and if we all consumed like Americans, we would need four.

Almost 90% of the general public say they are concerned about environmental problems, although environment still rates well behind the economy, health, crime and education as a community issue of concern. In 2006, water was nominated as an environmental issue by three times more people than any other environmental issue. Climate change and energy concerns have grown rapidly in the past few years. In NSW 39% of respondents surveyed mentioned climate change, water or environment in their two most important State issues¹⁵.

Concerns about sustainability have increased significantly in the past few years, creating a variety of risks and opportunities. Climate change and water supply, in particular, stand to cause substantial increases in resource costs as their environmental costs are realised and incorporated in pricing structures for energy and water supply, transport and other inputs that affect virtually all businesses. Exposure to increased energy costs through carbon taxes or emissions trading schemes (ETS) is increasingly being factored into financial transactions and business strategies. Similarly, water shortages could result in significantly more expensive or supply-limited feedstocks.

“Climate change, national security and water shortages are now directly impacting Australian plastics and chemicals businesses. Just 12 months ago, these global and regional issues were not a dominant feature of the business context, but they now translate directly as higher costs for energy and raw materials and increasing regulation.”

Plastics and Chemicals Industries Association (PACIA)¹⁶

Becoming more sustainable involves rethinking past approaches, sorting through a wide variety of confusing and potentially conflicting information and conveying risk exposure through public reporting. Is it worth the hassle? Put simply, yes. The Australian financial services sector estimates a \$1.2 billion GDP windfall and a profit gain of 2-3% for medium and large companies that adopt sustainability risk reporting¹⁷ and on average, eight out of ten companies globally say that environmental and sustainability factors are taken into account when they select suppliers¹⁸. Increased awareness of sustainability can also create commercial opportunities for proactive companies that:

- Meet consumer and supply chain expectations;
- Reduce their carbon exposure;
- Reduce energy and water consumption;
- Reduce insurance premiums or otherwise improve financial viability; or
- Reduce likelihood of regulatory intervention.

Such efforts can also help to underpin a ‘social licence to operate’ and enhance ability to attract and retain employees.

Even if industry can prove that it manufactures and distributes its products in the most resource-efficient way possible, it is undeniable that fewer resources would be consumed if goods were never produced at all. There is a danger that legislators might intervene if improved functionality or convenience, or simply increased output, are deemed to be

imposing too much of a burden on the earth's resources. Questions have been asked, for instance, about 'food miles', allegedly 'unnecessary' packaged products such as bottled water, soft drinks and convenience foods, and allegedly 'unnecessary' packaging, such as plastic carry bags or plastic wrapping around fruit and vegetables on display in supermarkets.

Within the past few years, the packaging supply chain's emphasis on sustainability has increased dramatically. Various stakeholders consulted, particularly brand owners, have indicated that their sustainability efforts are now increasingly being noticed and that sustainability is far more of a commercial driver than ever before.

"The urgency and magnitude of the risks and threats to our collective sustainability, alongside increasing choice and opportunities, will make transparency about economic, environmental, and social impacts a fundamental component in effective stakeholder relations, investment decisions, and other market relations."

Global Reporting Initiative¹⁹

Criticisms and Awareness

An important distinction of packaging from other industries is that with packaging, consumers are buying the packaged product, rather than the packaging itself. Many people only think about the packaging when they come to dispose of it. Various non-government organisations (NGOs) seize on this concern to target packaging as a visible indicator of rampant consumerism, pointing to wasted resources and large amounts of packaging materials going to landfill.

These targeted attacks have become more focused and visible during the debates on the original Covenant and Covenant MkII. With Covenant MkII's mid-term review due end-2008 and renewed efforts to introduce container deposit legislation (CDL) in various states, renewed opposition will be more problematic for the industry during 2008.

"There is work to be done on a sustainable consumer, and how to define them."

Jeff Angel, Director, Total Environment Centre

3.3 Towards sustainable packaging

Some of the new drivers for sustainable packaging globally include²⁰:

- Initiatives of major retailers and brandowners;
- Increased demand for renewable resources;
- Reduced packaging that still performs; and
- Ability of the packaging to be recovered.

In Australia, debates about sharing the costs of municipal recycling programs and about performance (or lack thereof) of the Covenant have been additional drivers.

Packaging has an essential role in getting goods to consumers, and there is no real alternative to it. Packaging will continue to be with us and packaging bans in full are unlikely. However, regulatory and consumer pressures could make preferred packaging approaches more expensive or the industry could be driven away from otherwise optimal approaches. Several key stakeholders have highlighted that greater regulatory pressure is likely and strong

pressure will remain for the packaging industry to ‘fund its share’ of recycling and waste management. Several key government and brand owner stakeholders have also raised the potential for extended producer (or product) responsibility (EPR) frameworks across all packaging, not just beverage containers, as a very real possibility.

Although it is difficult to find agreement on what is meant by ‘sustainable packaging’ (Chapter 4), sustainable packaging undoubtedly means big business. For example, in the US, the sustainable packaging market in the food and beverage sector was estimated at US\$37 billion in 2005 and is projected to grow to US\$42 billion in 2010²¹.

Over the past several years, MS2 and Perchards have assisted the PCA in understanding sustainable packaging. Building on these efforts, in May 2007 the PCA Board adopted the principles in ‘*Towards Sustainable Packaging*’ (Appendix B) and committed to continue to take a leading role in improving sustainability performance across the packaging supply chain. PCA’s stated aim is to make a positive contribution to helping consumers live a sustainable lifestyle, and to this end the PCA committed to:

- Actively and constructively engage in the public debate on sustainability as it affects packaging, including defining sustainable packaging in an Australian context and tracking progress toward sustainable packaging;
- Report annually on the overall recycling figures for Australian packaging, broader trends in sustainable packaging and on information and policy gaps that need to be addressed in order to provide more valuable feedback to the packaging industry and broader community;
- Help facilitate and track progress by companies in the packaging supply chain in reducing the environmental impact of packaging, including water, greenhouse and energy issues;
- Continue to encourage companies to commit and actively participate in the National Packaging Covenant and where possible, go beyond the requirements of the Covenant; and
- Continue (PCA’s) programs to develop educational materials for students at the primary, secondary and tertiary levels.

Towards Sustainable Packaging highlighted the need to assist consumers and decision makers in quickly evaluating environmental aspects of packaging, addressing disconnects between perceptions and reality on packaging and clearly communicating industry positions on sustainability. Addressing stakeholder concerns and providing reliable, verifiable information are essential in dealing with these needs. The PCA therefore committed to conduct this first annual report on packaging sustainability as part of a comprehensive approach to packaging sustainability.

Setting High Standards

In the 2006 Australian Packaging Awards, judges felt that none of the entrants warranted the Gold classification in the Sustainability Award, and therefore granted only Silver and Bronze.

Stakeholders consulted expressed strong support for this project and for PCA to be proactive on progressing packaging sustainability. Stakeholder support is also strong for annual public reporting and greater transparency. These are seen as real leadership issues for the PCA, especially to counter inaccurate claims about packaging sustainability, as criticisms that are not effectively countered stick in the minds of stakeholders.

A variety of stakeholders see sustainability as offering significant commercial opportunities; some consumers are increasingly concerned about sustainability and want to know what they can do to help. There is also strong support for putting packaging in context with other environmental issues (including impacts of the packaged products themselves).

“Consumers have a new need: to live more sustainably, and to consume products and services which are more sustainable. Our role as a business is to give them the information and the means to achieve this change. If we satisfy this need we will be rewarded with custom and loyalty. Other businesses will respond to this new competitive challenge by devoting more resources and more creativity to the task. Society and the economy will move ever faster down the road of sustainability.”

Terry Leahy, CEO, Tesco²²

3.4 Report format

Complexities in defining and benchmarking sustainable packaging are addressed in Section 4. The National Packaging Covenant is addressed in Section 5, while various parameters of packaging sustainability are addressed in Sections 6 through 12. Section 13 provides a risk and opportunity overview for the Australian packaging industry and Section 14 outlines a preliminary sustainability reporting implementation plan. Findings and recommendations are provided at the end of each section and conclusions provided in Section 15. Appendices A through G provide additional information to that referenced in the body of the report.

Throughout the report, the direct quotes provided occurred during stakeholder consultations specific to this report, unless otherwise referenced.

Findings – Introduction

- The Australian packaging industry had around \$10.5 - 11 billion turnover and 20,000 employees in 2007.
- Around 60-70% of Australian packaging is used by the food and beverage sector. This strong sector presence is a mixed blessing: while the benefits of packaging in avoiding food wastage are substantial they are largely unnoticed by consumers, but the visibility of the packaging associated with these products and the waste from that packaging brings increased pressure to become more sustainable.
- Preliminary figures under the National Packaging Covenant indicate that most packaging is sourced locally, with Australian sources accounting for 92% of packaging reported.
- To date, the Australian packaging industry as a whole has not demonstrated a clear commitment to sustainability. However, industry responses to past pressures to increase recycling rates and reduce litter mean that the Australian packaging supply is now well placed to demonstrate such a commitment.
- A variety of national and international drivers are acting in concert to raise awareness of the need for, and moves towards, more sustainable packaging.
- Stakeholders see a real leadership role for the Packaging Council of Australia in making a concerted effort to drive the industry towards greater sustainability, and in measuring and reporting progress.
- The role and impacts of packaging must be understood in the context of packaged products and other sources of environmental impacts.

4.0 Defining and Benchmarking Sustainable Packaging

Packaging is not a free-standing product – it exists only because there is a demand for certain products and packaging is the best way to get them safely from the point of production to the user. Back in the 1970s, the green movement singled out packaging for attack not because environmentalists believed that it was a major ecological problem *per se*, but because it was a symbol of, and enabler of, the consumer society. A full assessment of packaging sustainability should therefore take account of not only its immediate environmental impacts – the subject of virtually all packaging sustainability efforts to date – but also its social and economic context.

Defining ‘sustainable packaging’ involves cradle-to-cradle thinking that embraces the entire lifecycle of packaging in the context of the product and its supply chain, with the aim of optimising material and energy flows and the recovery of value from waste. No one parameter, whether recycling rates, waste minimisation, resource-efficiency (including energy and water efficiencies) or even minimum carbon emissions, adequately reflects the environmental aspect of sustainable packaging, let alone the social and economic aspects. Even these parameters can vary significantly by location and over time. For example, two identical manufacturing facilities located in Australia and New Zealand could have vastly different emissions due to the high availability of hydro power in New Zealand.

Objectives can also vary significantly. For example, less packaging is not necessarily better packaging. Under-packaging that results in the product being spoilt or damaged wastes 100% of the resources used to produce both the contents and its packaging, as well as the fuel used to distribute it. Typically, ten times as much energy and materials are locked up in household goods and food than in the packaging around them²³. Packaging failure can result in a big financial loss; the customer may reject the entire consignment and take his future business elsewhere.

Meanwhile, the packaging industry continues to face calls for sustainable consumption. With increasing efficiencies, the packaging sector is stabilising its resource consumption, but not reducing it, because of increasing demand for its products. In developed countries, food and beverage’s share of total household expenditure is falling, but demand for packaging is rising because of demographic changes (smaller households) and increasing demand for convenience and pre-prepared foods.

“Any more substantial changes in volumes of packaging placed on the market can only be achieved through changes in production, consumption and distribution patterns. This is reflected in the limited success of all prevention measures undertaken so far.”

European Commission, 2006

The hunt will be on for ‘unsustainable’ products or packaging that can be priced off the market through the use of economic instruments or forced off it through pressure of public opinion. The term ‘choice editing’ is beginning to be heard in Europe – an expectation on the part of the legislators that the retail trade will stop selling items deemed to be bad for the environment. If ‘choice editing’ comes about, the probability is that it will be based more on public opinion (as formed by media comment and NGO pressure) than by any objective assessment of environmental impact.

One of the most difficult components of *Towards Sustainable Packaging* to implement therefore is for the Australian packaging industry to build on overseas and domestic efforts to define and benchmark packaging sustainability in an Australian context.

The vast proportion of packaging sustainability efforts in developed countries have focused on environmental aspects, with less attention given to social and economic aspects. Although data on social and economic aspects of the Australian packaging supply chain has not been compiled to a significant extent, available information has been addressed in this report. The Sustainability Reporting Implementation Plan developed for this report (Section 14) incorporates social and economic sustainability indicators for packaging to help address current data gaps.

4.1 US view of sustainable packaging

The US-based Sustainable Packaging Coalition (SPC) was set up to transform packaging into a system that encourages economic prosperity and a sustainable flow of materials. It has more than 160 members which include a few academic institutions as well as many major packaging and packaged products manufacturers and some smaller companies. The SPC *“envision[s] a world where all packaging is sourced responsibly, is designed to be effective and safe throughout its life cycle, meets market criteria for performance and cost, is made entirely using renewable energy and once used, is recycled (recovered) efficiently to provide a valuable resource for subsequent generations.”*

According to the SPC²⁴, sustainable packaging:

- Is beneficial, safe and healthy for individuals and communities throughout its life cycle;
- Meets market criteria for performance and cost;
- Uses renewable energy at all stages in its life cycle;
- Maximises the use of renewable or recycled source materials;
- Is manufactured using clean production technologies and best practices;
- Is made from materials healthy in all probable end of life scenarios;
- Is physically designed to optimise materials and energy; and
- Is effectively recovered and utilised in biological and/or industrial cradle to cradle cycles.

4.2 European view of sustainable packaging

The European view of sustainable packaging is a little different from that in the US, coloured no doubt by operating in a more highly regulated business environment:

- There is no final goal of a ‘perfect’ package, but simply a process of continuous improvement;
- Recycling needs to be optimised rather than maximised – there will always be a place for landfill, if at a lower level than today;
- There are few absolutes, since many design decisions will involve a trade-off between different environmental parameters (e.g. recyclability versus energy-efficiency);
- There are many environmental issues (e.g. the use of renewable energy) where an individual company may not always have the ability to make a meaningful choice;
- The use of renewable resources (those that can be grown) may be but is not necessarily better for the environment than the use of renewable materials (those which after recycling retain their original properties with no degradation of performance) – and there may be some applications for which the most resource-efficient solution is energy recovery; and
- Above all, European industry opinion-formers would prefer to address not ‘sustainable packaging’ but a ‘sustainable packaging strategy’. Environmental improvement will come about through a mixture of better packaging design, more resource-efficient production and distribution and more resource-efficient management at end-of-life, so it is worth looking at the total system, not just the packaging itself.

The interviews carried out in the course of this study suggest that Australian companies are more in tune with the broader European approach than with the Americans’ more specific focus on packaging design, but it would be misleading and unhelpful to exaggerate the differences. Cross-sectoral organisations such as the SPC, EUROPEN (the European Organization for Packaging and the Environment), INCPEN (the UK-based Industry Council for Packaging and the Environment) and many sector-specific associations are working on identifying and communicating best environmental practice in their particular fields and they have valuable things to say.

4.3 Sustainable Packaging Alliance

In Australia, the Sustainable Packaging Alliance (SPA) is based in the academic community rather than the packaging supply chain, but its messages are similar. The SPA aims to engage with key stakeholders to develop a vision for sustainable packaging which is relevant to Australia and which will help define packaging solutions which are environmentally responsible, commercially viable and socially acceptable.

The SPA believes that packaging should meet the following four sustainability principles²⁵:

- Effective - providing social and economic benefits;
- Efficient - providing benefits by using materials, energy and water as efficiently as possible;
- Cyclic - recoverable through industrial or natural systems; and
- Safe - non-polluting and non-toxic.

The SPA concluded at an early stage that any evaluation of packaging sustainability needs to consider²⁶:

- The entire lifecycle of the package from raw materials through to ultimate disposal, to avoid problems being transferred from one part of the lifecycle to another;
- Interactions between the package and the product it contains, so that the environmental impacts of the product-packaging system as a whole are minimised; and
- ‘Triple bottom line’ impacts of packaging – on the business, on people and on the natural environment.

The SPA approach is very much in line with the European approach. It means that very little packaging can be classified as ‘good’ or ‘bad’. The real question is (having regard to all the trade-offs that must be made, between environmental considerations and functionality, and between one environmental parameter and another): is the packaging appropriate for its intended application or could it be improved? The SPA is in the process of updating its definition. It has prepared a draft paper, *Sustainable Packaging Redefined*,²⁷ which explains the issues very well.

4.4 Measuring sustainability performance

Stakeholders consulted for this report, in particular the AFGC, feel that what is needed is a complete picture of packaging to feed a packaging profile into broader reporting. A real difficulty, however, is in effectively measuring a suitably broad range of packaging sustainability indicators.

INCPEN

INCPEN is a research organisation drawing together an influential group of major packaging and packaged goods manufacturers and retailers. Its aims are to ensure that packaging policy makes a positive contribution to sustainability, to encourage industry to minimise the environmental impact of its activities and to explain the role of packaging in society.

In September 2006, INCPEN conducted a survey of the current environmental performance of its members in key impact areas²⁸. This report measured members’ progress on reducing environmental impacts and established a baseline against which to measure progress towards sustainable production, distribution and consumption. This study will be repeated every two years. Few of the indicators in the INCPEN survey could as yet be compiled in a meaningful way for Australian packaging.

While findings are detailed in Appendix D, some highlights of the report include:

- Members were undertaking a wide range of environmental initiatives that go above and beyond legal compliance;
- There was a high level of monitoring, target setting, and reporting in key areas among INCPEN members;
- Members had reduced consumption in the key environmental impact areas of energy use water use, CO₂ emissions, and solid waste generation (Figure 4-1); and
- 83% of INCPEN members were publicly reporting on energy, 83% on CO₂ emissions, 67% on water, and 83% on waste.

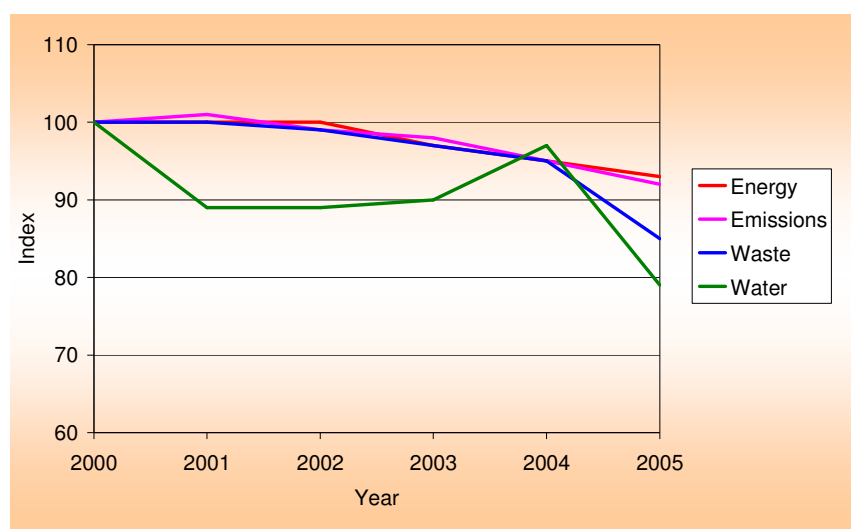


Figure 4-1: Summary of trends in INCPEN members' key environmental impacts

There was however significant variation in individual members' performance, and considerable differences in the form of the data being reported by companies. These differences included different reporting scales (global or regional), different reporting units (absolute data or relative data), different measurements (e.g. kWh or GJ), different definitions (e.g., solid waste or total waste to landfill), and reporting data for specific products or for a broad product mix.

The report suggested that better progress could be made in making reported data more readily comparable by increased use of the GRI, which aims to make sustainability reporting as routine and as standardised and comparable as financial reporting. The GRI has developed a uniform format for reporting information, made up of Sustainability Reporting Guidelines, Sector Supplements, and Indicator Protocols. The Guidelines recommend disclosure of specific information related to environmental, social and economic performance. This includes a CEO statement, key indicators, descriptions of policies and management systems, stakeholder relationships, management, operational and product performance, and a sustainability overview. Of INCPEN members who responded to the survey, 67% were then using the GRI guidelines.

Wal-Mart Sustainable Packaging Scorecard

Wal-Mart, the world's largest retail chain, has developed a Packaging Sustainability Scorecard which will rate packaged products according to indicators such as weight, headspace, recycled content, greenhouse gas emissions from packaging production and product to packaging ratio (Figure 4-2).

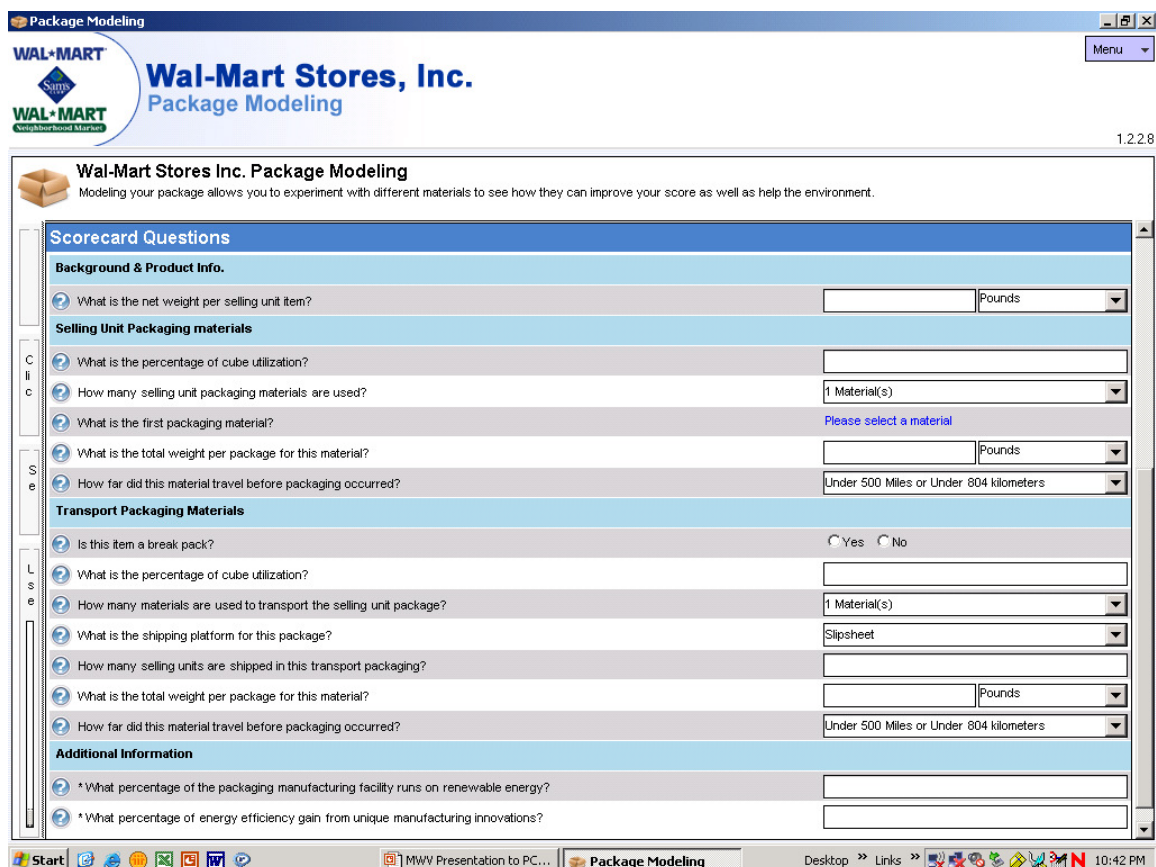


Figure 4-2: Wal-Mart Package Modelling

The scorecard is one of 13 measurement tools introduced to evaluate the performance of suppliers to Wal-Mart. The scorecard was launched to 2,000 private label suppliers in November 2006 and rolled out to over 60,000 global suppliers in February 2007. The intention was for the scorecard to encompass Wal-Mart's entire supply chain in February 2008.

EUROPEN set up a working group to evaluate the Wal-Mart packaging scorecard and commissioned an independent study to analyse its components and evaluate its measurement criteria against European norms. EUROPEN accepts that the packaging scorecard can be a useful business management tool but cautions that it should not be considered as an

environmental evaluation tool, principally because the aggregated result it produces cannot be scientifically validated. Principal concerns are outlined in Appendix E.

S-PAC

The Packaging Association of Canada (PAC) is planning to introduce a sustainability rating tool to be called S-PAC. S-PAC is intended to complement, harmonise with and support the Wal-Mart Packaging Scorecard. The Canadian Council of Ministers of the Environment is reported to have expressed support for the proposal. The PAC is working with an environmental marketing company, TerraChoice, which will offer a validation service.

The Packaging Environmental Indicator - an earlier attempt

In 2003 the European Parliament called upon the European Commission (EC) to consider the idea of a packaging environmental indicator (PEI). A streamlined life-cycle assessment (LCA) would measure the environmental impact of packaging, and a single value would be generated which could be used to favour one type of packaging over another or to inform the consumer.

EUROPEN led the industry lobby against the PEI, arguing that it was:

- Unnecessary, because enforcement of existing regulations would ensure that the political objectives of prevention, minimisation of hazardous substances and recovery of used packaging were addressed;
- Unclear, because there is no scientific justification for combining LCA impact categories to derive a single number. This could only be done by allocating an arbitrary, or at best subjective, weighting to each category, and those weightings would undoubtedly be contested; and
- Impractical, because it would require a comprehensive life cycle inventory of processes and transport involved over the entire life cycle of each type of packaging, a most demanding step in terms of time, data and cost. Data would have to be collected along the entire supply chain for every type of packaging entering the market, and this would be totally disproportionate to any possible environmental benefit. The alternative, using average data, would lead to meaningless and scientifically unjustifiable results when comparing the PEI's of different packaging options.

Dutch consultants carried out a feasibility study on the PEI proposal, examining four product/packaging scenarios and concluded that *“this particular environmental methodology provides no real perspective for fully integrating environmental policy on packaging and products.”*²⁹

In December 2006 the EC published³⁰ its conclusion that a PEI would not be practical:

- If the PEI was limited to sales packaging, the results may not be correct for the total packaging system, since a reduction in sales packaging may be compensated by an increase in transport and grouped packaging to guarantee that the packaged good reaches retail points intact;

- If the PEI was limited to packaging, the results may not be correct with regard to the total packaging-product system. The environmental impact of packaged products is on average ten times higher than that of packaging, so if packaging minimisation results in more damaged products, the overall environmental impact of the packaging-product system might be increased even if the impact of the packaging itself has been reduced;
- For several key parameters, there are no universally valid values or approaches to determine such values. For instance, the source of electricity for packaging production can fundamentally change the results. It would not be correct to assume that all packaging is produced from the same average mix of European electricity production, or to assume that a particular packaging production plant can be associated to a particular power plant or the electricity mix of the country in which it was produced. Similarly, it would not be possible to determine in advance where and to whom the product will be distributed and sold; and
- For big companies with a limited number of products sold in high volumes, a simple standard PEI may be very easy to apply, however the results might not reflect real environmental impacts. As such, more sophisticated tools could be preferable. For small companies or companies with a high number of products sold in small volumes, a simple PEI may be the only feasible approach. However, for many small companies without any experience in environmental assessment, even the use of such a simple tool can constitute a significant burden.

The Commission's report concluded that the potential use of a PEI should be focused on giving guidance and tools to companies using life cycle approaches rather than trying to calculate single conclusive numbers. Such guidance could consist of identifying key parameters, such as greenhouse gas emissions or the amount of waste generated. Also, the development of tailored and simplified life cycle tools should be encouraged.

4.5 Social aspects of packaging

The social aspects of packaging in Australia relate to three key areas: (1) Performance of packaging manufacturers – employment, HR policies, safety, community engagement etc; (2) Performance of the packaging itself – health and nutrition, delivery of product to consumers, lifestyle choices, freedom and flexibility; and (3) End use and disposal of packaging – consumption patterns, littering, reuse etc.

Other social aspects of packaging sustainability have not been compiled in a meaningful way across the packaging supply chain. Aspects worth examining in detail include:

- Occupational health and safety (OH&S) performance;
- Proportion of female employees;
- Community education efforts;
- Community engagement, including use of citizens committees, tours, etc.; and
- Overseas supplier or end use market performance on human rights, including child and forced labour.

Current industry estimates are that the Australian packaging industry employed approximately 20,000 people in 2007. Accurate estimates are difficult given the large number of varying roles in the packaging supply chain, the fact that packaging may represent only part of a business's operations and varying monitoring and reporting regimes. For example, Amcor employs approximately 5,500 people in Australia, while Visy employs around the same number in Australasia. Similarly, Alcoa ARP has more than 800 employed in can sheet production in Victoria and NSW, but only part of total production is in packaging. Accurate employment estimates need to be undertaken to determine employment specific to packaging.

Price-Fixing Cartel

In 2007, it was determined that Visy and Amcor, which together account for 92% of the multi-billion dollar paper/cardboard market, had entered into a price-fixing agreement between 2000 and late 2004 over their share of the cardboard box market. Amcor was granted immunity in exchange for testimony and cooperation with investigating authorities. Visy was fined \$36 million, more than twice the highest penalty previously ordered for cartel conduct, due to the significance of the cartel. Senior executives from both companies lost their jobs over the arrangements.

4.6 Economic aspects of packaging

Total Australian packaging industry turnover was approximately \$10.5 – 11 billion in 2007, representing 1.2% of total Australian GDP. In comparison, packaging manufacturing represented around 0.7% of total UK GDP in 2006³¹.

Again, accurate estimates are difficult as reporting regimes vary. For example, Amcor report \$1.92 - \$2 billion turnover for 2006-07 in Australia, while Visy report sales revenue exceeding \$3 billion turnover for 2005-06 in Australasia.

Other economic aspects of packaging sustainability have not been compiled in a meaningful way across the packaging supply chain. Aspects worth examining in detail include:

- Estimates of avoided product damage and losses due to packaging;
- Indicative investments in capital equipment and infrastructure development;
- Investment in environmental management practices and efficiency improvements;
- Estimates on industry investment in packaging recovery, waste management and litter;
- Value of materials recovered through industry efforts; and
- Multiplier effects of the industry on other aspects of the economy.

Compiling consistent information would enable understanding of whether parameters for sustainable packaging are showing improvement over time in comparison to economic indicators. For example, Figure 4-3 shows how a combination of technological progress (lightweighting and cleaner production), the price mechanism (lightweighting and energy

savings) and legislation (recycling and cleaner production) can generate impressive environmental improvements despite growing prosperity and demand.

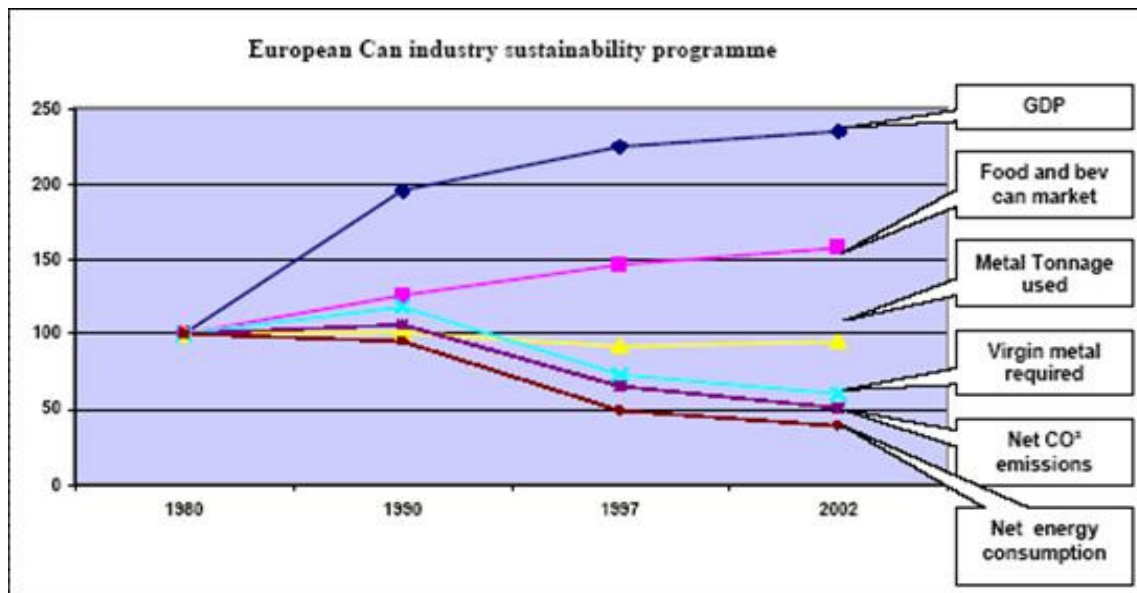


Figure 4-3: European Can Industry - Sustainability Indicators and GDP³²

4.7 Context with other reporting requirements

In addition to standard development and permitting requirements, the Australian packaging supply chain, especially large manufacturers and brand owners, is already subject to a variety of environmental planning and reporting requirements, including:

- Energy Efficiency Opportunity (EEO) Assessments (Clth);
- National Greenhouse and Energy Reporting (NGER) (Clth);
- Environment and Resource Efficiency Plans (EREP) (Vic);
- Water Efficiency Management Plans (WEMP) (Qld); and
- Energy and Water Saving Plans (NSW).

Most regulatory requirements relate to facility size and/or emissions thresholds and therefore their applicability is inconsistent across the supply chain.

In addition, companies participate in the Covenant's KPI reporting framework (Industry Data Aggregation System, or IDAS) and participate to varying extents in sustainability rankings such as the Dow Jones Sustainability World Index and the Carbon Disclosure Project (CDP). Frameworks therefore exist to some extent already for broader sustainability reporting for the industry.

Stakeholders consulted for this report support broader sustainability reporting as a means of demonstrating industry leadership and the extent of industry efforts to the supply chain,

governments and the broader community. However, ability to integrate with, and build upon, existing reporting requirements while avoiding duplication will be essential.

Findings and Recommendations – Defining and Benchmarking Sustainable Packaging

- A number of national and international attempts have been undertaken to define sustainable packaging, virtually all of which have focused on environmental rather than social or economic parameters.
- The Australian packaging manufacturing industry employed approximately 20,000 people in 2007.
- Total Australian packaging manufacturing industry turnover was approximately \$10.5 – 11 billion in 2007, representing 1.2% of total Australian GDP. In comparison, packaging manufacturing represented around 0.7% of total UK GDP in 2006.
- EU environmental law, and to a lesser extent pressure from NGOs and the media, have sharpened up the environmental awareness and performance of European-based brand owners and their packaging suppliers. International packaging and packaged goods companies and beverage container brand owners and suppliers in Australia have also long been targeted and have had to respond. As a result, these companies are in an excellent position to embrace sustainability now that the packaging supply chain is increasingly held accountable for the sustainability of its business practices.
- Stakeholders consulted for this report support broader sustainability reporting as a means of demonstrating industry leadership and the extent of industry efforts to the supply chain, governments and the broader community. However, ability to integrate with, and build upon, existing reporting requirements while avoiding duplication will be essential.
- Various stakeholders point to a wide variety of existing state and Commonwealth requirements for initiating and reporting on energy efficiency and water efficiency efforts.
- NGOs do not generally consider energy efficiency and water efficiency efforts to be demonstrating real industry leadership, as they are a response to rising costs and regulatory influence.
- MS2 and Perchards recommend that the Australian packaging supply chain:
 - Use active stakeholder engagement to build on efforts to date in defining sustainable packaging in an Australian context and establish consensus-based monitoring and reporting frameworks for measuring progress towards sustainable packaging specifically for Australian packaging for designated time periods in annual surveys and public reporting; and
 - Facilitate / develop consistent measurement and reporting frameworks to simplify efforts for members while fostering public reporting.

5.0 National Packaging Covenant

Since 1999, the National Packaging Covenant has been the primary policy instrument for reducing the environmental impacts of packaging in respect to consumer product packaging, household paper and in-store packaging in Australia. The Covenant embodies a life cycle approach across the packaging supply chain intended to reduce the overall environmental impacts of packaging.

Original National Packaging Covenant

The original Covenant was a five-year framework, commencing in 1999. Under the Covenant, company signatories made a series of commitments under an Action Plan and contributed funding to make kerbside recycling more efficient, with the funding amount varying with a company's role in the supply chain and their size. This funding was matched by governments. Governments were also responsible for implementing the regulatory National Environment Protection Measure (NEPM) to avoid 'free-riders'. The NEPM was intended to encourage companies to sign the Covenant by instituting onerous take-back requirements for not signing or complying with the Covenant.

By the end of its tenure, the first Covenant had more than 600 company signatories and had resulted in far greater awareness of packaging-related issues at senior management levels. An independent review of Action Plans found that:

- 68% made a clear effort to deliver against at least some of the objectives;
- Around 20% of Action Plans were good or outstanding;
- 29% showed little understanding or commitment to the process; and
- 2.5% were considered unacceptable.

Therefore, nearly 70% of company signatories to a voluntary process took it seriously.

However, drawbacks of the original Covenant included:

- The Covenant was not necessarily a strong driver for optimising packaging waste management;
- There was little consideration of the ECoPP;
- A significant number of stakeholders, especially local governments, were not engaged in the process and harboured resentment against the Covenant;
- The Covenant failed to provide effective data and feedback in order to reflect its achievements;
- There was so much inherent flexibility for companies that progress could not be measured effectively; and
- NEPM enforcement needed to be more visible and rigorous.

Covenant MkII

Following an extensive review and negotiation process, ‘Covenant MkII’ commenced 15 July 2005 for a five-year period. Substantial differences from the original Covenant included:

- Overarching targets and KPIs;
- Re-prioritisation of funding;
- Strengthening of the ECoPP and greater integration into Covenant processes; and
- Strengthened NEPM and enforcement provisions.

System-wide, overarching targets for 2010 included:

- A recycling rate for packaging of 65%;
- No increased landfilling above the 2003 baseline; and
- A 25% recycling rate for ‘non-recyclable’ packaging.

As of end-2007, the Covenant had over 600 signatories, including companies from across the entire supply chain representing³³:

- A combined annual Australian turnover of \$130 billion;
- Around 90% of the packaging produced in Australia;
- An estimated 80% of packaged retail brands sold (Figure 5-1); and
- All State local government associations except NT & NSW.

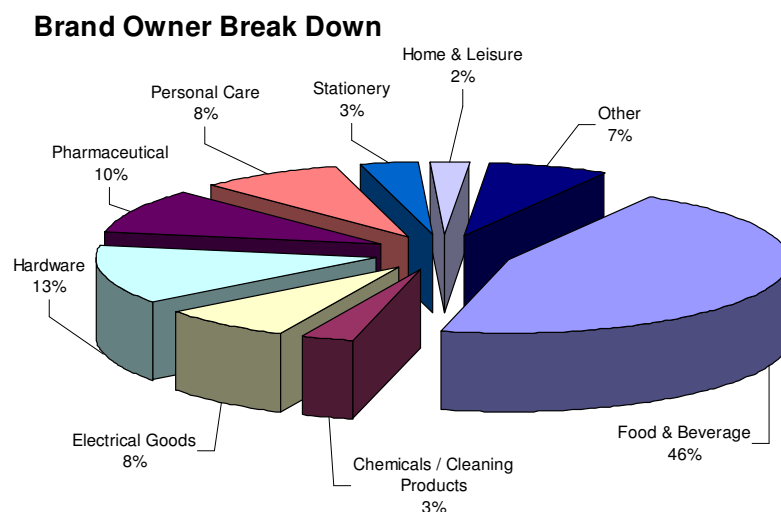


Figure 5-1: Covenant brand owner break down end-2007

Targets and Progress

Indicative contributions to the Covenant’s overall 65% target were established. Table 5-1 provides an overview by material type of 2003 baseline estimates, 2007 interim progress, indicative contributions for 2010 and EU Packaging and Packaging Waste Directive targets for most of the EU-15 from 2008 onwards.

Table 5-1: Targets and progress

Material	National Packaging Covenant				EU Directive
	2003 ‘Baseline’*	Revised FY 2003*	Revised FY 2007*	2010 ‘Contribution’	Targets for 2008 Onward
Paper/ cardboard	64%	49%	65%	70-80%	60%
Glass	35%	28%	46%	50-60%	60%
Steel	44%	36%	38%	60-65%	50% Metals
Aluminium	63%	63%	70%	70-75%	
Plastics	21%	21%	31%	30-35%	22.5%
Overall Recycling Rate	48%	40%	56%	65%	55%-80%

*Source: NPCC. Refer Section 7.1.

The EU has set second-stage targets which are based on bringing the rest of the member states up to the recycling rates of the front-runners. These targets apply to most of the EU-15 countries from 2008, but Greece, Ireland and Portugal were given a 2011 deadline and the 12 new member states have negotiated various deadlines between 2012 and 2015.

There are no plans to increase the EU targets further. They are regarded as the optimum from an environmental, economic and social point of view and, says the Commission,³⁴ “should remain valid well beyond 2008.”

The EU targets are not strictly comparable with Australia’s. The EU bases its recycling rates on the tonnages delivered to a reprocessor, whereas the Covenant defines recycling as the output from a reprocessor. Since everything depends on (1) national sorting standards and (2) the specifications laying down the quality that the recyclers in each country are prepared to accept it is impossible to come up with a formula which would enable the EU targets to be adjusted so they could be benchmarked against Australia’s.

The Covenant’s mid-term review scheduled for end-2008 will report on the performance and effectiveness of the Covenant and progress against targets and goals.

A variety of Covenant signatories are only just realising the true significance of Covenant MkII and the opportunities it provides. Covenant awareness is still absent in certain supply chain sectors, and the broader community has little or no understanding of packaging improvements under the Covenant. While a Covenant communications plan is under development, industry signatories have again squandered the opportunity to make their sustainability efforts under the Covenant known more broadly.

Covenant Funding

During the original Covenant, more than \$19 million of joint funds was provided to local governments across Australia. Introduction of these programs contributed to³⁵:

- A 45% increase in number of councils providing a kerbside service;
- An average increase of 35% in the amount of recyclables collected in the first year of best practice kerbside programs in Victoria and 14% in Queensland;
- A 58% increase in packaging tonnages collected for recycling from 2000/01 to 2005/06; and
- More than 500 tonnes per annum of recyclables recovered from major events.

Funding under Covenant MkII was redirected to include away from home recycling, not just kerbside; and the primary focus placed on glass and paper/cardboard recycling, based on their contribution to achieving the Covenant's 65% packaging recycling rate target. A significant change was also that local government non-signatories can now apply for funding.

As of June 2008, 55 jointly funded projects have been approved under Covenant MkII funding, with a total project value of almost \$90 million and the potential to recover over 600,000 additional tonnes of post-consumer packaging per annum³⁶.

Views on Covenant Effectiveness to date

It is difficult to evaluate the Covenant's effectiveness, and inadvisable to do so prior to the Covenant's mid-term review. However, stakeholders consulted for this report expressed the following views on the Covenant:

- Industry and government stakeholders had generally positive views;
- The packaging supply chain has wasted some of the potential opportunities under the Covenant;
- Some companies are using the extra data collection as a means of driving down costs;
- NGOs feel that the Covenant has utility as a mechanism for contacting and engaging brand owners on product design but say the Covenant is no longer a useful contributor to infrastructure development;
- Signatories need to be consulted about how to take the next step;
- There is a great opportunity for the Covenant to provide good information to consumers, but this is not being done;
- More could be done to help organisations recycle;
- Retailers feel that little capacity and leadership have been shown, as much of the debate has still revolved around plastic bags;
- The Covenant's legislative focus has left little room for innovation;
- Governments, industry and NGOs need to say the same things about the Covenant if they want it to work, as responses are currently fragmented; and
- The Covenant should be expanded more broadly to include sustainability.

Findings and Recommendations – National Packaging Covenant

- The Covenant has given Australia’s packaging supply chain an excellent opportunity to prove that it can effectively manage its own affairs and minimise the environmental impacts of packaging; however, some of this potential has been squandered.
- The majority of stakeholders consulted for this report have been supportive of National Packaging Covenant efforts to date and feel that the additional reporting under Covenant MkII has been useful; however, many feel that people are unaware of industry success stories.
- Waste and recycling have overshadowed the broader sustainability and life-cycle aspects of the Covenant.
- Strong support exists for broader awareness of case studies and the Covenant itself, as the Covenant has not been communicated effectively.
- A more comprehensive approach is now necessary to build on progress to date.
- MS2 and Perchards recommend that the Australian packaging supply chain:
 - Commence discussions about content and structure of a Covenant MkIII in conjunction with an independent stakeholder advisory panel;
 - Continue to try to optimise material recycling rates, which represent the most obvious indicator of sustainability, whilst also addressing other sustainability aspects of the Covenant such as source reduction, energy use, water use, litter and minimising the environmental impacts of packaging across the supply chain;
 - Quantify the amount of packaging avoided through initiatives undertaken as commitments to the Covenant;
 - Update KPIs and IDAS to reflect experience in collecting the data to date and to address broader sustainability KPIs, consistent with the Covenant’s objectives;
 - Develop more consistent data collection and reporting frameworks to more effectively report against Covenant KPIs;
 - Publicly demonstrate successful application of the ECoPP to the packaging decision-making process for new packaging and reviews of existing packaging;
 - Underpin the ECoPP with more robust data to more effectively guide packaging decision-making and make some of the trade-offs in packaging decision-making more transparent;
 - Expand representation on the ECoPP Management Committee to make the committee less industry-dominated and more representative; and
 - Encourage Covenant participation to non-signatories in order to expand coverage.

6.0 Reuse

With the advent of modern distribution and recycling programs, a variety of reuse programs, including many for packaging, have gone by the wayside. Comprehensive data on packaging reuse is not currently available, so this chapter relies upon a variety of case studies. While reuse is likely to be negligible for fast-moving consumer goods (FMCG), various examples of transport packaging reuse are readily available as packaging manufacturers and brand owners respond to supply chain pressures including potential for cost reduction and ECoPP implementation.

Refillable Beverage Containers

Once a controversial example of reuse programs, refillable beverage containers are no longer used in the US and Australia, while their use overseas is often underpinned with legislative requirements or container deposit systems (CDS) to help ensure that the containers are returned for reuse and recovery.

Prior to the widespread use of one-way containers, refillable glass bottles were traditionally used for beer and soft drinks. Due to the cost of the bottles, beer and soft drink manufacturers established voluntary deposits to ensure that the containers were returned for reuse. The deposit amount was based on commercial criteria, such as replacement cost if the product was not returned³⁷. However, over time the social, economic and environmental circumstances under which the previous reuse systems were implemented have changed significantly.

Reusable secondary packaging systems such as plastic trays and crates are increasingly common in the European beverage sector, and a large percentage of the total weight of UK soft drinks packaging is reusable – around 32% in the case of 500 ml PET, 33% for 330 ml cans and 44% for 2 litre PET.³⁸

In order to be economically viable, glass refillable bottles generally require a ‘trippage rate’ of 7-8 round trips, but for the last several decades consumers in Australia did not return the bottles in large enough volumes for refill programs to be economically viable. Thus most refillable beverage containers were withdrawn from the Australian market in the early-90s to mid-90s, with a few limited exceptions. Environmental benefits also relied upon the high trippage rates, but were generally a mixed bag at best (see below).

Refillable containers must be strong enough to withstand repeated trips and washing, thus requiring more material to be used in their manufacture. The washing process consumes considerable quantities of water, which is then contaminated with chemical detergents. One-way glass bottles are generally less than half the weight of refillable bottles designed to hold a comparable amount of product, resulting in significant energy savings for transport and distribution. Especially in Europe, most refillable bottle programs have switched to the use of PET.

Berts Soft Drinks

For almost 40 years, Berts Soft Drinks ran a system of refillable glass bottles in Sutherland Shire, NSW. However, by mid-2006, Berts had shut down its use and was recycling the old refillables.

Despite achieving 10 trips per bottle, the high costs for bottle purchase, recycling, washing and refilling more than offset expected savings from the high trippage rates. Annual bottle replacement costs often ran in the order of \$250,000, due in part to a necessary 'float' of four bottles in the pipeline for every one bottle in a store. The Berts bottle washer cost \$2.5 million and required three people to run, at a cost of \$2,250 per week in 2000 dollars. Energy and water use was also significant, as Berts witnessed more than an eight-fold increase in water consumption during use of the bottle washer from 480 L per hour to over 4,000 L per hour compared to single-fill operation³⁹.



Source: MS2

Transport Packaging

Reusable transport packaging reduces waste at the point of delivery and is increasingly used for business-to-business transactions. It can provide cost and material savings, depending on the distribution system used and ability of the packaging supply chain to collaborate on finding more optimal solutions.



Returnable Plastic Crates

Fibre King and the Coles Group collaborated to develop, manufacture and install automation at five returnable plastic crate (RPC) washing and processing plants around Australia. The project resulted in 39% less energy, 95% less total solid waste and 29% fewer total greenhouse gas emissions than the prior system⁴⁰.

Source: Viscount Plastics

Transport Packaging⁴¹

- Botanical Food Company is the brand owner for the Gourmet Garden brand of fresh herbs and spices in a tube. After adopting the ECoPP, the company negotiated with a major packaging supplier in 2006 to supply packaging in the same sized carton that Botanical Food Company uses for finished goods. This allowed reuse of over 36,000 empty cartons per year, for an annual 18% reduction in total waste.
- The 23L Returnable Enviro Crate from Viscount Plastics lasts several hundred trips and has a life expectancy of seven years or more. Since February 2007, customers have used 20,000 fewer cardboard waste cartons, saved \$60,000 savings in carton purchases and \$20,000 savings in damaged stock. At the end of their service life, Viscount Plastics offer to take back the crates for re-birth or to facilitate recycling.

- Industry sources are agreed that overall, the share of reusable business-to-business packaging is increasing in Europe, but there is no data to quantify this.
- Reusable packaging accounted for 75% of the trips made by commercial and industrial packaging in Belgium in 2004.⁴²

Australia Post WinePak

- Australia Post commissioned the Centre for Design at RMIT University to undertake an LCA of their PP Wine Pak, and to undertake a design review for a more environmentally friendly alternative. The original pack could be used only once and was not recyclable.
- The new cardboard WinePak has 100% recycled content.
- The new Wine Pak has increased product protection, in addition to being re-useable and fully recyclable.



Source: PCA

Findings and Recommendations – Reuse

- Once a controversial example of reuse programs, refillable beverage containers are no longer used in the US and Australia, and their use overseas is rapidly declining even when underpinned by legislation.
- Industry sources are agreed that overall, the share of reusable business-to-business packaging is increasing in Europe, but there is no data to quantify this.
- A variety of reusable transport packaging systems have been introduced in the Australian packaging supply chain, as highlighted in case studies. These systems can yield significant supply chain benefits, but companies should verify this case-by-case.
- MS2 and Perchards recommend that the Australian packaging supply chain:
 - Document the extent of reuse of transport packaging and assess resulting economic and environmental benefits.

7.0 Waste, Recycling and Recyclability

Waste, recycling and recyclability are over-simplistic, yet common and visible, indicators of packaging sustainability.

In a recent international study on sustainability and environmental trends, eight out of ten managers and professionals in the USA, Brazil, Italy and Germany rank waste reduction as a higher priority than other environmental factors such as increasing energy efficiency or developing ‘green’ products⁴³. Australian manufacturers generally have a more balanced view, but recycling and recyclability are still likely to be the principal indicators of packaging sustainability despite the growing prominence of greenhouse gas emissions and water demand.

While this chapter provides a variety of European and New Zealand data for comparison of Australia’s performance, such comparisons should be viewed as indicative only, given the substantial differences in data collection and reporting methodologies. For example, recycling rates in the EU are measured on the basis of the input to the reprocessor, while Australian data generally relates to the output from reproducers. Between each jurisdiction there are also large differences in how individual material types are counted, and even Member States within the EU cannot be reliably compared.

Most comparisons are based on EU-15, the 15 Western European countries in membership of the EU before May 2004. Less data is available on the new countries, and their lower level of economic development would skew the data. Official EU packaging and recycling data includes wood, which is notoriously difficult to measure. On that basis, the recycling rate in 2005 was 57.0%, per capita consumption 183 kg and per capita recycling 104 kg; without wood, the recycling rate was 60.8%, per capita consumption 152 kg and per capita recycling 95 kg.

7.1 Waste and Recycling

Packaging’s Contribution to the Waste Stream⁴⁴

- Packaging accounts for 18% of total household waste in NSW, 25% in the ACT and 28% in SA.
- Packaging represents 8% of the commercial and industrial waste stream in SA and 22% in NSW.

Australia

The NPCC has estimated the Australian packaging recycling rate at 56% for 2007, up from 40% in 2003. Data by material type for 2007 is provided in Table 7-1. Comparison of overall parameters against 2003 performance is provided in Table 7-2. Local sources account for a reported 92% of packaging.

Table 7-1: Summary Australian Performance Data 2007

Material Type	Total Consumption t/yr	Total Recycling t/yr	Recycling Rate %	Kg / Capita Consumption	Kg / Capita Recycling
Paper/Cardboard	2,639,000	1,720,000	65%	124	81
Glass Packaging	893,031	410,700	46%	42	19
Plastics Packaging	585,296	178,351	31%	27	8
Steel cans	92,399	34,760	38%	4	2
Aluminium beverage cans	48,791	34,300	70%	2	2
Total	4,258,517	2,378,111	56%	199	111

Source for consumption and recycling figures: NPCC

Table 7-2: Comparison of Australian Data 2003 and 2007

Parameter	2003	2007	Units	% change
Total Consumption	4,113,034	4,258,517	t/yr	3.5%
Total Recycling	1,642,288	2,378,111	t/yr	44.8%
Overall Recycling Rate	40%	56%	%	40%
kg per capita consumption	207	199	kg per capita	-3.9%
kg per capita recycling	83	111	kg per capita	33.7%

Source for consumption and recycling figures: NPCC

Tables 7-1 and 7-2 reflect NPCC revisions of earlier estimates of Australian packaging recycling rates that followed significant debate about packaging recycling rates. The revised data is based on applying consistent methodologies to historic data and more narrowly defining packaging consumption and recycling for paper/cardboard and glass packaging than in the past. Figure 7-1 provides summary figures by material type and compares revised recycling rates against the 2003 estimates which were used as a 'baseline' for establishing the NPC's overall recycling rate target of 65% by 2010.

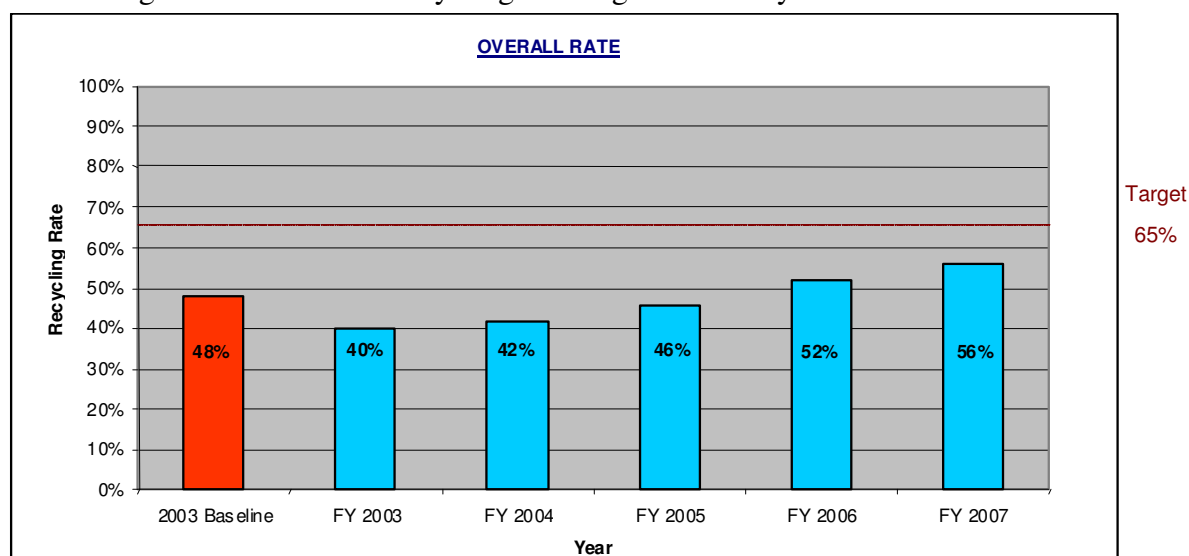


Figure 7-1: Packaging Recycling Rates FY 2003 to FY 2007 and 2003 'Baseline'

When the 2003 'baseline' estimates were compiled, the assumptions made and limitations of the data were made clear, but the figures were ultimately used in the absence of anything more robust, thus highlighting the problematic nature of using limited, inconsistent data approaches. To help address such concerns, the NPCC has agreed the revised figures are to be independently reviewed and a 'level of confidence' rating applied.

Australia's progress toward the NPC's 65% target is even more significant given the lower than expected actual baseline for 2003.

Australia's packaging recycling in 2007 delivered an indicative annual net benefit⁴⁵ equal to 6.6 million m³ of landfill space saved; 1.5 million tonnes CO₂-equivalent saved; 357,000 cars removed from roads; and 19,331 Olympic pools worth of water savings (Table 7-3). Negative water savings values for HDPE and PET result from the relative water intensities of the recycling processes involved.

Table 7-3: Indicative Environmental Benefits for Australian Packaging Recycling 2007

Material Type	Amounts Recycled	Landfill	Greenhouse Benefits	Cars Permanently Removed from Roads	Water Savings	Water Savings Olympic Swimming Pools
		Space Saved				
	t/yr	1,000 m ³	1,000 t CO ₂ eq/yr	1,000 cars	ML	
Paper/ Cardboard	1,720,000	5,558	688	165	40,764	16,308
Glass	410,700	738	144	35	821	329
Aluminium	34,300	29	520	125	7,999	3,200
Steel cans	34,760	99	28	7	38	15
HDPE	67,524	129	33	8	-702	-281
PET	49,630	95	75	18	-601	-240
Total	2,316,914	6,649	1,488	357	48,320	19,331

Based on IDAS reporting under the Covenant, 88% of all packaging sold into the Australian market is recyclable and 12% is 'non-recyclable' as defined under the Covenant (Plastic grades 4-7 and certain types of paper packaging).

Indicative Environmental Benefits of Recycling – Visy Industries

The transparency of Visy Industries' reporting under the Covenant reporting system allows greater understanding and ease of comparisons. Applying Visy's recycling tonnages for Australia, New Zealand and south-east Asia to the same environmental benefits calculator used for the NPCC data shows the following benefits.

Indicative Environmental Benefits for 2005-06 Packaging Recycling for Visy Industries

Material Type	Amount Recycled	Landfill Space Saved	Greenhouse Benefits	Cars Permanently Removed from Roads	Water Savings	Water Savings
	t/yr	1,000 m ³	1,000 t CO _{2-eq} /yr	1,000 cars	ML	Olympic Swimming Pools
Paper/ Cardboard	1,550,000	5,009	620	149	36,735	14,696
Glass	375,000	674	131	32	750	300
Aluminium	3,500	3	53	13	816	327
Steel cans	13,000	37	10	2	14	6
HDPE	11,000	21	5	1	-114	-46
PET	28,000	54	42	10	-339	-136
LPB	1,700	5	0	0	16	7
Total	1,982,200	5,802	862	207	37,879	15,154

These benefits are compared against Visy's greenhouse gas emissions and energy and water consumption for Australia and New Zealand in the table below for 2005-06.

Parameter	Required ⁴⁶	Benefits of Recycling
Greenhouse gas emissions (t CO _{2-eq} /yr)	1,238,000	862,000
Water (kL)	5,432,000	37,878,620
Total Energy (GJ)	13,987,000	32,264,240

These comparisons should be taken as indicative only, since the Benefits of Recycling Calculator was intended to apply to recycling through kerbside recycling programs. Additional research would be necessary to develop and apply assumptions for commercial recycling, especially for paper/cardboard.

Totals may not equal due to rounding.

Fleet use excludes New Zealand.

Indicative Environmental Benefits of Recycling – Amcor

Applying Amcor's recycling tonnages for Australia only for 2005-06 to the same environmental benefits calculator shows the following benefits.

Indicative Environmental Benefits for 2005-06 Packaging Recycling for Amcor

Material Type	Amount Recycled	Landfill Space Saved	Greenhouse Benefits	Cars Permanently Removed from Roads	Water Savings	Water Savings
	t/yr	1,000 m ³	1,000 t CO ₂ eq/yr	1,000 cars	ML	Olympic Swimming Pools
Paper/ Cardboard	572,000	1,848	229	55	13,556	5,423
Glass	45,000	81	16	4	90	36
Total	617,000	1,929	245	59	13,646	5,459

These benefits are compared against Amcor's greenhouse gas emissions and energy and water consumption for the same facilities and time period in the table below for 2005-06.

Parameter	Required	Benefits of Recycling
Greenhouse gas emissions (t CO ₂ -eq/yr)	418,249	245,000
Water (kL)	704,153	13,646,400
Total Energy (GJ)	2,872,393	10,467,000

These comparisons should be taken as indicative only, since the Benefits of Recycling Calculator was intended to apply to recycling through kerbside recycling programs. Additional research would be necessary to develop and apply assumptions for commercial recycling, especially for paper/cardboard given the large proportion of industrial fibre packaging included in Amcor's recycling figures.

Totals may not equal due to rounding.

New Zealand

In comparison to Australia, while packaging consumption is lower under New Zealand's Packaging Accord (just over 160 kg per capita) (Table 7-4), recovery is also lower (just over 80 kg per capita) than Australia's rates (Table 7-1). The net result is that New Zealand's packaging recycling rate of 57% in 2006 is roughly comparable to Australia's.

Table 7-4: Summary New Zealand Performance Data for 2006⁴⁷

Material Type	Produced (t)	Consumed (t)	Recovered (t)	Recovery %	Accord Target
Paper	492,300	336,500	256,200	76%	70%
Glass	128,110	208,240	256,200	53%	55%
Aluminium	7,895	6,270	109,860	62%	65%
Plastics	136,079	156,359	3,900	22%	23%
Steel	44,765	21,340	34,891	57%	43%
Total	809,149	728,709	417,096	57%	

“Our recycling rate slightly higher than Australia’s and for some packaging types such as paperboard, we are amongst the world leaders for recycling. What is more, recovery is now consistently outpacing the amount of packaging waste per capita to landfill.”

Paul Curtis, Executive Director, Packaging Council of New Zealand⁴⁸

New Zealand consumption, recovery and landfill rates over time are shown in Figure 7-2. Recovery rates by material type over time are shown in Figure 7-3.

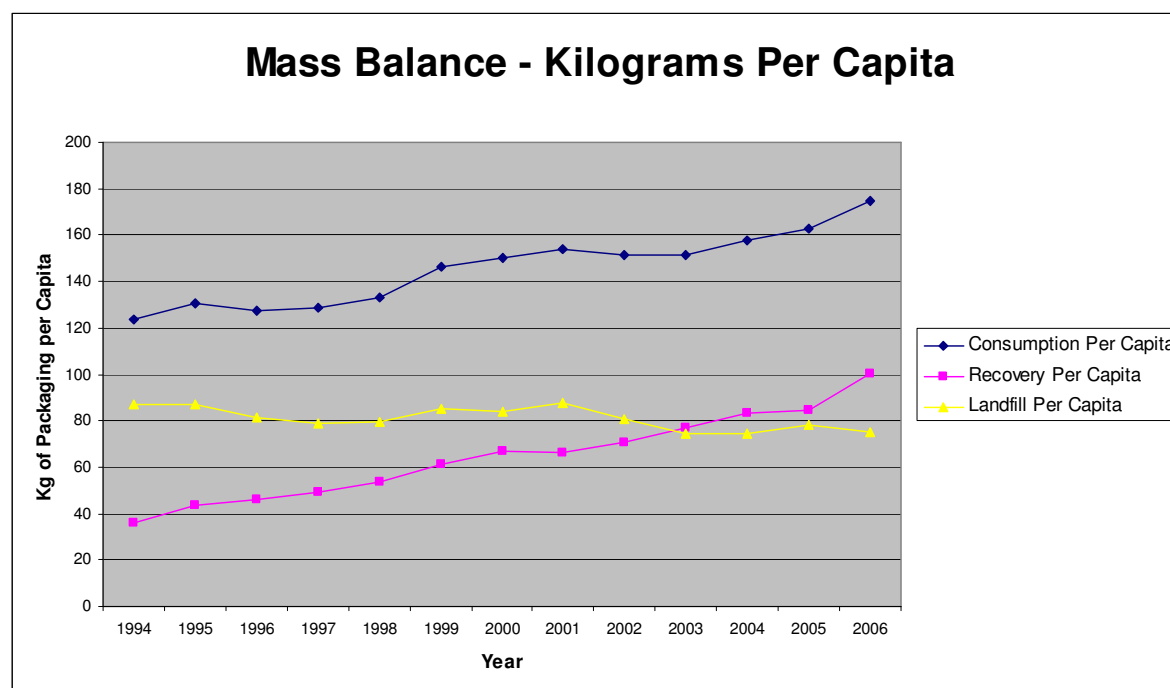


Figure 7-2: New Zealand Packaging Consumption, Recovery and Landfill Rates 1994-2006

This level of detail is not reliably available for Australian packaging on an aggregated basis. Some trends over time could be determined for aluminium and paper due to consistent methodologies. Several datasets are available for plastics and steel, however they too have had their methodologies refined over time, which can make comparison difficult.

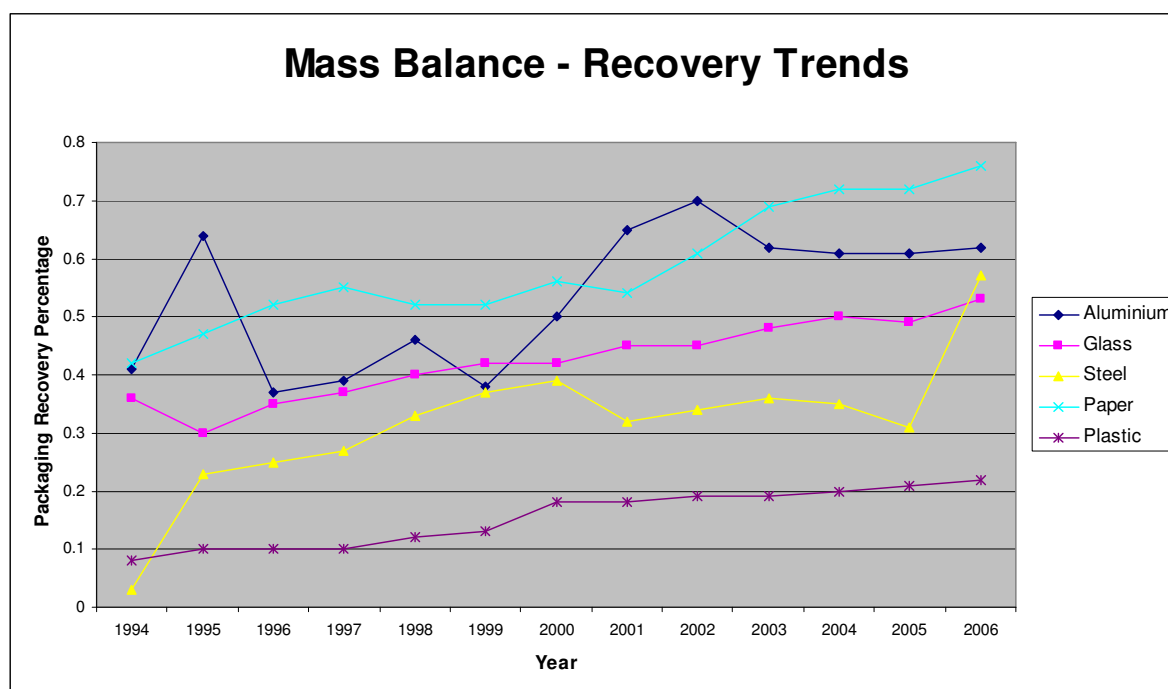


Figure 7-3: New Zealand Packaging Recovery Trends by Material Type 1994-2006

EU-15

EU-15 data for 2005 (Table 7-5) shows lower per capita consumption rates closer to New Zealand's figures than Australia's, and higher recycling rates for paper/cardboard and glass packaging than in Australia.

Table 7-5: Summary EU-15 Performance Data for 2005

Material Type	Total Consumption t/yr	Total Recycling t/yr	Recycling Rate %	kg per capita consumption	kg per capita recycling
Paper/Cardboard	27,654,406	20,781,372	74.9%	71	54
Glass Packaging	14,517,106	9,117,272	62.8%	37	24
Plastics Packaging	12,364,314	3,150,510	24.7%	32	8
Metal Packaging	4,390,566	2,793,041	63.6%	11	7
Total	58,926,392	35,842,195	60.8%	152	95

A comparison of 2003 and 2005 data for the EU-15 is provided in Table 7-6. Available official recycling rates for the EU member states are shown in Appendix G. This shows that recycling in the front-running member states are reaching a plateau as diminishing returns set in. The second-stage targets established in 2004 are intended to bring the rest of the EU up to the rates already being achieved by the five front-runners, as studies have indicated that these are the optimum from an environmental, economic and social point of view.⁴⁹

Table 7-6: Comparison of 2003 and 2005 EU-15 Data

Parameter	2003	2005	Units	% change
Total Consumption	57,825,802	58,926,392	t/yr	1.9%
Total Recycling	32,528,663	35,842,195	t/yr	10.2%
Overall Recycling Rate	56.3%	60.8%	%	8.0%
kg per capita consumption	151	152	kg per capita	0.7%
kg per capita recycling	85	95	kg per capita	11.8%

Australia and EU-15 comparisons for aluminium and steel

Australia 2005-06⁵⁰

Material Type	Total Consumption t/yr	Total Recycling t/yr	Recycling Rate %	Kg / Capita Consumption	Kg / Capita Recycling
Steel cans	92,399	34,760	37.6%	5	2
Aluminium beverage cans	50,210	35,800	71.3%	2	2

It is not compulsory for EU member states to report aluminium and steel recycling rates separately, but six countries do publish separate data:

EU-15⁵¹

Aluminium	Total Consumption t/yr	Total Recycling t/yr	Recycling Rate %	Kg / Capita Consumption	Kg / Capita Recycling
France	53,734	20,791	38.7%	0.9	0.3
Germany	83,500	63,600	76.2%	1.0	0.8
Greece	25,000	8,000	32.0%	2.3	0.7
Italy	68,800	33,100	48.1%	1.2	0.6
Sweden	25,963	15,906	61.3%	2.9	1.8
UK	141,500	39,956	28.2%	2.4	0.7

EU-15⁵²

Steel	Total Consumption t/yr	Total Recycling t/yr	Recycling Rate %	Kg / Capita Consumption	Kg / Capita Recycling
France	631,455	368,133	58.3%	10.1	5.9
Germany	814,700	695,300	85.3%	9.9	8.4
Greece	102,500	40,000	39.0%	9.2	3.6
Italy	565,000	356,000	63.0%	9.7	6.1
Sweden	47,400	30,800	65.0%	5.3	3.4
UK	686,005	352,358	51.4%	11.4	5.9

In 1997 Germany's recycling rate for plastics was 61%, by far the highest in Europe. Second was Austria, at 39%. The excessive cost and dubious environmental benefits of recycling

mixed and often food-contaminated mixed plastics has caused a rethink in Germany, which by 2005 was recycling just 39% of its plastic packaging. Second was Belgium, just one percentage point behind – but Belgium recycles only rigid plastics, which enables consumers to be given a clear and simple message and ensures that only high-value material which will readily find a market is collected for reprocessing.

Impacts of container deposits on recycling rates

Advocates of container deposits often argue that only states with container deposit systems have high rates of container collection and recycling. Figure 7-4, which shows EU recycling rates in 2005, demonstrates that countries with parallel systems, deposits for beverage containers and kerbside and bring systems for other packaging, achieve lower recycling rates than comparable countries without CDL.

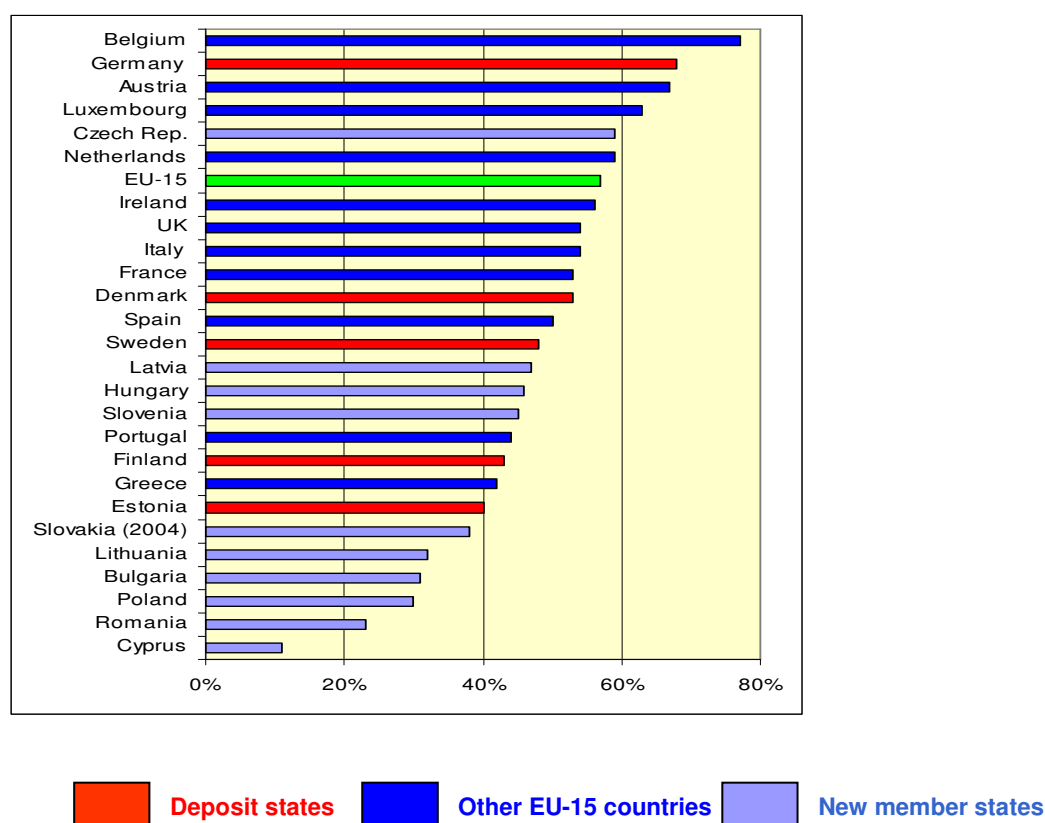


Figure 7-4: Container deposits and European recycling rates 2005

Of the five EU ‘deposit states’, only Germany exceeded the average recycling rate in the EU-15 countries in 2005. Germany has the second highest recycling rate in Europe but not because of the deposit law. Germany’s recycling rate⁵³ has continued its downward trend after an upward blip in 2002 (Figure 7-5). This decline has been principally due to the failed opening up of the household packaging waste management system to competition. The producer responsibility organisation DSD was set up by industry in 1990 to fund household

packaging waste management, using the on-pack Green Dot logo to indicate participation in the system. Competition authorities gradually eroded DSD's monopoly in a way that allowed free-riding to increase, and price-competition between DSD and its competitors brought about a cutback in the expensive and environmentally-dubious collection and recycling of mixed and often food-contaminated flexible plastics. Meanwhile, beverage containers are collected in a parallel system, and it is up to individual operators whether they send the returned containers for recycling or not.

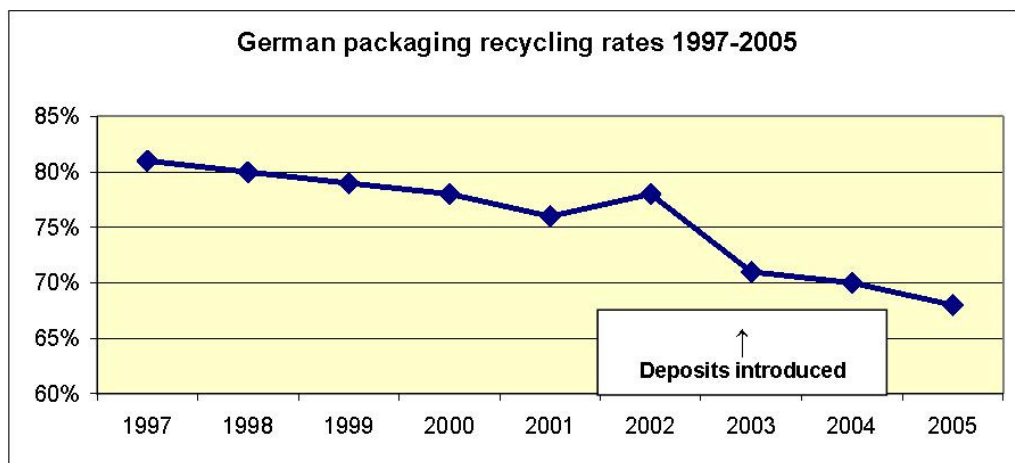


Figure 7-5: Declining German packaging recycling rates 1997-2005

When mandatory deposits are superimposed onto an existing collection system, they do not help achieve higher recycling rates because they just divert some recyclable containers from multi-material kerbside collection to a parallel system. As a result, the collection of non-beverage packaging loses not only critical mass but also the material with the highest scrap value. This usually leads to some cutting back, including a reduction in the range of packaging collected, withdrawal of a separate collection service from small or isolated communities, or both.

Figures 7-6 to 7-8⁵⁴ compare the 2005 recycling rates for glass, metal and plastic packaging in the four Western European deposit states Denmark, Finland, Germany and Sweden and three non-deposit states with a strong recycling culture. They demonstrate that there is no evidence that mandatory deposits alone result in a high recycling rate for the materials most used for beverage packaging.

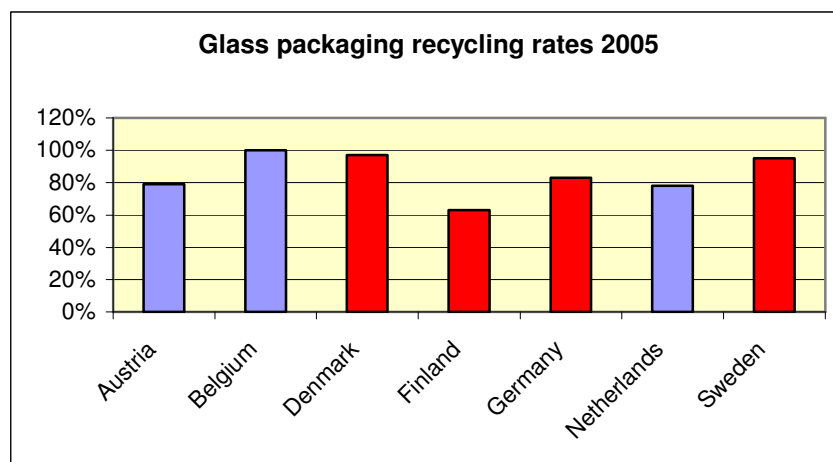


Figure 7-6: Glass packaging recycling in EU deposit states (red) and non-deposit states (blue) 2005

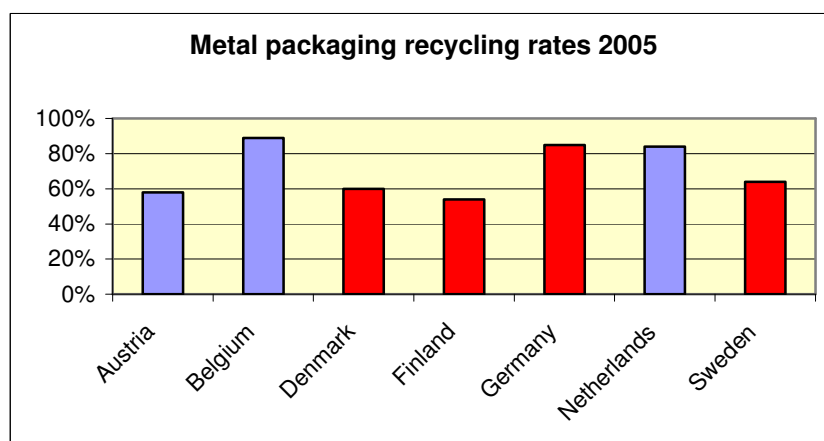


Figure 7-7: Metal packaging recycling in EU deposit states (red) and non-deposit states (blue) 2005

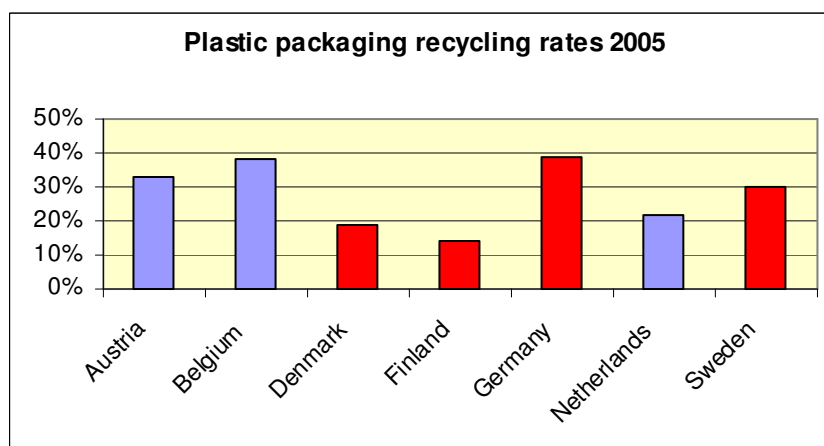


Figure 7-8: Plastic packaging recycling in EU deposit states (red) and non-deposit states (blue) 2005

In 2004, the average estimated beverage container return rate in the US was 72% in the 10 deposit states and 28% in the 40 non-deposit states. However, US estimates are highly unreliable – some states have claimed a 90% or 95% return rate every year they have reported, while some have reported recycling rates greater than 100% at various times. It is probable that in reality return rates in the best-performing states average around 75%-80%.

It is impossible to measure US states' return rates accurately because there is no reporting requirement and because most containers are marked with the abbreviations of all the deposit states and the deposit rates, rather than being specific to each jurisdiction as in Europe. Thus, cross-state recovery is not tracked.

Figure 7-9 compares return rates in US, Canadian, Australian and Nordic deposit states.⁵⁵

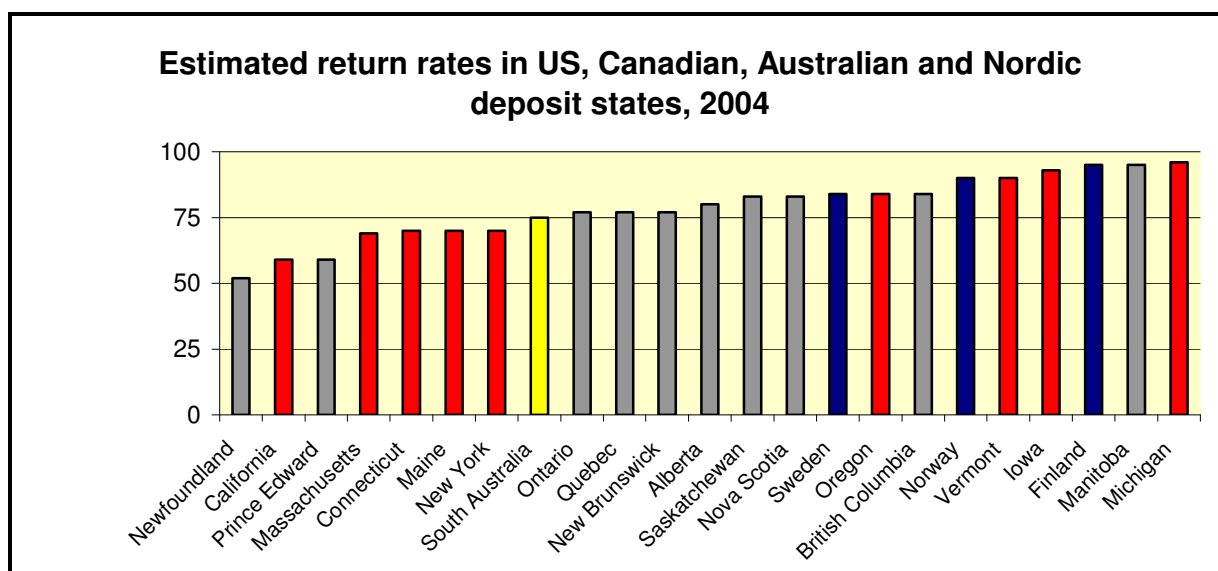


Figure 7-9: Estimated return rates in deposit states 2004

Criticisms of Recycling Rates

Some NGOs feel that current packaging recycling rates represent poor performance while others believe that Australia has reached the limit of what current collection and recycling systems can achieve. Various governments consulted feel that with kerbside recycling, consumers can feel they're doing their part for the environment, without thinking about consumption.

Most stakeholders consulted for this report feel that the packaging supply chain needs to do more to increase recycling rates for packaging and that the Covenant is at risk of being replaced by more discriminatory regulatory approaches such as CDL or broader packaging taxes. This is attributed to the emphasis on achievement of the Covenant's 65% packaging recycling rate target and the ongoing debate about how to accurately account for packaging recycling activity.

Stakeholders, particularly packaging industry stakeholders, were decidedly split on where industry's efforts are best placed over the next few years. While many expressed the view that recycling rate is only one of many sustainability indicators for packaging that should be considered and that broader sustainability efforts should be pursued, many others expressed the view that recycling rate will continue to remain the most prominent indicator for sustainability and broader sustainability efforts would not be taken seriously if recycling rates are perceived as being too low. These divergent views have implications for proposed industry priorities.

7.2 Recyclability

Under the Covenant, 'recyclable' packaging is reasonably able to be recovered in Australia through collection or drop-off systems and can be reprocessed and used as a raw material for the manufacture of a new product, while 'non-recyclable' packaging is defined as plastics 4-7 and certain grades of paper. The NPCC estimated that 88% of all packaging sold in the Australian market was classified as recyclable in 2005-06 while 12% was 'non-recyclable'⁵⁶.

Recyclability in the Packaging Supply Chain

- Over 98% of Foster's Group packaging material is recyclable and over 98% of packaging material contains recycled content.⁵⁷
- Highlights from other Packaging Stewardship Forum members include⁵⁸:
 - 97.2% of Lion Nathan's packaging materials are recyclable;
 - 99.97% of packaging materials are recyclable for Golden Circle; and
 - 98.57% of packaging materials are recyclable for Original Juice Company.

One of the Covenant's overarching targets is to raise the recycling rate for 'non-recyclable' packaging to 25% by 2010. Plastics 4-7, which accounted for 71% of the 'non-recyclable' packaging in 2005-06⁵⁹, achieved a recycling rate of 24.1% in 2006⁶⁰.

Several brandowners consulted for this report feel that the Covenant's definitions are too general and that industry has not been given clear guidance on the 'recyclable' and 'non-recyclable' classifications. They also point to the fact that the circumstances for plastics 4-7 have changed significantly since the Covenant was negotiated. In particular, PP and PS recycling opportunities have increased significantly under the Covenant and local governments increasingly collect all plastics in their kerbside recycling programs.

Cadbury Schweppes - Influence of other market forces and trade-offs⁶¹

- The post-consumer recycled (PCR) content in Cadbury Schweppes' packaging manufactured decreased from 36% in 2004-05 to 34% in 2005-06, due in part to a lack of recycled materials as a result of export pressures.
- Cadbury Schweppes undertook trials in early 2006 with 10% PCR in 600ml Gatorade bottles, becoming the first hot fill PET bottle in Australia to be using mono blend PCR into the consumer bottle.
- The level of PCR was increased in 600ml Gatorade bottles to 20% in late 2006.

Findings and Recommendations – Waste, Recycling and Recyclability

- The National Packaging Covenant Council has estimated the Australian packaging recycling rate at 56% for 2007, up from 40% in 2003.
- From 2003 to 2007, total packaging consumption increased 3.5% while total packaging recycling increased 44.8%.
- Australia's progress toward the National Packaging Covenant's 65% recycling rate by 2010 target is even more significant given the lower than expected actual baseline for 2003.
- The EU is now concentrating on bringing recycling rates in the rest of the member states up to the rates long achieved by the five front-runners. Experience has shown no value in pushing recycling beyond a certain point, so the goal is now to optimise recycling for resource-efficiency rather than maximise recycling rates for their own sake. EU member states are now required to aim for an overall recycling rate of between 55% and 80%. Having regard to the different ways that recycling rates are calculated in the EU and in Australia, this has implications for future targets here.
- Comparisons of deposit and non-deposit states demonstrate that there is no evidence that mandatory deposits alone result in a high recycling rate for the materials most used for beverage packaging. Deposits may lead to higher collections of beverage containers, but the overall effect is not positive because of the knock-on effects on the viability of collecting non-beverage packaging for recycling
- Australian packaging recycling in 2007 delivered an indicative annual net benefit equal to 6.6 million m³ of landfill space saved; 1.5 million tonnes CO₂-equivalent saved; 357,000 cars removed from roads; and 19,331 Olympic pools worth of water savings.
- When environmental benefits of recycling are considered, two large companies that both manufacture and recycle packaging, Amcor and Visy, yield net savings in energy and water consumption.
- MS2 and Perchards recommend that the Australian packaging supply chain:
 - Continue to try to optimise material recycling rates, an obvious indicator of sustainability, whilst also addressing other sustainability aspects of the Covenant such as source reduction, energy use, water use, litter rates and minimising the environmental impacts of packaging across the supply chain. Given embodied energy and savings in greenhouse gases from recycling, increasing recycling is an obvious way to reduce carbon exposure for most packaging materials. However, recycling should not be the only indicator of sustainability; and
 - Study the evidence gathered in Europe alongside Australian LCAs before decisions are made on future Australian recycling targets.

8.0 Energy and Greenhouse Gases

Energy costs typically make up around 15% of the input costs for packaging manufacturers, so energy efficiency is good business practice and has been an area of focus for the industry for many years. A variety of energy markets are coming off 10 year power contracts, and power cost increases in the order of 40-50% are anticipated (without even considering some form of carbon tax or impost under an ETS). Increased public awareness of the significant impacts of climate change due to greenhouse gas (GhG) emissions has created broader awareness about reducing GhG emissions.

The Carbon Disclosure Project (CDP) is the world's largest collaboration of institutional investors. It is supported by 250 institutional investors with assets of US\$ 40 trillion. It represents an efficient process whereby many institutional investors collectively sign a single global request for disclosure of information on GhG emissions and around 1000 large organisations report through the website.

The Association of Chartered Certified Accountants (ACCA) and the FTSE Group have conducted an analysis of the current state of climate change reporting among leading UK companies.⁶² They surveyed ten high-impact sectors and twelve medium-impact sectors (food and beverage production, paper, trucking and waste and waste disposal services being listed among the sectors that have a medium impact on climate change).

80% of these companies included in their reports a policy or statement on climate change. Of these, 86% disclosed trend data relating to carbon emissions, 80% reported absolute data and 73% normalised data, albeit in inconsistent formats. More than half the companies opted for independent verification of the data.

57% disclosed short or medium term targets relating to carbon emissions. Others may have internal targets, but, says ACCA, it is publicly-announced targets that demonstrate a vision for the company and give readers confidence that there is a structured management system in place to manage impacts.

Companies increasingly understand the need to reduce their risks from exposure to carbon pricing and to reduce, or at least offset, their GhG emissions (though offsetting is controversial and may be of limited value). It is increasingly important to ensure that efficiencies are in place before facing increased energy costs and a variety of stakeholders consulted anticipate commercial advantages from proactive approaches to energy and carbon. However significant confusion about measurement and reporting remains.

Recently, the Australian Industry Group (Ai Group) completed the largest survey of environmental practices by Australian industry (810 companies with revenues of \$41 billion and employing over 56,000 people), in conjunction with Sustainability Victoria⁶³. Findings include:

- 78% believe they had a responsibility to contribute to a reduction in carbon emissions, even if it adds some costs to the business;
- 56% saw opportunities from climate change to promote their company as socially responsible and to improve energy efficiency and lower costs;
- 45% are undecided as to whether climate change is a net loss, gain or neutral for their business;
- Only one in ten companies knew the volume of GhGs emitted by their firm, due primarily to uncertainties about emissions from energy sources;
- Electricity is the largest resource consumed in the production process (relative to gas, water and fuel), and 45% of firms identified managing electricity usage as their most critical priority;
- Around 15% of firms have initiated changes that have contributed to savings in electricity usage in 2005/6, with savings equal to 5.8% of electricity costs;
- Around 40% of companies had taken one or more actions to lower GhG emissions, a figure rising to 70% among large firms; and
- Only 1% of firms used 'green' power sources and around 2% generated their own onsite electricity.

At this stage, it is unclear what comparable results would be for the packaging industry.

8.1 Energy

The four major packaging companies providing confidential information for this report (Amcor, Carter Holt Harvey, Huhtamaki and Visy) account for virtually all paper and cardboard manufacturing in Australia, with Carter Holt Harvey importing from New Zealand. MS2 further estimated greenhouse gas consumption for O-I using publicly available data and workbooks⁶⁴. Together, these companies account for all domestic paper/cardboard and glass production in Australia and also for significant volumes of aluminium, plastic and other materials. As such, they are likely to account for the bulk of energy consumption in the Australian packaging industry. In 2005-06, these users consumed just over 21.8 million GJ of energy. Given current reporting frameworks, a comparable figure for total Australian energy consumption in GJ to place this figure in context is not available. The Commonwealth NGER system currently being implemented should provide additional information.

CEPI, the Confederation of European Paper Industries, reports that 49.5% of primary energy consumed in its members' pulp and paper mills originates from biomass (the target is 56% by 2010). More than 93% of the electricity produced on-site is generated through CHP technology, which allows some 30%-35% energy savings.⁶⁵

8.2 Greenhouse emissions

Australia's per capita emissions of the six GhGs carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) are of the same order of magnitude as those of the US and are well above European levels. Whereas US and EU-15 per capita emission levels have generally been improving, Australia's have not.

During 2005, total Australian net GhG emissions were 525.4 million tonnes of carbon dioxide equivalent (Mt CO₂-e). Net emissions and their sources are provided in Table 8-1⁶⁶. Comparison with EU-15 data is provided in Table 8-2.

Table 8-1: Australia's Net Greenhouse Emissions 1990 - 2005

	Emissions (Mt CO ₂ -e)		% Change in Emissions	% of Total Emissions
	1990	2005	1990-2005	2005
Energy	287.0	391.0	36.3	74%
Stationary Energy	196.0	279.4	42.6	53%
Transport	61.9	80.4	29.9	15%
Fugitive emissions	29.1	31.2	7.3	6%
Industrial Processes	25.3	29.5	16.5	6%
Agriculture	87.7	87.9	0.2	17%
Waste	18.3	17.0	-6.9	3%
Australia's Net Emissions (excl. Land Use, Land Use Change & Forestry)	418.3	525.4	25.6	100%

Source: United Nations Framework Convention on Climate Change (UNFCCC) Secretariat
Land Use, Land Use Change & Forestry (LULUCF) has been excluded for comparison with international data.
Data is compared with 1990, the baseline for comparisons under the Kyoto Protocol.

Estimates prepared for this report indicate that in 2005-06, domestic packaging manufacturing generated around 3.7 Mt CO₂-e, or less than 0.7% of total Australian GhG emissions. Although consistent methodologies are available for determining GhG emissions, their application can still vary and complicate meaningful comparisons. For example, both Visy and Amcor have used the Commonwealth AGO Workbook⁶⁷ to calculate their GhG emissions. However, Visy applied the AGO Workbook to determine transport fossil fuel use, while Amcor and others have not; other discretionary variables complicate comparisons of what would appear to be comparable datasets.

Table 8-2: EU-15 Net Greenhouse Emissions 1990 - 2005

	Emissions (Mt CO ₂ -e)		% Change in Emissions 1990-2005	% of Total Emissions 2005
	1990	2005		
Energy	3262.7	3357.3	2.9	80%
Stationary Energy	2466.3	2423.2	-1.7	58%
Transport	700.3	879.7	25.6	21%
Fugitive emissions	96.1	54.5	-43.2	1%
Industrial Processes	375.0	331.9	-11.5	8%
Agriculture	434.3	386.3	-11.1	9%
Waste	175.6	109.1	-37.9	3%
EU-15 Net Emissions (excl. Land Use, Land Use Change & Forestry)	4257.8	4192.6	-1.5	100%

Source: UNFCCC Secretariat

Greenhouse gas emissions attributable to packaging consumption in the EU-15 were estimated to be around 80 million tonnes of CO₂ equivalent per annum⁶⁸, or around 2% of total GhG emissions. Per capita GhG emissions were estimated to be 216 kg CO₂-equivalent per annum from packaging. What is unknown is whether the GhG savings from reduced food spoilage due to packaging would amount to more or less than 2% of total emissions. In other words, is packaging a net contributor to GhG emissions or does it reduce them?

Compared to a scenario where all packaging waste is sent to landfill or incinerated without energy recovery, packaging waste recycling and recovery (i.e., recycling and energy recovery) was estimated to save around 25 million tonnes of CO₂ equivalent and save around 10 million tonnes of oil equivalent. This represented around 0.6% of total EU-15 greenhouse gas emissions in 2002.

Figure 8-1 compares Australia's per capita GhG emissions with those of New Zealand, the EU-15 and the US, and also with two European countries with a warm climate and rising emissions and with one de-industrialising European country where emissions have fallen rapidly. These data may perhaps show Europe in a better light than it deserves, as Europe's increasing reliance on imported raw materials and indeed manufactured goods will tend to reduce local GhG emissions.

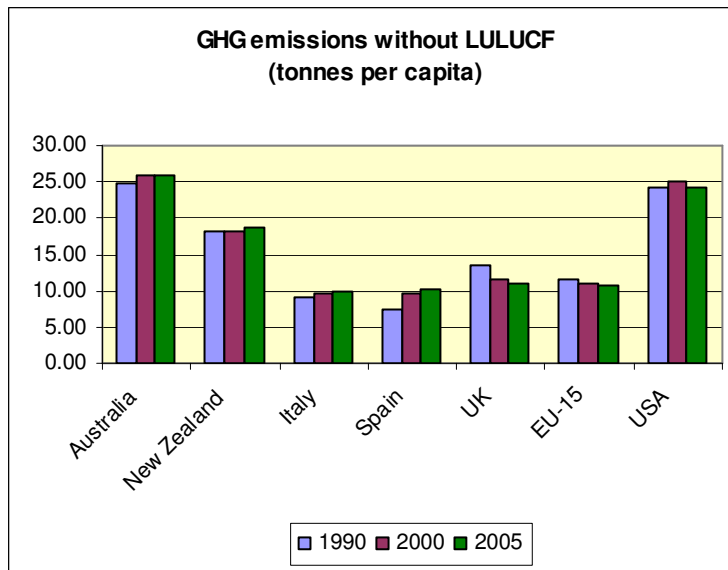


Figure 8-1: per capita GhG emissions (CO₂equivalent) for selected countries and regions

In absolute terms Australia has outperformed the EU-15 in reducing its per capita GhG emissions from waste (Figure 8-2). Australia has reduced emissions by 250 kg per capita and the EU-15 by 200 kg per capita between 1990 and 2005. However, Europe has reduced GhG emissions from a much lower base, and so has achieved a reduction of 38% against Australia's 7%. New Zealand started from a similar level to the US, but has reduced its GhG emissions from waste much more rapidly.

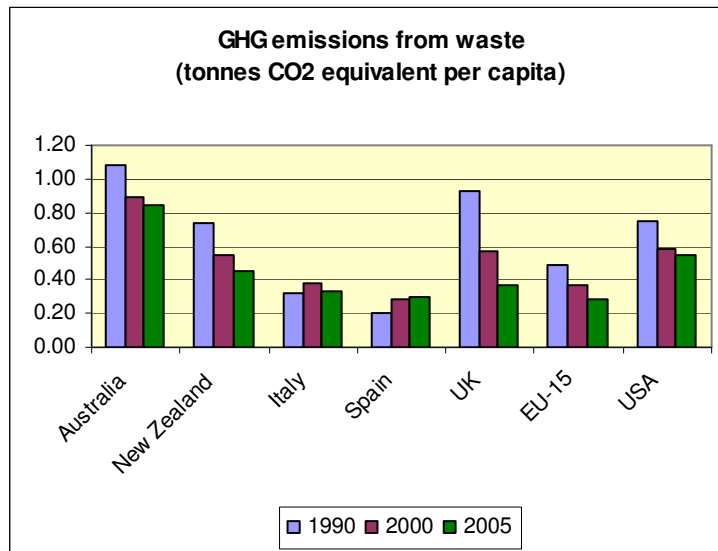


Figure 8-2: Per capita GhG emissions from waste (CO₂-equivalent) for selected countries and regions

“Visy completed another lifecycle analysis on the greenhouse gas emissions through its paper supply chain. That is, all emissions and abatement from waste paper collection to paper production to corrugated box production. This has found that Visy has further reduced its emissions per tonne of production. Visy achieves significant methane avoidance by diverting paper from landfill and recycling it and Visy actually reduces greenhouse gases by almost half a tonne for every tonne of boxes it produces.”

Visy Industries⁶⁹

Solid waste disposal on land is responsible for most of the GhG emissions in the waste sector; a rising proportion in Australia and Spain, but a declining proportion in the other countries and regions examined (Figure 8-3). Emissions are predominantly derived from methane, a GhG more than 20 times as damaging as CO₂ in respect of climate change. Methane is emitted from paper and food and garden wastes as they decompose in landfill.

In the UK, even though some 78% of methane emissions from landfill are now captured and used for electricity generation or flared, landfill emissions still account for a fifth of all UK methane emissions and just over 1% of UK GhG emissions. Emissions from home composting and poorly run composting operations may also contribute significant amounts of methane to atmosphere.⁷⁰

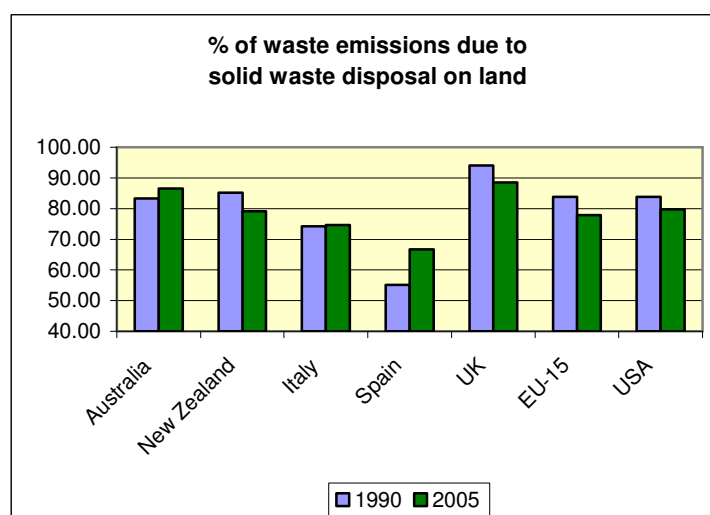


Figure 8-3: Waste emissions due to solid waste disposal on land

A 2001 study for the European Commission⁷¹ indicated that the principal processes leading to GhG emissions from municipal solid waste (MSW) management operations are emissions of methane from the landfilling of biodegradable wastes; emissions of fossil-derived CO₂ from the fuel used for collecting, transporting and processing wastes; emissions of halogenated compounds with high global warming potentials used as refrigerants and insulating foam in refrigerators and freezers. To be weighed against this are avoidance of emissions that would have been produced by other processes. As an example, recycling avoids the emissions associated with producing materials recovered from the waste from primary resources.

The study concluded that the composting / anaerobic digestion of putrescible wastes and recycling of paper produce the overall greatest reduction in net flux of GhGs. Diversion of putrescible wastes or paper to composting or recycling from landfills operated to EU-average gas management standards decreases the net GhG flux by about 260 to 470 kg CO₂ equivalent per tonne of MSW, depending on whether or not carbon sequestration is included.

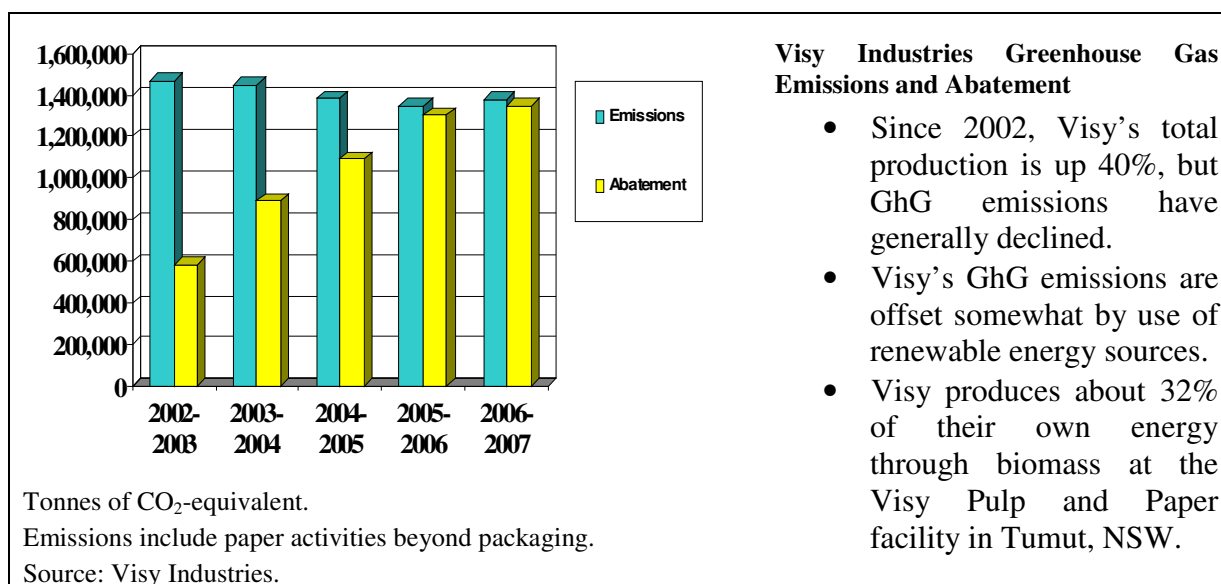
However, the advantages of paper recycling and composting over landfilling depend on the efficiency with which landfill gas emissions are controlled; the higher the landfill standard, the less the benefits of recycling. Thus, when best-practice gas control is in place, net GhG savings from recycling and composting range from about 50 to 280 kg CO₂ equivalent per tonne of MSW. If landfills further reduce methane emissions with a restoration layer to enhance methane oxidation, then recycling and composting incur a small net penalty, increasing net greenhouse gas fluxes to about 20-30 kg CO₂ equivalent per tonne of MSW if carbon sequestration is taken into account, and a net flux saving of about 50 (putrescibles) to 200 (paper) kg CO₂ equivalent per tonne of MSW if it is not.

The report warns that this apparent advantage of high-quality landfilling over paper recycling relates only to GhG fluxes. Issues of resource use efficiency and avoided impacts from papermaking from virgin pulp must be considered as part of an overall assessment of the options. These factors would almost certainly point to recycling and composting in preference to any form of landfill disposal for these waste components, the authors say.

For glass, plastics, steel and aluminium, the report concludes that recycling offers overall net GhG flux savings of between about 30 (for glass) and 95 (for aluminium) kg CO₂ equivalent per tonne of MSW, compared with landfilling untreated waste. For these materials, the benefits are essentially independent of landfill standards and carbon sequestration. Thus for these materials the environmental benefit of collecting for recycling stands or falls on whether the impact of the process of collection, transporting and cleaning is less than the impact of disposing of the materials and using new ones.

“Will carbon push us into a new paradigm or not?”

Diana Gibson, Manager - Sustainable Products and Services, Sustainability Victoria



"If landfill diversion was factored in, we'd probably be carbon positive."

Nick Harford, General Manager, Environment, Visy Industries

8.3 Carbon footprint and carbon labelling

In Australia, as elsewhere, waste and recycling have accounted for most of the 'sustainability' efforts to date, with some limited exceptions. However, with climate change top of the environmental agenda, carbon footprinting is coming to the fore together with carbon labelling, the upshot being that consumers can make more informed purchasing decisions.

A carbon footprint is defined as the total amount of carbon dioxide and other greenhouse gases emitted over the full life cycle of a product, operation or service. However, within the packaging industry key players are at vastly different levels of understanding how carbon footprint can be accurately determined and those trying to do so are using a variety of different measures.

Stakeholders consulted for this report agree almost unanimously that the packaging industry needs to address carbon accounting, and this suggests that industry should be facilitating or developing consistent measurement and reporting frameworks. Greater consistency in understanding and applying specific AGO workbook calculations would be especially useful.

However, there are three key questions:

- Will it be possible to collect and analyse the data in a way which will give a reasonably reliable indication of carbon footprint?
- Is carbon footprint the right proxy for overall environmental impact?

- Can the results be boiled down into a single value which can be used to make easy comparisons?

Collecting and analysing the data

The European Commission's Joint Research Centre (JRC) points out⁷² that a carbon footprint is a life cycle assessment with the analysis limited to emissions that have an effect on climate change. Suitable background data sources for the footprint are therefore available in existing LCA databases. However, others have noted⁷³ that the carbon footprint calculation is all too often limited to the production phase, with little or no account taken of the subsequent use and disposal phases. It also neglects contextual effects. For example, many people believe fewer goods should be packaged, on the grounds that, by not using packaging, a certain 'footprint' is saved. However if as a result of eliminating packaging the goods perish, then all the environmental impact of producing and transporting them will have been for nothing and the small environmental benefit gained by eliminating packaging will have been more than outweighed by the loss of the goods.

Thus carbon footprinting is likely to generate all the usual arguments about LCA data, particularly whether system boundaries have been set correctly, and whether apples have been weighted fairly against pears.

Is carbon footprinting the right proxy for overall environmental impact?

The JRC warns that if procurement decisions or product improvements are exclusively supported by carbon footprint data, important environmental impacts will be neglected and the result may be no more than a shifting of environmental burdens.

"Thus if organisations are now developing carbon footprint data, then it makes sense to evaluate also relevant non-greenhouse gas emissions (e.g. NO_x, particles, SO₂) along the product supply chain or full life cycle. The in-house effort is only slightly higher and same background data sources will be used."

European Commission Joint Research Centre⁷⁴

Decisions about packaging involve finding a balance between the functional benefits of different materials, cost, end-of-life treatment, and a whole host of other factors. With relatively little extra effort and cost, and using much of the same data, a more complete LCA method could be used, resulting in a measure of environmental impact that is fairer, more comprehensive and more transparent.

Despite some concerns, carbon footprinting is a better measure of packaging sustainability than recyclability and recycling rates, which have been popularly regarded as the principal indicators of environmental virtue up to now, but it is best used as a way of measuring progress (using consistent data) than as a way of making comparisons between companies or products (as data are unlikely to be comparable).

Is carbon labelling feasible or desirable?

Data availability will improve over time, but concerns about system boundaries and relative weightings remain. Narrowing down the focus to a single item in the product range for labelling purposes will be even more problematic. The results of such measurements will be so specific to the product in question, to the plant where it is produced, to the location of the points of production and use and to the time when the measurements were taken, that it is questionable whether it will ever be possible to boil the results down to a single meaningful number which can be displayed on the pack. For example, the same packet of potato crisps could have different carbon ratings according to the time of year when the potatoes were harvested and processed. In any case, carbon labelling would be misleading, since focusing only on the CO₂ impact of a product would distract attention from factors such as the amount of water required or waste generated, nutritional value and convenience.

Cadbury Schweppes has established a target of 50% reduction in net carbon emissions by 2020 that is not tied to production; it is a full cap.

working with
the Carbon Trust



Carbon Trust Carbon Labelling Pilot Project

- The Carbon Trust launched a carbon labelling pilot project in the UK in April 2007. The label shows how many grams of CO₂ had been emitted from the sourcing of raw materials through the manufacturing processes, to transporting the products to stores.
- Ten leading companies have agreed to take part,
- For their products to carry the carbon reduction label, companies have to undertake a comprehensive carbon audit of the supply chains, and commit to further CO₂ reductions over a two-year period.

Tesco has announced that once it has developed a suitable measuring system, it will be labelling all its products so that consumers can compare 'carbon costs'. Within five years, it will halve the CO₂ used in its distribution network per case delivered, and by 2020 it will halve the emissions produced by its stores and distribution centres. All food air freighted will be specially labelled, and the proportion of goods flown in by air will be reduced from 2%-3% to 1%. It will start by using the Carbon Trust's methodology to measure the carbon footprint of 30 own-brand products in the following categories – tomatoes, potatoes, orange juice, light bulbs and washing detergent.

In January 2008 FECD, which represents 93% of French hypermarkets and more than 80% of the supermarkets, signed a commitment to promote sales of environmentally friendly goods, increase recycling rates and lower carbon emissions from supermarkets. The retailers will launch a study to assess the carbon emissions of around 300 key shopping basket items. The results will be communicated to consumers through on-pack labelling from 2010.

Some European retailers seem to be going cool on carbon labelling. A number of retailers took part on a debate about carbon labels for individual products at a Sustainable Energy Week event in Brussels in January 2008. Marks & Spencer think consumers aren't ready for this. Alliance Boots has experimented with carbon labels, but is now moving more slowly, as customers had not shown much interest. The French chain Carrefour agreed only a minority of customers look at carbon labels, they are prone to inaccuracies, they are not necessarily the cheapest way to reduce emissions, and they can overlook other environmental impacts.

The general message from the debate was that it would be better for retailers to offer lower-impact products and use labels to show consumers how they can change their behaviour to help the environment. Speakers from DEFRA and WWF agreed.

Carbon Footprint Framework

- At a sectoral level, the Confederation of European Paper Industries has already developed a Carbon Footprint Framework for paper and board products. This is intended to allow clear numbers to be generated so that paper buyers can understand the carbon footprint of each product. CITPA (the International Confederation of Paper and Board Converters in Europe) is working on complementary guidelines.
- The starting point for the framework is that if forests are managed sustainably, trees are renewable and recycle carbon from the atmosphere resulting in a neutral effect as regards the amount of atmospheric CO₂. Thus the carbon footprint of a fibre product may be seen as a balance sheet of greenhouse gas emissions and removals (transfers to and from the atmosphere).
- The framework looks at direct and indirect emissions, carbon sequestration in forests and in products, the value of bio-energy and the concept of avoided emissions and proposes a common approach to deal with them.

International standards and guidelines on carbon footprinting have not yet been developed, but the EU Environment Commissioner has suggested that an EU carbon label might be one option for the EU's Sustainable Consumption and Production programme. If carbon labelling is going to take off, he says, it would make sense to have one system for the entire EU single market. Meanwhile, in the UK, the Carbon Trust and DEFRA are leading work on a specification setting out a methodology to measure the embodied greenhouse gas emissions in products and services.

Stakeholders consulted for this report had a variety of concerns on carbon footprinting and carbon labelling, including:

- Reliable standards and guidelines are not in place.
- 'We can reduce our emissions but still have a big impact.'
- Carbon footprinting is difficult where multiple products are manufactured across multiple sites and until carbon footprint can be calculated down to the SKU, report by brand is impossible.
- 'If a competitor has a worse carbon footprint, where's our incentive to improve?'
- Most carbon footprint assessments stop at delivery to retail and ignore subsequent impacts.

- Carbon footprinting may penalise fibre-based products for landfill-based methane emissions, while not recognising forest and imbedded carbon sequestration.
- Consistent guidance is needed on how to measure; companies want to do and need to do, but the boundaries are too loose.
- It is difficult to show carbon footprinting just for packaging or for individual packaging, but stakeholders strongly supported assessing the carbon footprint for the packaging industry as a whole.

Findings and Recommendations – Energy and Greenhouse Gases

- Energy consumption for domestic packaging in 2005-06 is estimated in the order of 21.8 million GJ of energy.
- In 2005-06, domestic packaging manufacturing generated around 3.7 Mt CO₂-e, or less than 0.7% of total Australian greenhouse gas emissions.
- Packaging is responsible for around 2% of total greenhouse gas emissions in the 15 countries in membership of the EU in 2001.
- What is unknown is whether the greenhouse gas savings from reduced food spoilage due to packaging would amount to more or less than total emissions.
- Carbon footprint is a better proxy for total environmental impact than waste avoidance, but the results will not be clear and precise enough to be translated into a single value for on-pack labelling.
- MS2 and Perchards recommend that the Australian packaging supply chain⁷⁵:
 - Assist in developing standardised methods for calculating and reporting energy use, greenhouse gas emissions and other sustainability indicators to help address identified gaps in public reporting and IDAS data entry. Such methods should seek to build on existing state and Commonwealth reporting requirements to provide greater consistency and minimise duplication;
 - Strongly resist carbon labelling. The Carbon Trust has said that "the really important part of the scheme is the commitment from the companies that they are doing what they can to cut their emissions"- which suggests that like conventional LCA, carbon footprint measurement is best seen as a way of helping companies benchmark their own progress rather than as a means of comparison;
 - Support public policies that promote accelerated depreciation rates so that companies can invest in energy- and carbon-intensity improvements; and
 - Assist in creating public policies and carbon crediting schemes that recognise all activities that accomplish real and verifiable reductions in atmospheric greenhouse gases.

9.0 Water

Despite the significance of water supply in Australia and attention to drought, in stakeholder consultations, water rated a distant second mention to recycling rates as an issue. This could be due to either the relatively low cost of water or because stakeholders have already taken steps to reduce their water consumption. Another possibility is that perhaps people don't really think of water as an issue when they think of packaging.

The Ai Group's survey of environmental practices shows:⁷⁶

- Water is the smallest input (relative to electricity and gas) to production costs in manufacturing and construction;
- Water as a percentage of sales averaged 0.15%;
- Just under one in two companies indicated that their water reduction activities were driven by an obligation to the community to lower water usage; and
- While just under 26% of companies had changed their water use, most changes related to domestic use of water in kitchens and toilets, with little or no water savings resulting.

At this stage, it is unclear what comparable results would be for the packaging industry.

In addition to (admitted slight) water supply savings, reducing the quantity of water used means less effluent needs to be treated and disposed of. Effluent from manufacturing sites can be heavily loaded with organic material as measured by biochemical oxygen demand (BOD) and chemical oxygen demand (COD).

During 2004-05, the most recent period for which reliable data is available, total Australian water consumption was 18,767 GL, a 14% decrease from 2000-01. The agriculture industry represented 65% of total consumption (12,191 GL), while households accounted for 11% (2,108 GL).⁷⁷

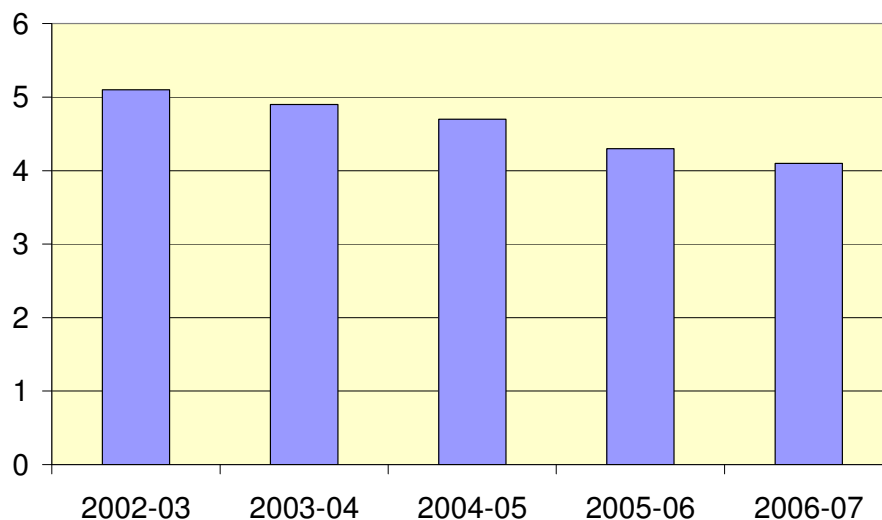
The four major packaging companies providing confidential information for this report (Amcor, Carter Holt Harvey, Huhtamaki and Visy) account for virtually all paper and cardboard manufacturing in Australia, with Carter Holt Harvey importing from New Zealand. MS2 further estimated water consumption for O-I using publicly available data⁷⁸. These companies account for all domestic paper/cardboard and glass production in Australia and also for significant volumes of aluminium, plastic and other materials. As such, they are likely to account for the bulk of water consumption in the Australian packaging industry. In 2005-06, these users consumed just over 7.2 million kL, or 7.2 GL, of water, just under 0.04% of total Australian water consumption.

Visy's Water Usage⁷⁹

- Visy Pulp & Paper accounts for 86% of Visy Industries' total water usage.
- Benchmarking shows Visy Pulp & Paper consistently at or better than world's best practice:
 - In 2006-2007, Visy Pulp & Paper averaged 4,210 litres per tonne of paper produced;
 - In Australia the paper industry standard is 26,000 litres per tonne produced and internationally it is 20,000 litres; and
 - Similar packaging paper producers achieve about 16,000 litres per tonne produced.
- Over the last four years Visy has reduced its total fresh water use 11%.
- In 2006-2007 Visy is using 636,000,000 litres less per year than it was in 2003-2004.
- In total Visy uses about 5.3 billion litres of water a year.

Fresh Water Consumption – Visy Industries⁸⁰

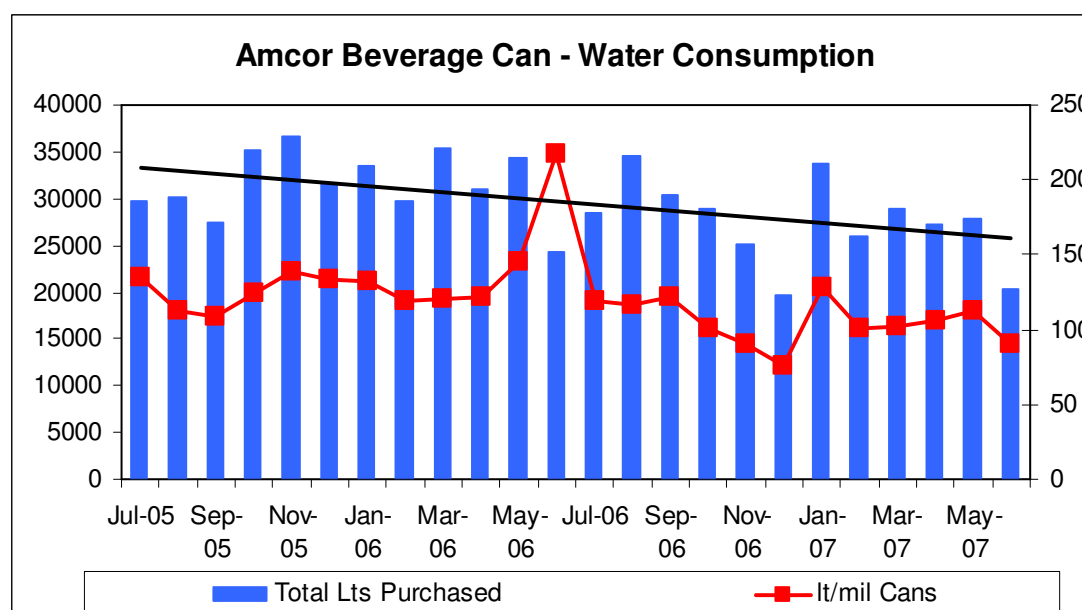
Fresh Water (ML)	2003-04	2004-05	2005-06	2006-07
National	5,955	5,803	5,510	5,318
VIC	2,100	2,497	2,522	2,370
NSW	2,398	2,234	2,036	2,084
QLD	863	777	747	730
SA	59.8	59.4	42.9	44.5
WA	43.8	43.3	27.2	29.4



Visy Pulp & Paper water use (kL) per tonne paper production⁸¹

Water Efficiency – Amcor’s Beverage Can Division

Through installation of water meters, new water nozzles and other improvements, from 2005-06 to 2006-07, Amcor’s Beverage Can Division reduced water consumption from 380,000 KL to 330,000 KL, despite increasing can production from 2.9 billion cans to 3.1 billion cans. The overall efficiency improvement was a reduction in 27KL/million cans produced or a 23% efficiency improvement.



Amcor Water Usage

- Amcor Cartons at Zillmere has reduced its water usage by 83% over the three-year period ending June 2007.
- At Amcor’s Botany Mill, \$13.5 million was invested in a new boiler project that uses the latest reverse osmosis technology to treat bore water in the steam generating process, which will enable the site to reduce use of potable water by over 50%.
- Amcor Fibre Packaging at Rocklea uses approximately 40ML/yr of potable water for making starch and washing down equipment. The plant is investigating processes that would reduce its potable water usage by 90%.
- Amcor Beverage Cans at Rocklea currently uses around 80ML/year of potable water and is at world best practice for water efficiency when benchmarked against other can manufacturers. They are now investigating the use of an ultra filtration and reverse osmosis system to clean up their waste water so that it can be re-used in the can washing process. This would reduce the plant’s potable water usage by 70%.

Amcor's Petrie Mill

Australia's only cartonboard manufacturer, Amcor's Petrie Mill, is located in the northern metropolitan area of Brisbane, which along with the rest of Southeast Queensland is currently experiencing critical water supply shortages and Stage 6 water restrictions.

The Petrie Mill produces around 140,000 tonnes of cartonboard each year and is among the top 10 water users in the Brisbane catchment area, using around 4 ML per day. The Mill has been working on water reduction projects since 2005, resulting in a 32% reduction in the use of potable water over the last two years. Water saving initiatives include increased use of water recycling through the water treatment ponds and eliminating town water for cooling.

There are now plans in place to take recycled water from the Pine Rivers waste water treatment plant through a reverse osmosis process by October 2008. The mill will then become drought proof and free up enough potable water to supply more than 35,000 people.



Source: Modified from Amcor Australasia photo

Findings and Recommendations – Water

- Water consumption for domestic packaging is estimated in the order of 7.2 million kL of water, or 7.2 GL, representing just under 0.04% of total Australian water consumption in 2005-06. In comparison, agriculture and household use represent 65% and 11%, respectively.
- MS2 and Perchards recommend that the Australian packaging supply chain:
 - Incorporate water consumption and water intensity for designated product categories in improved data collection and reporting frameworks.

10.0 National Pollutant Inventory Emissions

Australia's National Pollutant Inventory (NPI) is an Internet database for public reporting of emissions and transfers of 93 toxic substances to air, land and water from industrial facilities and other sources. According to the Commonwealth, the objectives of the NPI are to:

- Help industry and government with environmental planning and management;
- Give the community up to date information about pollutant emissions from industrial facilities; and
- Promote waste minimisation, cleaner production, and energy and resource efficiency.

Industrial facilities using certain amounts of the 93 NPI substances must report their emissions to their State or Territory environment agency, which conducts a completeness review and forwards the data to the Australian Government. Reporting guidelines are used to help ensure consistency.

MS2 reviewed the NPI database for 2005-06 data for individual facilities involved in packaging manufacturing and converting, using the Australian and New Zealand Standard Industrial Classification (ANZSIC) classes. Results of the NPI review and the top five NPI pollutants reported by facility are detailed in Appendix F. It should be noted that emissions from listed facilities may result from activities related to products other than packaging.

Pollutants reported by facilities under the NPI are compared against the maximum emissions of that substance from all reporting facilities, on a scale from 1 (lowest) to 100 (highest). The 56 packaging manufacturing and converting facilities identified in the NPI review reported a total of 24 different NPI pollutants. All facilities were ranked as low for each substance reported, except for O-I's Adelaide glass plant, which scored 100 for organo-tin compounds; this means the plant was the highest facility emitter for that substance across the NPI database. Virtually all other substances were ranked 1, the lowest such ranking.

Table 10-1 summarises the NPI review by packaging material type, with the number of packaging facilities reporting each substance. The most frequently reported substances were (in decreasing order):

- Oxides of Nitrogen;
- Total Volatile Organic Compounds;
- Particulate Matter 10.0um;
- Carbon Monoxide; and
- Polycyclic Aromatic Hydrocarbons.

Aperio Group has set a target of 75% reduction within five years for the amount of VOC-containing liquid waste disposed of per 1000m of plastic film produced through reducing the number of incompatible ink systems used in production and investigating further use of water based inks.

Table 10-1: NPI Reporting by Packaging Material Type and in Decreasing Incidence 2005-06

Pollutant	Packaging Manufacturing & Converting Facilities Reporting Pollutants Under NPI by Packaging Material Type			
	Paper (23 reporting)	Plastic (5 reporting)	Glass (5 reporting)	Metal (23 reporting)
Oxides of Nitrogen (NO _x)	21	3	5	9
Total Volatile Organic Compounds (VOCs)	19	5	2	9
Particulate Matter 10.0um (PM ₁₀)	19	3	4	6
Carbon Monoxide (CO)	19	3		7
Polycyclic Aromatic Hydrocarbons (PAH)	16	3		6
Cadmium & Compounds	5		1	
Hydrochloric acid	2		4	
Flouride Compounds	2		1	1
Magnesium Oxide fume	1		1	2
Chromium (VI) Compounds	1			2
Sulphur Dioxide	2			1
Xylenes (individual or mixed isomers)				3
Chlorine	1			1
Chromium (III) Compounds			2	
Formaldehyde (methyl aldehyde)	1			1
Lead & Compounds	1		1	
Nickel & Compounds	1		1	
Organo-Tin Compounds			2	
Toluene (methylbenzene)				2
Acetaldehyde	1			
Ethanol		1		
Hydrogen Sulfide	1			
Selenium & Compounds			1	
Tetrachloroethylene	1			

Findings and Recommendations – National Pollutant Inventory

- The 56 packaging manufacturing and converting facilities identified in the NPI review reported a total of 24 different NPI pollutants.
- All facilities were ranked as low for each substance reported, except for O-I's Adelaide glass plant, which scored 100 for organo-tin compounds; this means the plant was the highest facility emitter for that substance across the NPI database.
- Virtually all other substances were ranked 1, the lowest such ranking.
- MS2 and Perchards recommend that for future sustainability reports, the Australian packaging supply chain continue reporting NPI emissions, observe changes over time and provide some background about the chemicals and their usage.

11.0 Litter

Packaging's visibility, existence in the litter stream and contribution to perceptions of a 'throw-away society' have long led to calls to ban or otherwise regulate packaging, particularly for beverage containers.

Incidence of Litter

Current litter data in Australia is indicative at best. No nationally consistent litter measurement methodology is available, despite the Covenant requiring a count and a behavioural measure; no funding for such an approach appears likely as jurisdictions are generally heading in different directions on litter. Extrapolating such variable information to make claims about the overall level of litter in the environment is methodologically unsound.

In the absence of a national methodology, Keep Australia Beautiful (KAB) has obtained federal funding to resume its National Litter Index (NLI). Of the 'Dirty Dozen' top littered items reported by the NLI, six are packaging related (Table 11-1).

Table 11-1: 'Dirty Dozen' Top Littered Items 2005-06

Cigarette butts	Other paper (including tissues)	Snack bags and confectionary wrappers
All other plastic	Metal bottle tops and can ring pulls	Plastic bottle tops
Straws	Cigarette packs	Cups/take away containers (paper)
Other foil	Lollipop sticks	Take away containers and cups (plastic)

Indicative Incidence of Packaging Litter - Europe

- In the summer of 2003, the waste department of the city of Vienna and the Austrian Green Dot organisation ARA commissioned an analysis and comparison of the incidence of litter in Barcelona, Brussels, Frankfurt/Main, Prague and Vienna.⁸² In each city, typical areas – a central square, a busy shopping mall, a park near the city centre, and a major train station – were chosen and observed on four consecutive days. The proportion of packaging in litter averaged 6%. By far the largest fraction consisted of cigarette ends, organic waste and non-packaging litter.
- Ireland's Litter Monitoring Body found in 2006 that packaging litter accounted for 12.76% of litter pollution by item count.

Stakeholders consulted for this report have raised some concerns pertaining to the accuracy of the NLI. Such stakeholders are concerned that the presence of small items such as cigarette butts, bottle tops and broken glass are overstated in the litter stream due to cleaning crews not picking them up and the possibility that such items could therefore be counted in duplicate.

Despite this prominence, litter has consistently been overlooked under the Covenant, due in large part to the emphasis on achieving the Covenant's 65% packaging recycling rate target. Litter management is viewed as far more expensive than other approaches to cost-effectively deliver the target, and recovered littered items are generally not recycled.

As the Covenant is the leading instrument for managing the environmental impacts of consumer packaging including litter, the Covenant is less useful for demonstrating leadership if litter is consistently overlooked. The concern is that brand owners are not taking, and are not actively encouraged to take, a level of responsibility commensurate with the prevalence of their packaging in the litter stream and are hiding behind the Covenant or promoting degradable products to avoid littering responsibility.

That said, it has to be recognised that litter is a complex issue, involving not only personal values, but also non-value issues such as poor management – material that blows out of lorries; litter blown out of an uncovered rubbish bin during a windy day; and communities that don't regularly empty their bins. Brand owners and packaging companies have very little influence over these elements or over personal values.

There are major methodological issues with litter measurement. Numerous litter surveys have been undertaken in recent years, but how the outcomes are reported depends very much on the measurement methodologies used. For instance:

- Counting the area of ground covered by litter of a particular type is a good indicator of visual impact, but a poor guide to consumer behaviour;
- Counting the number of items littered is a good indicator of public behaviour, but a poor guide to visual impact – cigarette butts are over-represented, and large items such as discarded shopping trolleys or bedsteads are seriously under-represented; and
- How should items that have separated or partly disintegrated be counted? If a newspaper has blown away in several different directions, is it one item or several? It is unlikely to be practicable to reassemble scattered components of one piece of litter, so the number of littered items will inevitably be overstated.

A second set of alternatives consists of

- Measuring "visible accumulated litter" (the litter encountered on a typical day), which is again a measure of visual impact; and
- Measuring "fresh litter" (litter dropped since the last count), which is a better indicator of the extent of littering habits.

Thus comparisons between policy options based on data from different studies must be approached with caution. Comparative studies carried out by the same researchers in different places are much more reliable. Another warning from experienced researchers is that litter surveys designed to measure the impact of anti-litter measures can be skewed by changes in other factors such as expenditure on litter cleanup. Finally, littering will also be affected by individual countries' response to the threat of terrorism. In some countries it has

been found necessary to remove or temporarily block access to litter bins in railway stations, on Metro platforms and in other public places. The absence of litter bins will obviously have an effect on the incidence of littering.

Degradable Materials

Several key stakeholders have suggested substituting degradable materials for packaging that cannot currently be recycled or is likely to become littered such as lolly wrappers and for potential marine litter items such as plastic ice and bait bags. However, there is also strong resistance to such an approach due to concerns it could:

- Undercut recycling programs;
- Cause packaging/product failure and therefore increase consumer dissatisfaction; and
- Encourage people to litter in the belief that “it’s okay” because the item will break down quickly.

“With regard to the marine environment, in particular, it is not clear how quickly biodegradable plastics would break down and what would be formed as interim and final degradation products. In any case, biodegradable plastics could well persist long enough to cause harm to wildlife through their physical presence and mechanical properties once they have entered the marine environment. Finally, on a cautionary note, there is a danger that biodegradable plastics will be seen as “litter friendly” materials, conveying the wrong message to the public and potentially leading to less responsible and more wasteful practices than those extended to conventional plastics.”

Greenpeace⁸³

Findings – Litter

- There is concern that brand owners are not taking, and are not actively encouraged to take, a level of responsibility commensurate with the prevalence of their packaging in the litter stream and are hiding behind the Covenant or promoting degradable products to avoid littering responsibility.
- Brand owners and packaging companies have very little influence over personal values or over non-value elements such as littering due to poor management practices.
- Litter does significant damage to the image of the beverage, fast food and packaging industries, but major sponsorship implies an admission of guilt which undermines the argument that it’s people not products that cause litter.
- Litter has consistently been overlooked under the Covenant, due in large part to the emphasis on achieving the Covenant’s 65% packaging recycling rate target.
- There are serious concerns about current pushes for degradable packaging materials as part of addressing litter.

12.0 Packaging Design

Packaging should be designed to have the minimum net impact on the environment, specifically in terms of waste, water, energy and emissions, while also fully preserving the integrity of the product it contains. These are fundamental and equally important principles to packaging design, and also guide the Covenant's Environmental Code of Practice for Packaging (ECoPP).

The mention of water, energy and emissions suggests that the ECoPP will cover the current environmental sustainability agenda but in fact, like most other documents of this type, its environmental focus is on the main preoccupation of its time (2005) – waste minimisation. Thus it addresses source reduction; the potential for packaging reuse, recovery and recycling; the ability to incorporate recycled content; minimising the impacts arising from any use of toxic or hazardous substances in packaging; and the propensity of the packaging to become litter, but it has nothing specific to say about resource issues. Packaging design represents perhaps the most complex and least understood component of packaging sustainability given the complex interplay of social, economic and environmental factors.

"If you ask people whether there's too much packaging, they'll say yes. We don't need to campaign."

Jeff Angel, Director, Total Environment Centre

"The 'right' choice of packaging from a sustainability perspective is not about any one single issue - neither waste nor carbon, or even water consumption (which looks like being the next 'single issue'). It's about cradle-to-cradle thinking that considers the entire lifecycle of packaging in the context of the product and the supply chain, with the aim of optimising material and energy flows and maximising recovery of value from waste."

Jane Bickerstaffe, Director, INCPEN⁸⁴

Procurement

One sustainability objective for packaging design might be the use of materials from sustainably managed sources. The Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC) standards are the best-known though not the only certification schemes for wood fibre from sustainably-managed forests.

Another objective might be the use of materials with low embodied energy and carbon emissions. Aluminium has a high embodied energy content, but this is offset by its high recycling rate (which enables that energy content to be largely reclaimed and reused) – and by its light weight which reduces fuel requirements and transport pollution during the distribution phase.

As such sustainability does not necessarily imply an automatic preference for one material over another. In contrast wood, paper and board and some biopolymers are derived from

crops (regarded as renewable resources), glass and metals can be reprocessed into new materials without loss of quality, though with some melt losses, and so can be regarded as renewable materials.

The only non-renewable packaging material is oil-based plastic, but because of its high product-to-packaging ratio it can minimise the number of vehicle movements and storage space needed and thus, paradoxically, the fossil fuel requirement of the total production and distribution system.

Production and warehousing efficiency

Packaging dimensions, strength, material and design must be compatible with the filling and warehousing equipment in use. This does not prevent changes in packaging design, but it may limit the opportunities.

Filling machinery has a long life, and may be the factor that limits packaging design improvements. As well as improving energy-efficiency, new machinery may facilitate the use of lighter packaging or reduce product overflow and wastage. A holistic approach to continuous improvement may lead to the conclusion that filling or handling equipment should be replaced before the end of its design life.

Higher stacking in the warehouse will reduce land use requirements, but may need sturdier outer packaging. If the focus is solely on packaging, this might not be regarded as a good thing, although it could lead to overall environmental benefit.

Integrating the design of sales packaging and transport packaging

Transport efficiencies can be maximised by designing packaging so that the sales packaging is the minimum needed for the product, the sales packs fit snugly into the transport packaging, the transport packaging's dimensions fit the pallet exactly and the pallet fits into a distribution vehicle with no wasted space (unless weight rather than volume is the critical factor for vehicle loading). There are software aids that can help optimise cube utilisation.

Political attention usually focuses on the packaging that the consumer sees, but there are often greater weight and material savings to be made by redesigning the transport packaging. European packaged goods producers and retailers importing products from Asia appear to be concentrating on improving the transport packaging, where major savings can be made relatively easily. In doing so European producers and retailers are getting closer to their Asian packaged goods suppliers, however making direct contact with packaging manufacturers there is seen as a second and more difficult step.

Packaging for products for home delivery is a growing issue, as the internet is increasingly used to order goods for home delivery. Individual orders can be of any number of items, and it is impossible to configure each consignment for the standards of space-efficiency expected for delivery from warehouse to store. The distance seller's dilemma is whether to maintain a small inventory of outer carton sizes, and risk delivering half-empty boxes, or to use

expensive storage space in an attempt to match the volume of the consignment to the volume of the available cartons. This is an area that probably needs more management attention than it is receiving.

How is Australian industry doing?

Some critics have suggested that there is no evidence that marketing people have improved their ethics, so there has been no convergence of sustainability and marketing practices. They say that industry parades case studies that show it in a good light but the mainstream is not doing anything. Indeed, Environment Victoria's DUMP awards⁸⁵ (*'excessive use of material in a package, 'poorly designed for recycling', 'likely to be littered', etc*) show that there are a few bad examples which damage not only the companies concerned but also the reputation of the entire industry. The critics want evidence that the ECoPP really is integrated into companies' decision-making.

The DUMP Report (February 2007) lists current issues of concern. Some of these are arguable, but this is a useful checklist demonstrating where industry needs to improve either its performance or its communications:

- *'The replacement of often voluminous and heavy but recyclable traditional packaging (such as glass jars and tin cans) with low-weight but non recyclable flexibles (multi-layer materials) resulting in diversion of packaging from recycling to landfill.'*

Have the authors of the DUMP Report done their sums? 'Non-recyclable' packaging may in fact generate less waste than traditional materials. In 1991 the German Coffee Association calculated that the laminated pouches then being used for instant coffee weighed 11g, a metal can for the same amount of product 120g and a glass jar 470g. Even with 80% recycling, the can would still generate 24g of waste and the jar 94g, and three times more lorries would be needed to deliver the same amount of product.

The current recycling rates for both glass and steel containers in Australia are less than 45%, so unless recycling can be transformed overnight, laminates are the environmental winner – especially since the argument about vehicle movements, a key sustainability issue, would apply even if the recycling rate were 100%.

- *'The threat to birds and aquatic wildlife from plastic litter, particularly bags, and the aesthetic impacts of litter in public spaces, roadways and bushland.'*

Litter is a problem, and packaging is a part of it. Changes in packaging design might have a minor part to play, but to make a real difference it is the littering habit that has to be addressed.

- *'Changes in consumption patterns and lifestyles resulting in increased demand for convenience packaging with higher material-intensity e.g. small single serve packs, take-away food and drink packaging, pre-packaging of fresh food and tamper-proofing.'*

This is true. However, tamper-proofing (or tamper-evidence) is there for a reason, and pre-packaging of fresh food generally (though not in all cases) reduces product waste. A study for Marks & Spencer in the UK that compared apples sold loose with four in a

shrinkwrapped tray found that when they were sold loose there was 27% more waste (bruised apples and used packaging) from orchard to home. Also, the sell-by labelling on prepackaged fruit and vegetables ensures proper stock rotation. Unsold loose produce is often decanted onto the top of a full tray and then the whole tray may be ignored by consumers who assume that everything is of the same poor quality as the items on top.

This does not mean that no improvements are possible, though; new forms of tamper-evidence, or eliminating a tray or punnet if flow-wrap provides sufficient protection.

- *‘The excessive use of materials, and the mixing of materials incompatible for recycling, purely for marketing purposes; inks on full plastic sleeves, enclosed gimmicks and promotional material, etc.’*

The authors of the DUMP Report have a strong case here. Recoup, the organisation developing plastics recycling in the UK, has published an excellent guide⁸⁶ on how to avoid materials, combinations of materials or designs which might create problems in collecting, sorting or recycling.

- *‘Retailers’ demands for shelf-ready packaging (secondary packaging to take products from the warehouse to the shelves without unpacking) tend to increase the total amount of packaging per product. Elaborate product displays could also be considered excessive packaging.’*

Manufacturers and some retailers are also concerned about this. Shelf-ready packaging adds to suppliers’ costs, and unless changes are made in other areas it involves a significant increase in packaging material use. Since shelf-ready packaging also protects the product in transit, it may present opportunities for counterbalancing savings in the transport packaging used, but there is evidence of increasing damage rates where producers are relying too much on the protective function of the shelf-ready packaging and have cut down their transport packaging too much.

This demonstrates that there is a possibility of over-packaging or under-packaging if producers fail to review their entire packaging system when making one change within it.

- *‘Technical and regulatory requirements limit the use of recycled content in packaging in contact with food. However, there are no such regulations for non-food packaging and yet recycled content is still at a low level in these packs. This lessens opportunities to close the loop.’*

We agree that opportunities for increased recycled content may be neglected, but there is a trade-off between lightweighting and recycled content. Closed-loop recycling may not be the best environmental option. To give the same functional performance, packaging made from recycled plastics or fibre may need to be thicker and heavier than that made from virgin materials.

- *‘Although more plastic packaging is being identified with the Plastics Identification Code, labelling information about best disposal options for packaging is still very often misleading. No wonder every second person, when questioned, feels that it is confusing to work out what can and can’t be recycled. This confusion leads to high levels of*

contamination and causes further losses of resources, undermining the financial viability of kerbside recycling.'

To maximise recycling, consumers need proper information. It is difficult to supply this on-pack unless the same materials are collected everywhere, but in that case there should be a website explaining what can be collected in each locality, backed up by notices in supermarkets.

The DUMP Report is largely intended to highlight companies' failure to respect the ECoPP (compliance with the ECoPP is mandatory for Covenant signatories) and thus looks at minimisation and recyclability rather than overall sustainability. Nevertheless, there is considerable value in a body which will challenge manufacturers and 'name and shame' those that cannot defend themselves convincingly.

The report contains a table showing how the DUMP Awards winners responded to the complaint, whether they were a Covenant signatory (all but one were) and relevant extracts from their Covenant Action Plans. Three of the six 'winners' did not respond, one was a generic rather than a company-specific issue and the other two responses were (at least as reported) not particularly impressive. This suggests that the DUMP Awards are not taken seriously by the companies whose packaging is highlighted, probably because of the adversarial tone of the report.

What is needed is an effective national 'packaging watchdog' to carry out random audits and investigate and adjudicate on complaints. This should not only 'name and shame' but also publish its findings when a complaint was rejected. The watchdog should report at least once and preferably twice a year, and should follow up its findings to report what the producer had done to improve unsatisfactory packaging.

This is one of the roles of the ECoPP Management Committee, but it has not been proactive and has apparently not received any complaints. This may be because the general public is not aware of its existence or of how to complain, but the Committee is open to the accusation that being composed of industry representatives, apart from one academic, it has not been anxious to look for complaints or to be pro-active in driving improvements.

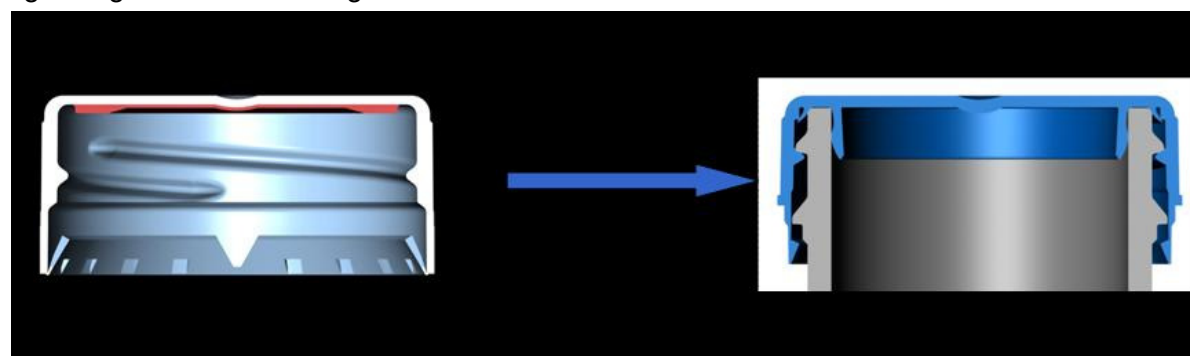
However, industry at large should want to distance itself from flagrant abuses, and companies should welcome the chance to explain their side of the story when the environmental benefits of their approach are not obvious to the layman. If companies felt that the investigating body was genuinely seeking to understand and help the public understand, they would be more willing to engage with it.

We recommend that the ECoPP Management Committee sets up a Packaging Standards Sub-Committee to address these issues. Membership of the Sub-Committee should include academics and government and NGO representatives as well as members drawn from the packaging, packaged goods, retailing and recycling sectors, but day-to-day operations should be managed by a full-time or part-time packaging technologist, possibly a retiree.

Compliance with the ECoPP would also be strengthened if retailers were to ask their suppliers if the ECoPP is applied, or better still write this into their contracts. Some retailers and a variety of brandowners are starting to document such efforts in their Action Plans.

Some of our interviewees suggested that the ECoPP should provide more substantive information to assist in packaging decision-making. The ECoPP sets out principles and it would be hard to build design guidance into it, but an expert group operating under the auspices of the ECoPP or another industry body in Australia should certainly take up this challenge.

38 DoubleSeal®: Amcor's Beverage Can and Closures Division has developed the lightest hot-fill closure on the market for Berri (National Foods), switching from the 4.8g SLJ closure to the 3.75g DoubleSeal® closure. The plastic lining and foil liner have been removed, leaving mono-material, 100% recyclable HDPE and creating opportunities for new lightweight PET neck designs.



Existing SLJ Closure

Liner-Less DoubleSeal® Closure

The Sustainable Packaging Alliance has developed a Packaging Impact Quick Evaluation Tool (PIQET®) to help companies identify opportunities for environmental improvement. Stakeholders' views on PIQET® are decidedly mixed. While large companies such as Woolworths and other key brand owners have signed on to the SPA and are committed to using PIQET®, others either have their own tools and/or do not see the value of applying consistent tools.

Relatively few companies have the resources to carry out full life-cycle assessments on their packaging, but a larger group could be in a position to conduct a limited LCA to identify the environmental benefits or limitations of possible changes. If the industry leaders use LCA in this way, the improvements identified will eventually become generic.

"Having in-house Life Cycle Assessment capability enhances Amcor's understanding of the environmental footprint of packaging through the supply chain. It enables us to design packaging solutions that meet the functional needs of our customers whilst minimising adverse environmental impacts."

Andrew Vanstone, Group General Manager Sustainability & Recycling, Amcor Australasia

There are however many examples of inappropriate uses of LCA. For example:

- In Denmark and the Netherlands, LCA has been used as the basis for packaging taxes designed to push the market towards some materials and away from others. The weightings given to different parameters are subjective and therefore questionable, and the distinction between ‘good’ and ‘bad’ packaging is a spurious one, since much depends on how the packaging will be used, the distances it will travel and the collection and recycling infrastructure in place at the point of consumption; and
- An extreme example was the German government’s use of an LCA published in 2000 to discriminate in law between ‘ecologically favourable’ beverage packaging (refillables, liquidpaperboard cartons and PE pouches) and ‘ecologically unfavourable’ containers (everything else). This distinction is enshrined in law, but as no methodology is defined there is no clear way that other types of packaging can apply for ‘ecologically favourable’ status. Interestingly, when the LCA was updated in 2002, the authors (the Federal Environment Agency) concluded that environmental impacts had been reduced for all alternatives and that the difference between ‘best’ and ‘worst’ options, 20% at the time of the first study, had narrowed to 5%.

In Europe there have also been many examples of unhelpful LCAs, designed to demonstrate that “my material is better than yours”. Because LCA results rely so heavily on decisions relating to system boundaries, the weighting give to different environmental parameters and the assumptions made, those commissioning such studies are rarely disappointed by the results. Ultimately the only result is to discredit the entire industry.

Some Design Improvements During the Covenant⁸⁷

Coca-Cola Amatil lightweighting of:

- PET bottles - saving more than 625 million bottles since 2003
- Aluminium cans - saving more than 91 million cans annually

National Foods:

- 1kg tubs - World-first yoghurt packaging using one plastic type (PP)
- Lightweighting of PET bottles saving more than 150 tonnes p.a. in materials

Goodman Fielder:

- Savings of more than 55 tonnes p.a. through packaging design (largely plastics) and efficiency savings

Kimberley Clark:

- 95% of all cardboard used is now 100% recycled fibre content
- Lightweighting and packaging changes saving 6,000 tonnes p.a.

Golden Circle:

- Decreased product to packaging ratio from 9.9:1 to 11.8:1
- Reduced total weight of ‘non-recyclable’ materials from 1,350 tonnes to just 3.6 tonnes p.a.
- New packaging with a 25% recycled content PET bottle

Findings and Recommendations – Packaging Design

- The ECoPP focuses primarily on waste minimisation, and needs to be updated to take account of the broader sustainability agenda.
- Companies should aim for overall optimisation rather than pursuing one environmental objective at the expense of all the others. Getting the public and the NGOs to appreciate this will be a major communications challenge – one which will require the industry to raise its game considerably.
- Packaging design and the ECoPP represent key areas of improvement under the Covenant. A wide variety of case studies on packaging design improvements are available, yet the public and governments are not aware of most of the gains made.
- Critics claim that these case studies are not typical and that many Covenant signatories are ignoring their commitment to comply with the ECoPP.
- The DUMP Report lists critics' current areas of concern, providing a useful checklist of where industry needs to improve either its performance or its communications.
- The ECoPP has always been industry-driven. However, incorporation of environmental considerations in packaging decision-making has been woefully under-reported to date. In part, this results from the ECoPP being an internal documentation process against challenges that have yet to eventuate.
- Relatively few companies have the resources to carry out full LCAs on their packaging, but a larger group could be in a position to conduct a limited LCA to identify the environmental benefits or disbenefits of possible changes. If the industry leaders use LCA in this way, the improvements identified will usually become generic.
- LCAs should not be misused by public policymakers to distinguish between 'good' packaging and 'bad' packaging materials, when the real distinction is between packaging which is appropriate or inappropriate for the uses to which it is put.
- MS2 and Perchards recommend that the Australian packaging supply chain:
 - Publicly demonstrate successful application of the ECoPP to the packaging decision-making process for new packaging and reviews of existing packaging;
 - Underpin the ECoPP with more robust data to more effectively guide packaging decision-making and make some of the trade-offs in packaging decision-making more transparent;
 - Expand representation on the ECoPP Management Committee to make the committee less industry-dominated and more representative; and
 - Set up a Packaging Standards Sub-Committee to oversee random audits and investigate and adjudicate on complaints about breaches of the ECoPP. The findings should be published whether they are positive or negative, so as to explain why decisions are made as well as to expose bad practice.

13.0 Risk and Opportunity Overview

A Cautionary Tale from the Netherlands

Recent developments in the Netherlands show that industry can lose control of its destiny even when things are going well. Table 13-1 compares Dutch recycling rates in 2005 with its neighbours and with those in Germany and in EU-15 as a whole, and shows that the Netherlands will have no problem meeting its next EU targets:

Table 13-1: Comparison of Dutch Recycling Rates 2005

	Glass	Metals	Plastics	Paper	Overall (excl. wood)
Belgium	100%	89%	38%	83%	77%
Netherlands	78%	84%	22%	72%	59%
France	60%	57%	19%	81%	53%
EU-15	63%	64%	25%	75%	57%
2008 targets	60%	50%	22½%	60%	55%

But in the Netherlands, unlike almost every other EU member state, there used to be no formal funding mechanism through which industry supported local authority packaging waste management operations. The Dutch local authorities lobbied for a change, and the third Dutch Packaging Covenant was not renewed when it expired at the end of 2005. It was replaced by producer responsibility legislation requiring industry to contribute to local authorities' collection costs for packaging waste as it does everywhere except Denmark (where there is CDL). Mandatory deposits on beverage cans and small PET bottles had also been on the agenda, but the government decided that a more holistic approach to litter abatement was needed and an anti-litter levy was agreed instead. And then a new government that took office in February 2007 decided to introduce a carbon-based packaging tax.

To avoid three sets of reporting, industry (perhaps unwisely) asked for the producer responsibility fee, litter levy and carbon tax to be rolled into a single payment, and a combined tax took effect from the beginning of 2008. The government says that this new funding arrangement will make life simpler for industry, but it also means that industry has lost control of its funding.

The tax is paid by producers and importers of packaged products and of service packaging, including producers who import packaged products for their own use. Companies placing less than 15 tonnes of packaging on the Dutch market each year are exempt, but they still have to report on the weight of packaging they use. The tax is expected to raise about \$600 million per year, equivalent to \$36 per head. By way of comparison, Green Dot fees in Belgium cost consumers about \$12 per head and those in France about \$10 per head.

13.1 Regulation by focus group – and by customer demand?

In Australia and overseas, the packaging industry has lost some measure of control over its future due to the influence of governments and supply chain pressures, which have been influenced to some extent by NGOs and perceived consumer concerns. However, consumers have exerted surprisingly little influence in this process.

Government influence

NGOs and media have used packaging's visibility to generate government pressures. In response, industry has effectively been put on notice that meaningful, measurable action and progress are necessary in the very near term. One brand owner consulted stated that industry just needs to stay slightly ahead of consumers and play the political process. The same brand owner also stated that if regulated, industry would adapt and figure out how to reduce compliance costs. However, many stakeholders stressed the cumulative impacts of the packaging supply chain not taking sustainability issues seriously and standing up for itself.

Australia already has some of the most draconian take-back legislation in place as penalty provisions under the NEPM, and taxes applied across all packaging have been on the table for some time. Several stakeholders have highlighted industry's inability to self-regulate, but feel that governments have failed to convince industry of the consequences of Covenant failure. So how and where do governments step in?

Governments often bear pressure for the lack of industry response, and will only do for so long before they decide to just regulate; plastic bags are the prime example. In contrast, the newsprint industry is viewed by governments as taking a more pro-active approach, and their high recycling rates mean no regulatory pressure is being exerted.

Australia's GhG emissions have been increasing, for whatever reason. We have been going in the wrong direction and we need to put that right. Meanwhile the natural resources we rely upon are under increasing pressure as rising demand meets diminishing supply. The cost of energy, raw materials and water is rising, and carbon pricing will increasingly reflect the environmental cost of emissions. Thus to some extent price mechanisms will force change. Indeed there will be one positive development as the value of secondary materials rises faster than the cost of collecting, sorting and reprocessing them.

As environmental pressures grow, industry will be on the front line, for although environmentalists all over the world (rightly) talk doom and gloom about the big picture, when it comes down to practical measures they come back to CDL, plastic bags or inadequate recycling rates. So legislators wanting to be seen to be doing something about the environment pick on the usual soft target where they feel they can demonstrate quick results (if not necessarily a reduction in overall environmental impact).

Environmental initiatives have always been contagious (CDL in the US in the 1970s, producer responsibility for packaging in Germany in 1991) but in the internet age ideas spread

much more quickly. The Irish government put itself on the environmental map with its plastic bag levy, and the UK's Courtauld Commitment is also being replicated in other jurisdictions. Unless Australia's packaging and packaged goods producers go beyond mere compliance and seize the initiative, they are likely to be faced with a hotchpotch of requirements that may make no economic or even environmental sense.

Distortionary Regulation

Some European countries have tried to tilt company decision-making to give greater weight to environmental considerations through the imposition of LCA-based taxes and other economic instruments. In 2001 Denmark introduced weight-based taxes for sales and secondary packaging (but not transport packaging) for a somewhat arbitrary collection of packaged products. The tax rate for each packaging material is based on the results of an LCA covering relative environmental impact (greenhouse effect, acidification, nutrient salt load, photochemical ozone creation), resource consumption (crude oil, natural gas and coal), waste, energy consumption and CO₂ emissions. The environmental impact assessment covered extraction of raw materials, production of materials, production of the packaged products and disposal of the used packaging but gave little weight to the distribution phase. There were many complaints that the LCA on which the tax was based used outdated figures and was not subjected to peer review. Indeed, it broke many of the LCA rules established by ISO 14040.

Nevertheless, when in 2006 Belgium planned to fill a billion-dollar hole in the national budget with a packaging tax based on the amount of CO₂ emitted during the production of packaging, it used the Danish model. After considerable uproar, the Belgian Government decided that the tax would be very difficult to implement and it abandoned the proposal, at least for the time being. It introduced a tax on plastic bags, clingfilm, aluminium foil and disposable tableware instead.

Addressing regulatory pressures can come at a significant cost to industry. As margins have become increasingly tight, industry can no longer pass these costs on to consumers, and must find more effective solutions. In reality, the pursuit of sustainability involves so many choices that it cannot be micromanaged by legislation. It needs to be built into everybody's expectations throughout the supply chain and into consumer behaviour. Clearly, comprehensive, integrated industry response strategies are required.

However, the first response of various NGOs to sustainability initiatives from the packaging supply chain has been that industry is trying to change the subject to divert attention from CDL or what they believe to be Australia's 'inadequate' recycling rates. Politicians then face pressure from NGOs for failing to properly regulate industry. Failure of industry to address these issues effectively results in cumulative impacts and the perceptions that either industry lacks the leadership to advance its position or that industry's position is poor, so it is just lying low.

Retailer influence

Up to now, policymakers have usually engaged with the packaged goods producers and their packaging suppliers when they want to influence packaging policy. The retail trade has been involved largely in its role as producer of home brand products and in some places (for instance the Nordic countries) as an ‘enforcer’ which would de-list suppliers who failed to join the relevant producer responsibility organisation.

But now policymakers are coming to realise that the multiple retailers’ economic strength and their direct connection with consumers makes them ideally-placed to formulate and implement environmental initiatives. The first example of this new trend was the UK’s Courtauld Commitment, under which retailers agreed to design out packaging growth and were left to devise their own routes towards this goal.

The Irish government has now set industry a similar challenge, and the French retailers’ association has signed an even more wide-ranging agreement with the authorities including:

- A pilot carbon labelling scheme covering 300 common products;
- Sectoral initiatives to promote sustainable consumption (will that mean ‘choice editing’?);
- A 10% reduction in packaging waste between 2008 and 2012;
- A recycled content target of 75% for glass and for fibre packaging, with targets for metals and plastics to follow;
- Reducing the retail sector’s energy consumption and GhG emissions, by making the audit of GhG emissions from retail stores widespread, and developing a common methodology for carbon audits, improving the energy-efficiency of retail stores, developing renewable energy and energy recovery, and improving the performance of refrigeration systems;
- Reducing GhG emissions from transport, by improving the efficiency of the lorry fleet, rationalising the flow of goods to improve delivery efficiency, and supplementing road transport with rail and water transport; and
- Limiting the visual impact of stores on the landscape and on eco-systems.

Learning from this, the European Commission has opened discussions with the retail trade on an EU-level voluntary agreement on ‘concrete measures and actions to promote sustainable consumption.’ ‘Choice editing’ again?

Wal-Mart’s packaging scorecard falls into a different category, as it is one of a set of business management tools rather than an instrument of government policy, but the effect is the same – a shift in the leadership on the packaging sector’s environmental policy from the manufacturers to distributors. The dangers for the packaging supply chain are considerable. Government proposals are put out to consultation and there are many opportunities to lobby; but if a major retailer sets a policy, its suppliers either have to comply or face losing the business.

Few retail chains employ packaging technologists. They may tell their suppliers the directions in which they want to go and they will always have the final say on what products are stocked, but they have generally left detailed design decisions to the packaged goods producers. Now they are intervening more directly, setting policies which have far-reaching ramifications without necessarily having very much idea of the implications. Retailers are driven by consumer demand and producers fear that some will respond too closely to public perceptions without fully understanding the performance requirements of packaging. Also, the retailers will view these initiatives as a way of taking cost out of the system – irrespective of whether they mean lower costs or extra costs for suppliers.

Could it happen in Australia? If it can happen in France, where the food industry wields so much political clout, it can happen anywhere. And the world's largest retail chain, Wal-Mart, will exert an influence beyond the 15 countries where it operates. If the drive for sustainable packaging is going to come to Australia, it is vital that suppliers and retailers work together to devise suitable strategies. If packaging and packaged goods manufacturers sit back and hope that nothing will happen, they are likely to meet with unpleasant surprises.

Meanwhile at least one international packaged goods company is exporting UK requirements to Australia. Cadbury Schweppes has said publicly that it wants a 10% reduction in primary packaging, and others may follow. After all, as the Irish Environment Minister has remarked to industry in Dublin, 'if the British can do it, why can't we?' However, what is being emulated is the British retailers' target-setting – it remains to be seen whether the targets will be met.

Consumer influence?

Australian consumers as a whole seem to care little about waste minimisation and packaging. Waste, the environmental concern most commonly associated with packaging, has been ranked by only 8% of people in NSW as an important issue; this included recycling issues (3%), general waste disposal or management (3%) and litter and rubbish dumping (2%)⁸⁸.

Australian research on consumer demand for environmental packaging found that packaging is a low priority at point of sale, with packaging in any form mentioned as a factor in purchasing for only 4% of consumers surveyed. Environmental aspects of packaging affected 3% or less of purchasing decisions, well behind price, product and convenience. When asked what they disliked about *products* purchased, 6% mentioned packaging, including environmental aspects and functional properties. When asked what they disliked about *packaging*, one in 10 mentioned disposal, recyclability or the environment.⁸⁹ As such current purchasing behaviour results in people having to manage packaging only when they start to use the product. Should more sustainable packaging be the norm from manufacturers, peoples' concerns may be alleviated prior to reaching for a product on the supermarket shelf.

Nevertheless, although Australian consumers appear to not care a great deal about packaging, community groups and governments often target it as a visible symbol of consumerism and waste. Avoiding 'excess' packaging and plastic bags are commonly cited as 'environmentally

friendly’ behaviours. Indeed the single largest ‘green behaviour’ in the past twenty years has been the phenomenon of the ‘green bag’. Avoiding plastic bags is a major shift in the general public’s thinking toward the environment, even though the impact is negligible compared to the impacts of more sustainable food and beverage production. Depending on the value put on litter avoidance as opposed to resource consumption, the impact may even be negative; the famous Irish tax on plastic shopping bags has resulted in an increase in imports of plastic bags and sacks as heavier gauge plastic bags are now needed for safe waste disposal since used shopping bags are no longer available for this purpose.

13.2 Industry leadership

During consultations for this report, most of the sharpest criticism of industry efforts to date came from a variety of brand owners and industry associations. Some of these criticisms include:

- Industry has failed to have a strong, united response on sustainability and has failed to communicate industry efforts effectively;
- ‘The industry is too inward looking; are we getting better value and recognition now with Governments and NGOs, or not?’;
- ‘Regulation leads to tick-boxes and minimum compliance. We clearly need to show that we’re doing something to avoid overly-simplistic responses by governments’;
- ‘The ECoPP committee has met twice; they should have quarterly, proactive meetings’;
- Drivers should be about doing better and doing the right thing, not because of regulatory pressures;
- ‘It’s good to have the NGOs at the table; we haven’t engaged with our detractors’;
- ‘What should packaging be like in 2020? How would we still meet our needs? What are NGO concerns? Are NGOs misinformed? We can’t address these concerns from trenches firing missiles’; and
- ‘We need to say we’ve done well, but that’s not enough; we need to do more. If we want to be seen as leaders, then we need to be leaders’.

“Industry has been very poor in its ability to communicate. There has been a lot of innovation in Australia and New Zealand, but industry’s ability to communicate and manage the debate is woeful and we’re usually on the back foot.”

David Carter, Group Environment & Technical Projects Director, Lion Nathan

The public has been led to believe that waste minimisation is the issue that matters, and industry will have to go with the flow sufficiently to reassure them that that question is being addressed, while trying to focus all stakeholders’ attention on the big picture and educating the public there too.

It shall be up to industry to demonstrate how to go beyond compliance and to demonstrate real leadership. The primary way of avoiding this is to draw the critic groups, and the legislators, into the process of problem definition, fact-finding and problem solving so that everyone has ownership of the policies that emerge. This means that what emerges will have

to be a compromise, but that is not such a bad thing. It is more important to demonstrate a clear commitment to improvement.

13.3 Waste generation and recycling rates

Waste generation and recycling rates continue to be the focal point of packaging sustainability; they are easy for the general public to understand and are some of the easiest parameters to distill into a single number, vastly simplifying complex issues of sustainability.

As noted in Chapter 7, stakeholders, particularly industry stakeholders, were decidedly split on where industry's efforts are best placed over the next few years. While many expressed the view that recycling rate is only one of many sustainability indicators for packaging that should be considered and that broader sustainability efforts should be pursued, many others expressed the view that recycling rate will continue to remain the most prominent indicator for sustainability and broader sustainability efforts would not be taken seriously if recycling rates are perceived as being too low.

During consultations, the Australian Council of Recyclers (ACOR) indicated that a variety of factors will help influence packaging recycling over the next few years:

- Councils are expanding collections to all rigid packaging, meaning greater collection, more options for consumers, and simpler education efforts;
- Service cost per unit has kept decreasing;
- Greater optical sorting at material recovery facilities (MRFs) will lead to increased recovery because it's more cost-effective;
- Increased use of mega-MRFs such as Visy's facility at Smithfield, NSW. Recycling is easier with a large facility rather than several small ones and mega-MRFs are more cost-effective due to throughput and economies of scale;
- An increased number of MRF designers means it is easier to get lower cost options for rural areas; and
- Mobile garbage bins result in greater yield and recovery.

It is unclear at this stage how these factors will affect the technical or economic feasibility of the Covenant's 65% recycling rate target.

The Bottled Water Conundrum – Unsustainable Consumption?⁹⁰

- Australians consumed around 550 million litres of bottled water in 2004-2005.
- 66% of adult Australians occasionally or regularly drinking bottled water.
- Although health benefits of drinking water are understood, critics target the waste from bottled water consumption (an estimated 916 million plastic bottles to landfill).
- Bottled water can cost up to 10,000 times more than tap water, and at as much as \$2.50 per litre (\$10 per gallon), costs more than petrol.
- Concerns have been raised about fossil fuels use in packaging for bottled water, with PET being the most commonly used plastic for water bottles:
 - US bottle-making for bottled water requires more than 17 million barrels of oil annually, enough to fuel more than 1 million U.S. cars for a year; and
 - Worldwide, some 2.7 million tons of plastic are used to bottle water each year.
- Driving a car for one kilometre used 4 MJ of energy, while drinking a 600 ml bottle of water used 1.5 MJ when the transport costs are included. Drinking tap water uses only 0.2 MJ⁹¹.
- NGOs have made a variety of claims about disposal of the PET bottles⁹²:
 - 86 percent of US plastic water bottles become garbage or litter.
 - Incinerating used bottles produces toxic by-products such as chlorine gas and ash containing heavy metals.
 - Buried water bottles can take up to 1,000 – 10,000 years to degrade.



Brita Water Filter Systems

- The introduction of the Brita “Fill & Go” filter sport bottle to the Australian market has the potential to provide a cheaper alternative to bottled water, a healthier alternative to tap water and will potentially minimise the amount of bottles going to landfill.
- The Brita “Fill and Go” is a sports bottle with an activated carbon filter inside, enabling users to fill from any tap and filter out unpleasant tastes and odours (while retaining fluoride).
- Both the bottle and filters are manufactured in Sydney.
- The filter processes up to 57 litres or 80 refills of tap water.
- This development is targeted at active consumers, including children, by offering a convenient and economical alternative to bottled water, and will effectively reduce the amount of water bottles going to landfill by encouraging users to reuse and refill with tap water.

Source: PCA

13.4 Visibility and perceptions

Concerns about sustainability of packaging, especially for beverage containers, take-away packaging and plastic bags, have long been driven by the sheer visibility of the packaging and packaged products as evidence of consumerism. As such, packaging will continue to be targeted by NGO and some consumers.

“Criticism of industry’s background, say 25-30 years ago is fair. The environment was just something to be dealt with. It took a long time to realise that this wasn’t an issue that was going away.”

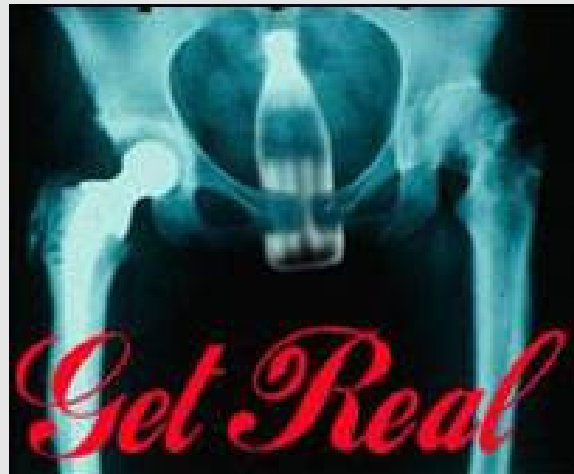
“We’ve reduced water consumption 50% over eight years – it had nothing to do with packaging. Foster’s and Lion Nathan will have world leading water consumption levels, and yet we’re still attacked on packaging issues.”

David Carter, Group Environment & Technical Projects Director, Lion Nathan

The Level of Vitriol

“It seems some industries just don’t give a shit about what happens to their end product. While most of us realise our responsibility to the fragile ecosystems of this planet, the major bottlers and packagers do not care about what happens to their waste. The beverage industry in Australia has for years fought against accepting any responsibility for their used packaging including funding a front group called the Packaging Stewardship Forum...”

“Through their front group in Australia, the Packaging Stewardship Forum, Coke seeks to mislead government and the public about the merits or otherwise of container deposits in order to avoid playing a productive role in seeing their used containers are both off the street and recycled.”



Beverage Industry Bastards⁹³

A wide variety of stakeholders consulted for this report felt that debates over CDL and plastic bags got blown way out of significance to their environmental impacts because of their visibility and industry’s lack of meaningful responses, particularly in the early stages of the debates. Periodically, these issues will flare up because of their visibility or because of NGO activities such as Clean Up Australia Day.

A common industry response in the past has been not to comment or to underplay media responses, in the belief that an industry response might cause greater media attention than would otherwise occur. Several NGOs have used this ‘non-response’ to plant misleading claims in consumers’ minds. In the absence of strong, clear, factual responses to the contrary, these claims become accepted as ‘fact’ and further influence perceptions of consumers and governments. In the belief that sunshine is the best disinfectant, misleading and unsubstantiated claims should be much more effectively attacked by industry.

It is not enough to be anti-CDL or pro-plastic bag; industry must present viable alternatives to achieve desired outcomes. While the Covenant was intended to serve in this capacity, the packaging supply chain has not communicated the benefits of the Covenant or industry's support for the Covenant accordingly. Consumers are therefore not aware the Covenant is in place or preferable.

13.5 Consumer information

Under Australia's *Trade Practices Act*, consumers are protected from false or misleading claims by companies. The government watchdog, the Australian Competition and Consumer Commission (ACCC) says there has been an increase in complaints about businesses who provide false information about their products' environmental credentials⁹⁴.

Over the years, there have been a number of efforts to examine product labelling for packaging or for conformance with the Covenant. Now carbon labelling is being examined, although there are real reservations about accurately conveying such complex information effectively to consumers (section 8.3). Given the regulatory penalties and potential damage to company reputations of false claims, the packaging supply chain will need to ensure that claims are not vague or difficult to substantiate.

"If a claim is made, it's got to be truthful, it's got to be able to be substantiated."

John Martin, Commissioner, Australian Competition and Consumer Commission⁹⁵

The Covenant's definition of 'recyclable' packaging is a potential area of concern; additional effort will be necessary to clarify coverage and recyclability of packaging materials.

Some additional stakeholder feedback on consumer information and labelling included:

- 'Consumers would hate labelling schemes.' (NGO);
- 'Consumers can't do proper research; there's too much information. I'm unsure a government-accredited system would work.' (NGO);
- 'The current information is confusing to customers, with different, competing labels – look at fat, energy, etc., now; there's no room to say what the product is.' (industry association); and
- 'Green doesn't really sell, but it doesn't hurt either. Any environmental claim would have to have a massive impact to be worth it.' (brand owner).

As shown in Chapter 4, it is especially difficult to define, much less convey, packaging sustainability. Stakeholders have consistently expressed strong support for the PCA's efforts to compile meaningful information on industry performance and report industry progress on packaging sustainability publicly to ensure that stakeholders seeking reliable information are readily able to access such information and understand packaging sustainability issues in context.

One brand owner observed that younger people seem less concerned about packaging sustainability and the environment broadly than older people, a view reinforced by some

government research on consumer perceptions⁹⁶. While to some extent this may be due to apathy, it is possible this may be due to information overload; scale of larger issues such as climate change and droughts; and/or the ability to rapidly access information. Regardless, there is value in ensuring consumers have accurate information to assist in forming their views on packaging.

13.6 Supply chain influences

Consumers generally lack the knowledge on waste and resource recovery to be substantial drivers for packaging sustainability, but the supply chain does, and exerts significant influence. Globally, retailers such as Wal-Mart and Tesco have been driving significant changes in packaging along the supply chain.

“Amcor's approach to sustainability is to create shareholder value by taking advantage of opportunities and managing risks. In terms of opportunities, it means we want to be a leader, where we work collaboratively with our stakeholders, particularly our customers, to develop environmentally sustainable and innovative packaging solutions”

Andrew Vanstone, Group General Manager Sustainability & Recycling, Amcor Australasia

Stakeholders consulted for this report consistently noted the influence of large global retailers in driving supply chain improvements. Stakeholders also indicated that while they understood the substantial labour savings for retailers that have motivated the increased use of shelf-ready packaging (SRP) and could see some resulting commercial opportunities, SRP could also result in increased packaging-product ratios, increased bleaching and chemical use for printing. Some stakeholders have also reported increased product damage rates resulting from re-design for SRP. Such impacts could undo years' worth of packaging design improvements.

Several brand owners stated that if the Australian packaging industry cannot satisfy supply chain demand, then an increasing proportion of packaging will need to be sourced from overseas suppliers, which could result in a more negative view of packaging sustainability due to concerns about overseas labour/working conditions and difficulties in compiling and verifying sustainability indicators from overseas sources.

Some Supply Chain Influences

- 50% of companies will now deselect suppliers for not meeting sustainability criteria, a rare occurrence as recently as five years ago⁹⁷.
- 83% of the top 100 largest retailers globally are involved in green practices and 62 of those have increased their green investments during the past two years⁹⁸.

Some Amcor Supply Chain Opportunities

- **Fruit & Produce Xitex to CE:** The development of a twin wall board grade allowed Amcor Fibre Packaging to eliminate the freight cost and environmental impact of the interstate transport associated with transporting Xitex fruit and produce packaging. Xitex was previously transported in sheet format from Queensland to NSW for die cutting. For 1 million trays, this resulted in avoiding approximately 53 semi-trailer loads delivered to NSW per year.
- **Arnott's Shapes 20- to 24-pack:** A joint development project with Arnott's and Amcor Fibre Packaging focusing on SRP and mutual Covenant obligations led to a change from a 20 carton pack to a 24-pack that reduced the number of outer cases used by over 588,000 and provided savings in transport, warehousing and the number of movements required throughout the supply chain. However, introduction of the 24-pack Shapes carton resulted in an underutilisation of the corrugating deckle width and excessive trim due to the particular specification used by Arnott's for their packaging and distribution requirements. After redesign and trialling, this waste was reduced by 21,000 square metres per annum.
- **Amcor VinPorter™:** Amcor's VinPorter™ corrugated carton uses a patented one-piece design and perforation system to rapidly and safely transform into a branded six-bottle consumer carry pack. VinPorter™ was specifically developed for wine makers who want to offer a six-bottle carton that provides enhanced branding and improved retail display effectiveness. It uses half the fibre of a conventional six-bottle carton with dividers. The innovative design enables it to function as a shipper, point-of-sale display and reusable consumer carry pack.

"Coles Myer is the largest single recycler of cardboard in Australia, accounting for 9 percent of total cardboard recovered for recycling nationally."

Coles Group⁹⁹

13.7 Food miles

A variety of European governments and major retailers have begun seriously examining the issue of 'food miles' which creates a variety of risks and opportunities for the packaging industry. As with recycling rates and carbon footprint, food miles can be used to paint a decidedly negative view of industry practices when provided without their full context.

Several brand owners and retailers stressed that food miles can easily distort current practices; for instance, shipping from China may be more efficient and involve fewer environmental impacts than air freight from a closer location. Several stakeholders expressed concern that food miles would be used to try to portray 'bad' products or examples of excessive consumerism.

The UK is the world's largest importer of wine, accounting for about 18% of world wine imports by volume and more than 20% by value. Australia and France account for more than 40% of the 1.2 billion litres imported into the UK each year. WRAP is campaigning for more wine to be imported in bulk and bottled locally.

A 2007 study compared the carbon footprint of wine imported from the Berri Estate in South Australia with that from the Bordeaux region of France. It explores four areas which affect carbon emissions:

- Use of bulk containers instead of bottling the wine at source;
- Weight of the wine bottle;
- Distance travelled; and
- Method of transport.

The study found that in the case of Australian wine, CO₂ emissions are principally from long-haul shipping. This accounts for 91% of the emissions when bottling at source and 84% when shipping in bulk. It concludes that significant reductions in CO₂ emissions from the transportation of wine can be achieved by changing from shipping wine in bottles to importing wine in bulk containers. This can reduce emissions by 30% to 40% (164g per 75 cl bottle). In addition, lighter glass bottles can also achieve reductions of up to 30%.

However, the report claims that even greater reductions are possible by combining these strategies. For instance, combining the benefits of bulk shipping and bottling in the UK into the lightest 300g bottles could result in 375g CO₂ savings for every 75cl bottle of wine. The average bottle weighed 502g in 2005.

In the case of French wine, the greatest potential savings arise from road transportation in France. Significant savings could still be made from bulk transportation, but these are not of the same order of magnitude as the Australian savings.

While there are rightfully reservations about the food miles debate, it can create opportunities for the packaging industry as well. For instance, Swan Hill-based Andrew Peace Wines is using Tetra Prisma packaging technology from Tetra Pak to ship substantially more wine for the same weight, while halving carbon emissions from transport¹⁰⁰.

13.8 Markets for recovered materials

Viable end use markets are essential to ensuring effective recycling programs. A significant area of concern under the Covenant has been the loss of glass 'fines' that are too small to be captured through traditional glass manufacture. While some critics have argued that glass lightweighting has resulted in the high levels of breakage and loss (in the 40-60% range), ACOR's members disagree and say the breakage is due more to compaction rates in current commingled collection systems. These recyclers say that the collection system has changed in response to OH&S and cost concerns and become less compatible with glass in the process.

Due to the resource efficiencies involved and contribution to the Covenant's 65% recycling rate target, glass fines are an obvious area to target for improvement.

Glass Projects Funded under NPC MkII

Glass recovery projects funded under the Covenant in 2006-07 have the capacity to reprocess an additional 110,000 tpa which could increase the recycling rate for glass to 55% by mid 2009. These projects include glass crusher trials in the hospitality sector, residual glass fines processing and local market development.



JMB Beverages Pty Ltd

- JMB Beverages in Hornsby, NSW, sought to reinvigorate packaging and product innovation to the Australian market by delivering an attractive, recyclable and unique packaging solution that exceeded occupational health and safety expectations and satisfied "best practice" product development criteria.
- Brightlite Wines are packaged in recyclable aluminium bottles, a first for the Australian market.
- There is a 95% energy saving in recycling aluminium to that of producing aluminium from bauxite.
- The bottle is 15% of the weight of an average empty glass wine bottle and 30% lighter than a full glass bottle (750ml).
- The bottles are totally shatterproof.
- The financial return on one tonne of recycled aluminium is \$1800 compared to \$285 for glass and one tonne of recycled aluminium produces 3,350 bottles, compared to 2,350 glass bottles.

Source:
PCA

13.9 Difficult materials

Several materials are likely to prove difficult for the Australian packaging industry to address. For example, substantial growth is occurring in the degradable bioplastics industry due to consumer environmental awareness and rises in raw material and energy prices¹⁰¹. While degradable bioplastics are increasingly marketed as an environmental solution, and offer some advantages, including potential 40-50% lower energy requirements than conventional plastics, their use also raises a number of concerns about potential conflicts with recycling, composting and littering behaviour (Chapter 11). Cadbury Schweppes, for instance, trialled bioplastics across a range of products but subsequently decided they were not an appropriate substitute¹⁰². Similar concerns exist where additives are used to make biodegradable materials.

Some products are increasingly touted as environmentally superior based on the claim that they are biodegradable in landfill, which is not likely given modern sanitary landfill development. Such claims could potentially run astray of the *Trade Practices Act*.

Composite and flexible packaging also provide potential conflicts for the packaging industry. As discussed previously, they can offer significant environmental benefits overall but are subject to criticism about recyclability. They can also complicate recycling rate calculations, as they are either viewed as contaminants or get included with other material categories such as mixed paper.

Findings and Recommendations – Risk and Opportunity Overview

- Some resistance is understandable in not wanting to detract from brand profiles and difficulties in data collection and verification, or due to concerns about deeper environmental scrutiny. However, in the relative absence of ‘good news’ stories and lack of viable industry response to packaging misperceptions, the packaging supply chain will continue to be under threat.
- Companies that embrace packaging sustainability are finding increased commercial opportunities and cost saving, as well as the ability to monitor emerging issues and respond in meaningful ways.
- The retailers’ various sustainability programmes may well come to conflicting conclusions about what are the preferred options. There is a risk that their requirements, being commercially-driven rather than the outcome of a consultative process aimed at reaching consensus, may be more difficult for their suppliers to cope with than legislation would have been.
- MS2 and Perchards recommend that the Australian packaging supply chain:
 - As a priority, convene a Sustainable Packaging Summit with broad representation and workshop formats to evaluate and prioritise key issues and develop a series of commitments and strategies for addressing packaging sustainability.

14.0 Sustainability Reporting Implementation Plan

In its vision statement, *Towards Sustainable Packaging*, the PCA recognised that sustainability reporting for the Australian packaging industry lags behind that seen elsewhere in the world. This view was consistently reinforced during stakeholder consultations and preparation of this report, which has identified a variety of significant data gaps. Although many sustainability reporting guidelines are intended for individual companies, there is strong support for greater industry transparency and leadership in developing and implementing consistent reporting frameworks. This section addresses general drivers for broader sustainability reporting and seeks to outline a reporting framework for the Australian packaging industry. This framework should be considered only as a starting point for additional stakeholder engagement in defining and reporting sustainable packaging.

14.1 Regulatory requirements

In addition to standard development and permitting requirements, the Australian packaging supply chain, especially large manufacturers and brand owners, is already subject to a variety of environmental planning and reporting requirements, as outlined in Chapter 4. These requirements provide a framework upon which to build industry sustainability. However, these requirements can vary significantly by state, facility size and emissions thresholds. Any sustainability reporting framework will need to incorporate these reporting requirements without duplicating existing efforts.

14.2 Stakeholder expectations

In its report, *Confidence in Corporate Reporting 2007*¹⁰³, CPA Australia surveyed business leaders, financial industry experts and the general public and identified strong support for the following environmental and social factors to be included in a company sustainability report:

- Environmental policy and performance (96% overall);
- Social policy statements or guidelines (82% overall);
- Health and safety policy and performance (81% overall);
- Use of natural resources by suppliers (81% overall);
- Human rights policy and performance (70% overall); and
- Supply chain standards for social issues (64% overall).

Examination and measurement of past performance, discussion of ongoing strategies and identification of specific environmental and social risks in sustainability reports were also viewed as important. Overall, 75% of respondents supported legal requirements for companies to prepare sustainability reports and nearly as many supported requiring independent reviews of their sustainability reports. Of the public respondents, 91% want mandatory water consumption reporting by companies in their annual reports.

Stakeholders are generally split on how best to drive sustainability improvements in companies. Stakeholders consulted for this report expressed a similar mix of views as stakeholders in the CPA Australia survey on the most effective approaches:

- Government regulation (33% supported);
- Competitive pressures (21% supported);
- Government incentives (18% supported);
- Stakeholder demand (14% supported); and
- Market-based mechanisms (12% supported).

While many stakeholders supported government intervention only after the packaging industry has been given a chance to succeed voluntarily, many feel that the industry has been effectively put on notice about the need to demonstrate improvement. Packaging recycling rates and design improvements have been specifically highlighted as visible demonstrations necessary to show industry commitment. Stakeholders consistently feel that while a variety of improvements have been implemented, especially in the past few years, such improvements have not been communicated effectively to stakeholders.

14.3 Moving on from the KPIs in Covenant MkII

The following current KPIs provide a foundation for further development, however some KPIs are either too difficult to measure accurately or do not reflect the broader sustainability aspects of the Covenant.

COVENANT MKII	COMMENTS
<p>OVERARCHING TARGETS:</p> <ul style="list-style-type: none"> • Increased recycling of post consumer packaging • Non-Recyclable Packaging • Packaging to Landfill <p>Covenant signatories to establish their own specific performance goals and milestones</p>	<p>There should continue to be targets under these headings, with levels to be negotiated (including the option of maintaining at 2010 levels).</p> <p>However, these should no longer be regarded as “overarching” targets – they should be on the same level as other sustainability goals.</p>

1. Packaging optimised to integrate considerations about resource efficiency, maximum resource re-utilisation, product protection, safety and hygiene

Data required on:

<ul style="list-style-type: none"> Changes in total weight of consumer packaging and total weight of products packaged in the Australian market 	<p>Packaging/product ratio is difficult to calculate and can cloud many essential issues. It will vary according to demographics (household size), and to the market share of heavy materials like glass and fibre and lightweight materials like metals and plastics, and takes no account of the trade-offs between consumer packaging and transport packaging.</p> <p>We recommend that the PCA draw up (or endorse) standardised calculation and reporting methods.</p> <p>Useful qualitative information</p>
<ul style="list-style-type: none"> Changes in the amount of energy and water used to produce packaging, by material type 	<p>Useful qualitative information</p>
<ul style="list-style-type: none"> Improvements in design, manufacture, marketing and distribution to minimise the environmental impacts of packaging 	
<ul style="list-style-type: none"> Changes to protection, safety, hygiene, shelf-life or supply chain considerations affecting the amount and type of packaging 	<p>Useful qualitative information</p>
<ul style="list-style-type: none"> Changes in average post-consumer recycled content in packaging manufactured 	<p>Nice to know, but as noted in chapter 15, closed-loop recycling may not be environmentally superior to using recycled packaging material in a non-packaging application.</p>
<ul style="list-style-type: none"> Changes in total weight, by type, of “non-recyclable” packaging in the Australian market 	<p>Under the Covenant, “non-recyclable” means not generally collected for recycling. It would be better to list the % of the population covered by collection schemes for each material and the recycling rates achieved.</p> <p>Yes</p>
<ul style="list-style-type: none"> Changes in the total amount of packaging disposed to landfill 	
<ul style="list-style-type: none"> The amount of consumer packaging in the total waste stream and its relativity to other waste stream components 	<p>Given the trade-offs between consumer packaging and transport packaging, why not measure <i>all</i> packaging placed on the market and <i>all</i> packaging entering the waste stream?</p>

2. Efficient resource recovery systems for consumer packaging and paper

Data required on:

<ul style="list-style-type: none"> Changes in total weight of consumer packaging recycled, through domestic and away-from-home recovery systems 	
<ul style="list-style-type: none"> Total weight of recycled consumer packaging sold to end-users 	<p>Again, not convinced that the focus on consumer packaging is right</p>
<ul style="list-style-type: none"> Number of Councils operating to good practice collection principles and state-based benchmarks 	<p>Yes</p>
<ul style="list-style-type: none"> % of households with access to kerbside collection systems 	<p>Yes</p>
<ul style="list-style-type: none"> % of households with access to other domestic collection systems 	<p>Yes</p>

<ul style="list-style-type: none"> Number of commercial and industrial premises with packaging recycling collection systems % of Councils and government agencies providing public place recycling infrastructure % of signatories providing recycling collection facilities for post-consumer packaging generated on-site 	<p>This is useful to determine trends, but without data on the amount <i>not</i> falling into this category it is difficult to assess the implications</p> <p>Yes</p> <p>Yes</p>
3. Consumers able to make informed decisions about consumption, use and disposal of packaging of products Data required on:	
<ul style="list-style-type: none"> Amount and type of consumer packaging in the litter stream Level of contamination rates in consumer packaging recovery systems Improvements in consumer knowledge about the functional attributes of packaging, including recyclability/reuse Improvements in littering behaviour 	<p>Yes – but measurement methodology must be defined. The target should be a reduction in the measured amount of packaging material found in litter, according to surveys conducted in the same places at the same time of year</p> <p>Yes</p> <p>Useful qualitative information</p> <p>Yes – but measurement methodology must be defined</p>
4. Signatories to demonstrate how their actions contribute to Covenant Performance Goals 1-3 Data required on:	
Number of signatories adopting the ECoPP and systems to implement it Number of signatories not meeting their obligations under the Covenant and implementation of the NEPM by jurisdictions Adoption and application of “Buy Recycled” policies or practice	<p>Yes</p> <p>Yes</p> <p>Yes</p>
5. Signatories to demonstrate continuous improvement in their management of packaging through their individual Action Plans and Annual Reports	
Extend obligation to demonstration of continuous improvement in the sustainability of their operations	

The following are provided for consideration and further consultation.

PROPOSED NEW KPIs FOR COVENANT MKIII AND/OR SUSTAINABILITY REPORTING		COMMENTS
Systems		
<ul style="list-style-type: none"> Number of signatories using an environmental management system such as the ISO 14000 series Number of signatories reporting according to GRI guidelines Number of signatories using PIQET or similar tools to guide their packaging development work Number of signatories using independent, third-party forest certification programs for sourcing fibre-based products 		
Emissions		
<ul style="list-style-type: none"> CO₂ equivalent emission levels Emissions to water 		We recommend that the PCA draw up (or endorse) standardised calculation and reporting methods BOD, COD, AOX (in kg per tonne of product)
Distribution efficiencies		
<ul style="list-style-type: none"> Freight km travelled per tonne of packaging or packaged goods delivered 		By improving routing, sharing loads and increasing backloading, improving the efficiency of central warehousing operations and minimising empty running
Waste		
<ul style="list-style-type: none"> Production residues to landfill Packaged product damage and loss rates Food wastage rates 		
Natural resources		
<ul style="list-style-type: none"> % of pulp and paper from certified forests Water consumption and water intensity for designated product categories Energy consumption and energy intensity for designated product categories 		Coal, gas, fuel oil, energy-from-waste, biomass reported separately in total MJ and MJ per tonne of product
Renewables		
<ul style="list-style-type: none"> % of energy obtained from renewable sources % of packaging materials produced from renewable sources 		This may not <i>necessarily</i> be an indicator of good environmental practice, but it would be useful to know the trend
Reusable packaging		
<ul style="list-style-type: none"> Quantify the extent of use of reusable transport packaging, in terms of <ul style="list-style-type: none"> (a) proportion of deliveries made in reusable packaging; (b) the average number of times that a reusable tray, crate, drum or pallet is reused 		Calculation methodology needed – there is a CEN report (TR 14520:2005) on methods for assessing the performance of a reuse system

Economic activity

- Decoupling of packaging generation from economic growth
- Estimates of avoided product damage and losses due to packaging
- Indicative investments in capital equipment and infrastructure development
- Investment in environmental management practices and efficiency improvements
- Estimates on industry investment in packaging recovery, waste management and litter
- Value of materials recovered through industry efforts
- Multiplier effects of the industry on other aspects of the economy

Packaging placed on the Australian market vs. GDP - %age changes from baseline year

Social influence

- OH&S performance, including accident rate per 1000 employees per year
- Proportion of female employees
- Community education efforts
- Community engagement, including use of citizens committees, tours, etc.
- Overseas supplier or end use market performance on human rights, including child and forced labour

Efforts to improve OH&S performance such as training, incentives, etc. would be useful

Absolute and relative decoupling of packaging generation from economic growth:

The concept of “absolute” and “relative” decoupling is now widely accepted in the EU.

“Absolute decoupling” means an absolute reduction in the amount of packaging placed on the market over a period of time, and can be regarded as an unqualified success for industry (provided comparable data are available for the start-point and end-point)

“Relative decoupling” means that packaging use is growing more slowly than GNP. This is often regarded as success, but it may not be a very relevant measure for countries where prosperity is growing rapidly.

If more people are coming into the market economy and are for the first time having access to packaged goods and modern retailing (e.g. China), it is reasonable to expect packaging growth to outstrip GNP.

If on the other hand this development has already happened, but incomes are rising rapidly (e.g. Ireland), there is no reason why packaging should keep pace with GNP. When we become better off, we do not buy twice as much breakfast cereal or twice as many bottles of wine; we probably have more evenings out or more expensive holidays, and buy better wine.

Thus in MS2 and Perchards’ view, avoidance of any increase in the weight of packaging placed on the market in relation to the volume of output should be the aim. Data on this are more likely to be available at company level than at industry level.

14.4 Sustainability reporting framework

The Covenant currently requires specific KPIs for recycling, waste and other sustainability indicators, as well as KPI reporting through the IDAS. This approach provides a useful starting point, as it currently covers 90% of the packaging produced in Australia and an estimated 80% of packaged retail brands sold¹⁰⁴. Although this approach has been refined over the past few years, there are still a variety of gaps and inconsistencies that argue for taking a more comprehensive approach.

Similarly, regulatory reporting requirements outlined previously are inconsistent and already burden many companies in the packaging supply chain. The PCA should not impose yet another reporting tier, but could support members and broader sustainability reporting by assisting in the development of consistent data collection and reporting frameworks.

14.5 Compiling and verifying information

In *Towards Sustainable Packaging*, the PCA committed to regularly produce examples of ‘best practice’ reporting overseas and to assist companies in sustainability reporting in five priority areas:

- Minimising water use;
- More efficient energy use;
- Less reliance on fossil fuels;
- Optimising resource efficiency; and
- Minimising waste impacts and optimising recovery of value from waste.

Energy efficiency and water efficiency KPIs required of packaging manufacturers are not available through IDAS due to low response and inconsistent measurement frameworks¹⁰⁵. These constraints are due in part to the wide variety of packaging types and concerns about unfair comparisons. However, the lack of consistent measurement and reporting is also a significant factor. For example, while both Amcor and Visy use Australian Greenhouse Office reporting workbooks to calculate greenhouse gas emissions, the companies take different approaches within the workbooks to account for transport emissions.

Various stakeholders consulted highlighted the value of the ability to gain independent verification for publicly reported data, particularly where such data becomes the basis for industry-wide sustainability reporting. Details on how best to secure such verification should be addressed through further discussions with stakeholders.

Findings and Recommendations – Sustainability Reporting Implementation Plan

There is a clearly identified need for greater transparency and accountability in reporting sustainability for the Australian packaging supply chain. However, such action will also increase stakeholder expectations and scrutiny, so these concerns will need to be managed sincerely and effectively. To make industry's responses more meaningful and effective, MS2 and Perchards recommend that the PCA:

- As a priority, convene an independent stakeholder advisory panel comprising industry, government, retail, community and other key stakeholders to develop consensus recommendations on packaging sustainability indicators and reporting frameworks in a transparent and accountable manner. Deliberations should focus on joint fact-finding, be open, duly minuted and regularly reported publicly to help ensure member accountability;
- The advisory panel should also be provided the opportunity for substantive feedback on the industry vision statement, Towards Sustainable Packaging and to recommend revisions to expand and strengthen the Covenant ('Covenant MkIII'); and
- Conduct annual public reporting on the state of packaging sustainability in Australia and ensure such reporting is readily available on PCA's website.

Resistance to reporting and KPIs under Covenant MkII has been less than expected, with many companies using the KPIs and increased data requirements, in particular, as an opportunity to reduce costs across their systems. Governments seem to have a greater understanding of data limitations, but lack of data is wearing thin as an industry excuse. Amcor, Visy and other prominent packaging manufacturers are increasingly open and transparent in reporting against environmental performance indicators. However, collective reporting of industry has been hampered by inconsistent data collection methodologies. MS2 and Perchards recommend that the PCA:

- Assist in developing standardised methods for calculating and reporting energy use, water use and other sustainability indicators to help address identified gaps in public reporting and IDAS data entry. Such methods should seek to build on existing state and Commonwealth reporting requirements to provide greater consistency and minimise duplication; and
- Undertake more detailed data collection across PCA members to report against the agreed indicators, including economic activity and social influence.

15.0 Conclusions

A change in mindset is underway in the Australian packaging industry to move toward greater sustainability as evidenced in the industry vision statement, *Toward Sustainable Packaging*, and in industry's commitment to conduct annual sustainability reporting. A sense of urgency is required, given significant supply chain pressures and the pending mid-term review of the National Packaging Covenant.

EU environmental law, and to a lesser extent pressure from NGOs and the media, have sharpened up the environmental awareness and performance of European-based brand owners and their packaging suppliers. International packaging and packaged goods companies and beverage container brand owners and suppliers in Australia have also long been targeted and have had to respond. As a result, these companies are in an excellent position to embrace sustainability now that the packaging supply chain is increasingly held accountable for the sustainability of its business practices.

“As globalisation accelerates, and as the limits of the planet's resources are reached, large companies and brands will increasingly be held to account on the sustainability of their business practices. The companies that succeed will be those that reduce their environmental impacts and increase the sustainability of their supply chains now, rather than wait until either legislation or public outcry forces them to do so.”

Patrick Cescau, Group Chief Executive, Unilever¹⁰⁶

Companies that embrace packaging sustainability are finding increased commercial opportunities and cost saving, as well as the ability to monitor emerging issues and respond in meaningful ways.

Various sustainability programs by retailers, particularly overseas retailers, may well come to conflicting conclusions about what are the preferred options. There is a risk that their requirements, being commercially-driven rather than the outcome of a consultative process aimed at reaching consensus, may be more difficult for their suppliers to cope with than legislation would have been.

Transparency and Accountability

Past packaging supply chain behaviour, exclusionary decision-making and general lack of stakeholder engagement have generated significant mistrust and scepticism that industry is serious about packaging sustainability. The supply chain must provide clear, verifiable evidence that progress is being made.

The Australian packaging supply chain has initiated a wide variety of efforts to improve industry sustainability. However, most Australian consumers, NGOs and governments are not aware of the extent of these efforts. In addition, a small number of poor packaging decisions are used to paint negative pictures of the industry as a whole.

In the relative absence of ‘good news’ stories and lack of viable industry response to packaging misperceptions, the packaging supply chain will continue to be under threat. Just as the Australian packaging industry must demonstrate that it is accountable for its actions, NGOs and opponents must also be held accountable. The PCA and its members must be more proactive in ensuring an accurate understanding of packaging is available to educate those interested in packaging sustainability.

Consistent Data Collection

Resistance to reporting and KPIs under Covenant MkII has been less than expected, with many companies using the KPIs and increased data requirements, in particular, as an opportunity to reduce costs across their systems. Governments seem to have a greater understanding of data limitations, but lack of data is wearing thin as an industry excuse. Amcor, Visy and other prominent packaging manufacturers are increasingly open and transparent in reporting against environmental performance indicators. However, collective reporting of industry has been hampered by lack of data and inconsistent data collection methodologies. MS2 and Perchards have recommended that the PCA assist in developing standardised methods for calculating and reporting sustainability indicators to help address identified gaps and undertake more detailed data collection across PCA members to report against the agreed indicators.

National Packaging Covenant

The Covenant has given Australia’s packaging supply chain an excellent opportunity to prove that it can effectively manage its own affairs and minimise the environmental impacts of packaging; however, some of this potential has been squandered.

A variety of Covenant signatories are only just realising the true significance of Covenant MkII and the opportunities it provides. Covenant awareness is still absent in certain supply chain sectors, and the broader community has little or no understanding of packaging improvements under the Covenant. While a Covenant communications plan is under development, many industry signatories have again squandered the opportunity to make their sustainability efforts under the Covenant known more broadly.

MS2 and Perchards have recommended that the Australian packaging supply chain commence discussions about content and structure of a Covenant MkIII in conjunction with an independent stakeholder advisory panel. Various recommendations have been made to address sustainability more broadly, more effectively report against Covenant KPIs and strengthen the ECoPP and its review process.

Stakeholders consulted for this report see a real leadership role for the Packaging Council of Australia in making a concerted effort to drive the industry towards greater sustainability, and in measuring and reporting progress. Meaningful efforts to do so can provide substantial benefit for PCA and its members.

16.0 References

- ABC News, 2007, Consumer watchdog targets 'green marketing', <http://www.abc.net.au/news/stories/2007/10/29/2073575.htm>, accessed October 2007.
- ABS (Australian Bureau of Statistics), 2006, *4610.0 – Water Account, Australia, 2004-05*, <http://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/4610.0?OpenDocument>, accessed December 2007.
- Ackerman, F., Salon D., Segall L. & Zuckerman B., 1995, *Refillable Bottle Use in the Beer Industry*. Preliminary report to the U.S. EPA Office of Solid Waste. Boston.
- AEA Technology, 2001, *Waste management options and climate change*, http://ec.europa.eu/environment/waste/studies/climate_change.htm, accessed March 2007.
- AFGC (Australian Food and Grocery Council), 2003, *Environment Report 2003*, Canberra.
- AGO (Australian Greenhouse Office), 2006, *AGO Factors and Methods Workbook*, Canberra.
- AGO, 2007a, National Greenhouse Gas Inventory 2005, <http://www.greenhouse.gov.au/inventory/2005/pubs/inventory2005.pdf>, accessed November 2007.
- AGO, 2007b, National Inventory by Economic Sector 2005, <http://www.greenhouse.gov.au/inventory/2005/pubs/inventory2005-economic.pdf>, accessed November 2007.
- AiGroup (Australian Industry Group), 2007, Environmental Sustainability and Industry: Road to a sustainable future, http://pdf.aiigroup.asn.au/environment/enviro_sustain_indust_report.pdf, accessed October 2007.
- Amcor, 2007, Sustainability Report 2006, <http://media.amcor.com/documents/AmcorSustainabilityReport2006.pdf>, accessed October 2007.
- Amcor Cartonboard Australasia, 2007, One Greyback Communication, Melbourne.
- Aperio Group, 2005, *National Packaging Covenant Action Plan July 2005 to June 2008*, http://www.packagingcovenant.org.au/documents/File/ap_Aperio_Group_05_08_PUBLIC.pdf, accessed October 2007.
- Arnold, E., and Larsen, J., 2006, Bottled Water: Pouring Resources Down the Drain, <http://www.earth-policy.org/Updates/2006/Update51.htm>, accessed January 2008.
- Australian Greenhouse Office, Department of the Environment and Heritage, 2005, Australia's Fourth National Communication on Climate Change, <http://unfccc.int/resource/docs/natc/ausnc4.pdf>, accessed February 2008.

Bio Intelligence and O2 report for the European Commission 2003, *Study on external environmental effects related to the life cycle of products and services*

British Soft Drinks Association, 2005, personal communication quoted in Perchards et al, 2005, *Study on the progress of the implementation and impact of Directive 94/62/EC on the functioning of the Internal Market*, http://ec.europa.eu/enterprise/environment/reports_studies/studies/report_packaging_direct.pdf.

Cadbury Schweppes, 2005, *National Packaging Covenant Action Plan 1 July 2005 – 30 June 2008*, http://www.packagingcovenant.org.au/documents/File/ap_Cadbury_Swheppes_05_10.pdf, accessed November 2007.

Cadbury Schweppes, 2006a, *National Packaging Covenant 2005 / 2006 Annual Report*, http://www.packagingcovenant.org.au/documents/File/AR_Cadbury_Swheppes_05_06.pdf, accessed November 2007.

Cadbury Schweppes, 2006b, *Corporate and Social Responsibility Report 2006*, <http://www.cadburyschweppes.com/EN/EnvironmentSociety/>, accessed October 2007.

CE Delft / KPMG, 2004, *A new environmental methodology for packaging and its integration with product policy: A preliminary study*, <http://www.cedelft.nl/eng/index.html>, accessed January 2008.

CEN, 2000, *Packaging - Report on criteria and methodologies for life cycle analysis of packaging* (CR 13910:2000).

CIAA (Confederation des Industries Agro-Alimentaires de l'UE), *CIAA Environment Report Marks European Food And Drink Industry Contribution To Constructive Debate On Environmental Sustainability*, http://www.ciaa.be/documents/press_releases/pr_envi_report_10-2007.pdf, accessed December 2007.

Coles Myer Ltd, 2006, *National Packaging Covenant Action Plan: Coles Myer Action Plan 2005 – 2008*, http://www.packagingcovenant.org.au/documents/File/AP_Coles_Myer_05_08.pdf, accessed October 2007.

Cordner, E., 2007, *The Covenant – Product Stewardship and EPR in Action*, presentation to Local Government Association of Queensland Waste Forum, Brisbane, 5 December 2007.

CPA Australia, 2007, *Confidence in Corporate Reporting 2007*, http://www.cpaaustralia.com.au/cps/rde/xchg/SID-3F57FECA-8D85F521/cpa/hs.xsl/726_24967_ENA_HTML.htm, accessed December 2007.

C4ES Pty Ltd, 2000, *Impacts of Container Deposit Legislation on New South Wales Recycling And Litter Management Programs*, report for Beverage Industry Environment Council, Sydney.

DEC (Department of Environment and Conservation) (NSW), 2006a, Environmental Benefits of Recycling Calculator, prepared by Hyder Consulting, available at http://www.environment.nsw.gov.au/education/spd_lgov_benefitrecycling.htm, accessed March 2007.

DEC, 2006b, *Who Cares about the Environment in 2006?*, <http://www.environment.nsw.gov.au/whocares/index.htm>, accessed October 2007.

DECC (Department of Environment and Climate Change NSW (previously DEC)), 2007, *Who Cares about Water and Climate Change in 2007?*, http://www.environment.nsw.gov.au/resources/207545_whocares_waterclimate07.pdf, accessed January 2008.

Ecovoice, 2006, Bottled water impacts environment, http://www.ecovoice.com.au/enews/enews-34/bottled_water_enews34.php, accessed January 2008.

ElAmin, A., 2007, *Wal-Mart Rating System not a Standard Says Industry*, <http://foodproductiondaily.com/news/ng.asp?id=80216>, accessed October 2007.

Environment Victoria, 2007, *The DUMP report*, <http://www.envict.org.au/file/DUMP%20Report%202006.pdf>, accessed February 2008.

European Commission, 2006, *Report from the Commission to the Council and the European Parliament on the implementation of Directive 94/62/EC on packaging and packaging waste and its impact on the environment, as well as on the functioning of the internal market*, COM/2006/0767 final, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52006DC0767:EN:NOT>.

European Commission - Joint Research Centre, Institute for Environment and Sustainability, 2007, *Carbon footprint - what it is and how to measure it*, http://lca.jrc.ec.europa.eu/Carbon_footprint.pdf

European Commission, 2008, Packaging and packaging waste data published on the Europa website at <http://ec.europa.eu/environment/waste/packaging/data.htm>.

European Environment Agency, 2005, Report No. 11/2005, *Household consumption and the environment*.

EUROPEN (European Organisation for Packaging and the Environment), 1997, *Economic Instruments in Environmental Policy: a Discussion Paper with Special Reference to Implications for Packaging and Packaged Goods*, Brussels.

EUROPEN 2007, EUROPEN Bulletin 42 – December 2007, Brussels.

Finsia (Financial Services Institute of Australasia), 2007, *Tip of the Iceberg?*, report by Econtech, Sydney.

Foster's Group, 2007, *Foster's Group National Packaging Covenant Annual Report July 2006 – June 2007*, http://www.packagingcovenant.org.au/documents/File/Fosters_Group_AR_06_07.pdf, accessed November 2007.

Greenpeace, 2006, *Plastic Debris in the World's Oceans*, http://oceans.greenpeace.org/raw/content/en/documents-reports/plastic_ocean_report.pdf, accessed January 2008.

GRI (Global Reporting Initiative), 2000-2006, *Sustainability Reporting Guidelines 2000-2006*, <http://www.globalreporting.org/ReportingFramework/G3Guidelines/>, accessed August 2007.

Gronow, J, 2006, *Future trends in waste management and carbon*.

Hyder Consulting, 2007, *Independent Assessment of Public Place Recycling*, report for Queensland EPA and National Packaging Covenant Council, http://www.packagingcovenant.org.au/documents/File/NPG_11_06_PPR_Assessment_Final_Report.pdf, accessed January 2008.

INCPEN, 1996, *Environmental impact of packaging in the UK food supply system*, London.

INCPEN, 2006, *Towards Sustainable Distribution: performance of INCPEN members*, London.

KAB (Keep Australia Beautiful), 2007, *National Litter Index 2006 – 2007*, http://www.kab.org.au/dbase_upl/a%20NLI%20report%200607%200506.pdf, accessed January 2008.

Kooijman, J M, 2000, *Environmental impact of packaging – performance in the household*, prepared for INCPEN and summarised in INCPEN, 2001. *Towards greener households – products, packaging and energy*.

Larsen, J., 2007, *Bottled Water Boycotts: Back-to-the-Tap Movement Gains Momentum*, <http://www.earth-policy.org/Updates/2007/Update68.htm>, accessed January 2008.

Lewis, H, Fitzpatrick, L, Verghese, K, Sonneveld, K and Jordon, R, 2007, *Sustainable packaging redefined*, Sustainable Packaging Alliance, <http://www.sustainablepack.org/database/files/newsfiles/Sustainable%20Packaging%20Redefined%20Nov%20%202007.pdf>

Linde, A., Rexam PLC, slide presented at INCPEN seminar, *Thinking out of the box – packaging in a sustainable future*, 14 September 2006.

Linden, A., 2007, *Green wine? I'll drink to that.*, <http://smallbusiness.theage.com.au/starting/technology/green-wine-i'll-drink-to-that.-902147111.html?page=2#>, accessed November 2007.

Mortensen, A, 2005, Tomra Systems ASA, *Models for collecting used beverage packaging*.

MS2 (Martin Stewardship & Management Strategies), 2006, *Strengthening Packaging Product Stewardship in Australia*, report for National Packaging Covenant Industry Association, <http://www.ms2.com.au/pubs.htm>, accessed September 2007.

Munro, C., 2006, *Bottled water the 'new eco-disaster'*, published in *The Age*, 26 February, 2006.

NPCC (National Packaging Covenant Council), 2007, *The National Packaging Covenant 2005-2006 Annual Report*, <http://www.packagingcovenant.org.au/page.php?name=reporting>, accessed May 2007.

O-I (O-I Australia), n.d., O-I Australia Action Plan 2006-2008, http://www.packagingcovenant.org.au/documents/File/AP_ACI_Glass_Packaging_06_08.pdf, accessed November 2007.

PACIA (Plastics and Chemicals Industries Association Incorporated), 2007a, *Sustainability Leadership Framework for Industry: Plastics and Chemicals Industry Discussion Paper*, Melbourne.

PACIA 2007b, 2007 *National Plastics Recycling Survey (2006 calendar year)*, prepared by Hyder Consulting, Melbourne.

PACIA, 2007c, *Using Degradable Plastics in Australia: A Product Stewardship Guide and Commitment*, Melbourne.

PAC NZ, 2007, New Zealanders recycled almost 20% more packaging last year than the year before, http://www.packaging.org.nz/media/media_news.php#recycling, accessed September 2007.

PCA (Packaging Council of Australia), 2007, *Australian Packaging: Real Examples of Change and Innovation*, Melbourne.

PIRA and ECOLAS (PIRA International Ltd and ECOLAS N.V.), 2005, *Study on the implementation of Directive 94/62/EC on Packaging and Packaging Waste and options to strengthen prevention and re-use of packaging: Final report*, http://www.europa.eu.int/comm/environment/waste/studies/packaging/050224_final_report.pdf, accessed July 2005.

PlasticsEurope, 2007, *The 'carbon footprint' – an unreliable indicator of environmental sustainability*, <http://www.plasticseurope.org/Content/Default.asp?PageName=openfile&DocRef=20080129-001>.

Platt, B., 2006, Crops Into Plastics, http://wasteage.com/mag/waste_crops_plastics/, accessed September 2007.

PR Newswire, 2007, *Waste Reduction is Top Environmental Concern for Manufacturers Globally: Survey Highlights Differences In Sustainability Priorities around the World*, www.cnnmoney.com, accessed October 2007.

PSF (Packaging Stewardship Forum), 2007, National Packaging Covenant Action Plan Report 2006-2007, http://www.packagingcovenant.org.au/documents/File/Packaging_Stewardship_Forum_AR_06_07.pdf, Accessed January 2008.

Rowell, R., 2007, *Sustainability and Retailers Perspectives from Wal-Mart*, presentation to the Packaging Council of Australia,

SCA (Svenska Cellulosa Aktiebolaget), 2007, *SCA Sustainability Report 2006*, http://www.sca.com/documents/en/Env_Reports/Sustainability_Report_2006_en.pdf, accessed September 2007.

Sustainable Forest Products Industry (SFPI), 2007, *The Sustainable Forest Products Industry, Carbon and Climate Change – Key Messages for Policy-Makers (2007 Update)*, <http://www.wbcsd.org/>, accessed October 2007.

Sustainable Packaging Alliance (SPA), 2007, *Sustainable Packaging Redefined*, <http://www.sustainablepack.org/research/subpage.aspx?id=7&PageID=10>, accessed January 2008.

Sustainable Packaging Coalition, (SPC), 2005, *Definition of Sustainable Packaging Version 1.0*, <http://www.sustainablepackaging.org/pdf/Definition%20of%20Sustainable%20Packaging%2010-15-05%20final.pdf>, accessed September 2007.

TRC (Taverner Research Company), 2004, *Consumer Demand for Environmental Packaging*, report for the Jurisdictional Recycling Group, Sydney.

United Nations Framework Convention on Climate Change (UNFCCC) Secretariat, <http://unfccc.int/2860.php>, accessed February 2008. Per capita data derived from UN Department of Economic and Social Affairs, Population Division, <http://esa.un.org/unpp/> accessed February 2008.

VAL-I-PAC, 2005, *personal communication*.

Verfaillie, H. and Bidwell, R., 2000, *Measuring Eco-efficiency: A Guide to Reporting Company Performance*, report for the World Business Council for Sustainable Development, <http://www.wbcsd.org/DocRoot/inRjcUqcjX3UepuL9xAN/MeasuringEE.pdf>, accessed September 2007.

Vienna Economic University, Department of Technology and Commodity Science, 2003, *Analysis and evaluation of littering in Vienna and other European cities*.

Visy, 2006, The Visy National Packaging Covenant Report 2006, http://www.packagingcovenant.org.au/documents/File/AR_Visy_Industries_05_06.pdf, accessed September 2007.

Visy, 2007, *Visy and Water*, Fact Sheet July 2007.

WBCSD (World Business Council for Sustainable Development), 2006a, *Bioplastics Show Signs of a Boom in 2006*, <http://www.wbcsd.org/>, accessed September 2007.

WBCSD, 2006b, *Sustainable Food and Beverage Packaging Market to Surpass \$42 Billion by 2010*, <http://www.wbcsd.org/>, accessed September 2007.

WBCSD, 2007a, *Green Grocer? Tesco, Carbon and the Consumer*, <http://www.wbcsd.org/>, accessed September 2007.

WBCSD, 2007b, *Clinton sees Economic 'Boom' in Fighting Climate Change*, <http://www.wbcsd.org/>, accessed September 2007.

WBCSD, 2007c, *Business Leaders Call for Public Policies that Leverage Forest Carbon Cycle*, <http://www.wbcsd.org/>, accessed September 2007.

WBCSD, 2007d, *Beyond Corporate Responsibility: Social Innovation and Sustainable Development as Drivers of Business Growth*, <http://www.wbcsd.org/>, accessed September 2007.

WBCSD, 2007e, *Sustainability Commitments and Supply Chains*, <http://www.wbcsd.org/>, accessed September 2007.

WBCSD, 2007f, *Majority of Retailers Taking Sustainability to Heart, Survey Finds*, <http://www.wbcsd.org/>, accessed October 2007.

Appendix A: Methodology and Limitations

MS2 has led this project within Australia, facilitated stakeholder engagement and led report development, while Perchards have provided support research and reviews based on European experience.

This report is intended to be consistent to the fullest extent possible with reporting principles established by the Global Reporting Initiative's (GRI) Sustainability Reporting Guidelines¹⁰⁷ and reporting principles of the World Business Council for Sustainable Development (WBCSD)¹⁰⁸. These principles are detailed in Appendix B, and include Materiality, Stakeholder Inclusiveness, Sustainability Context, Completeness, Balance, Comparability, Accuracy, Timeliness, Clarity and Reliability. Limitations in trying to apply these parameters across the Australian packaging supply chain are reported below.

Initial Research

MS2 and Perchards conducted secondary (desktop) research on defining and reporting against sustainable packaging. Perchards addressed experience in Europe, while MS2 addressed experience in other regions, including Australia.

Stakeholder Engagement

MS2 conducted primary (consultative) research on views on global examples of packaging sustainability reporting and on key issues for defining and reporting against sustainable packaging in Australia with the key stakeholders identified below. Key stakeholders were identified in consultation with PCA to reflect the packaging supply chain broadly and ensure representative involvement from a full range of interests. We appreciate the interest and insight of those consulted.

Australian packaging supply chain companies

Amcor Australasia	Carter Holt Harvey	Mead Westvaco
Visy Industries	Huhtamaki	

Brand Owners

McDonald's Australia	Goodman Fielder	Fosters Group
Unilever	Lion Nathan	Cadbury Schweppes
Nestle		

Retailers

Coles Group Limited	Woolworths	Metcash
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Industry Associations

Packaging Council of Australia

Australian Food and Grocery Council

Packaging Stewardship Forum of the AFGC

Australian Council of Recyclers

Plastics and Chemicals Industries Association

Government Agencies

NSW Department of Environment and Climate Change

Sustainability Victoria

Queensland Environmental Protection Agency

Community and Other Organisations

Total Environment Centre

National Packaging Covenant Secretariat

Sustainable Packaging Alliance

WME Media

In addition, consultations were scheduled but failed to eventuate with: Aperio Group Australasia, Campbell/Arnott's and the Local Government and Shires Association NSW.

Comparisons with Overseas Programs

Relatively little original research has been conducted on environmental issues. Most studies involve manipulation of existing data or review existing reports to look at old findings in a new way. One very common short-cut is to 'borrow' data from abroad. Europe has been the global leader in waste management policymaking, and is also seeking to drive the sustainability debate. Australia tends to look to Europe as the benchmark on environmental issues, and it is tempting to base the debate in this country on data collected there or in the US and rely on the use of inappropriate comparisons. MS2 and Perchards sought to draw on Australian data to the fullest extent possible, and to use the wealth of material available from abroad only when it is fully applicable to Australia.

Draft Report and Finalisation

Where necessary to preserve confidentiality, non-disclosure agreements were entered into to enable compilation of confidential parameters and incorporation with publicly available data to report parameters on an aggregated basis.

To encourage stakeholder engagement and an accurate reflection of the state of packaging sustainability in Australia, it was agreed during project scoping that this report would be broadly circulated as a Draft Report, including to all stakeholders consulted. The Draft Report provided a Preliminary Implementation Plan to assist in prompting stakeholder feedback.

Benefits of Recycling Calculations

- Indicative environmental benefits calculated for national data and the Amcor and Visy case studies have used the NSW DECC's Environmental Benefits of Recycling Calculator (DECC 2006). Assumptions used by this calculator are listed in Table A-1.

Table A-1: Assumptions in Calculating Environmental Benefits

	Greenhouse Benefits	Water Savings
Material	t CO ₂ eq per tonne recycled	1,000 litres per tonne recycled
Paper/ Cardboard	0.4	23.7
Glass	0.4	2.0
Aluminium	15.2	233.2
Steel cans	0.8	1.1
HDPE	0.5	-10.4
PET	1.5	-12.1

- Recycling benefits calculators have been developed for South Australia and Western Australia, but are not yet publicly available. These new calculators will likely use different assumptions than those shown in Table 8-2, and would produce different results.
- One constraint in applying this model is that the calculator only covers HDPE and PET plastics. Input values of plastics 3-7 are not readily available, and would have required extensive modelling outside the scope of this project, so the calculation of environmental benefits of recycling plastics is understated, having been restricted to PET and HDPE only. Environmental benefits have been calculated using the PET and HDPE tonnages reported recycled for 2006 in PACIA 2007b.
- All benefits are net benefits; that is, they are the benefits after the average impacts of collection, transport and reprocessing have been accounted for.
- Most figures have been rounded and totals may not equal due to rounding.

Limitations

This report is supplied in good faith and reflects the knowledge, expertise and experience of the consultants involved, supplemented with input from key stakeholders and secondary research.

This report is intended to be consistent to the fullest extent possible with reporting principles established by the GRI Sustainability Reporting Guidelines¹⁰⁹ and reporting principles of the WBCSD¹¹⁰. In trying to report across the packaging supply chain, it will not be possible to report all activities consistent with these principles, which relate primarily to an individual organisation.

MS2 and Perchards have endeavoured to use the best information is available and to use publicly available information to the fullest extent possible; the authors are therefore relying on the accuracy and credibility of that information. References are provided throughout the

report and in endnotes. References are specified in Section 16. MS2 and Perchards have also relied upon the accuracy and credibility of information, including data provided on a confidential basis, provided by stakeholders during consultations.

Confidential performance data was provided by Amcor Australasia, Carter Holt Harvey, Huhtamaki and Visy Industries in a consistent reporting framework developed by MS2. While these companies provided data for the categories ‘Recovery & Recycling’, ‘Paper-based Packaging’, ‘Food & Beverage Packaging’ and ‘Other Packaging’, results could not be presented in these categories without revealing confidential information. Greater response across a broader range of packaging manufacturers would be necessary to provide such distinctions within a public report.

As this report represents the first time that sustainability has been reported for the packaging supply chain in Australia, it is anticipated that the report and reporting frameworks will improve and evolve over time while remaining consistent with international principles.

Appendix B: Towards Sustainable Packaging

Towards Sustainable Packaging

Moving Beyond the Debate

Australians are concerned about a range of environmental issues. In recent times these concerns have increased significantly. Climate change, greenhouse gases, water shortages and energy usage are all issues provoking questions about the sustainability of our lifestyle. Being environmentally responsible is now more important to consumers.

The packaging industry in Australia needs to respond to these concerns. Packaging is not viewed positively. Perceptions persist about over-packaging and excessive waste. With the heightened focus on the environment, these criticisms are likely to become louder.

Yet the reality is different. The industry has a solid base of environmental achievement. It has taken the lead on recycling. Commercial pressures are reducing the amount of resources put into producing packaging. Packaging actually reduces product waste. It minimises environmental impacts by protecting products from damage and increasing the shelf-life of perishable products. These are all sustainable outcomes.

The industry is well positioned to address sustainability, and will benefit from doing so. Sustainable packaging is good business! Packaging innovation and better design often means the use of less resources, the production of less waste, lower costs and a more competitive product. Recycling of used packaging also enhances sustainability.

Industry must articulate what sustainable packaging means for Australia. It needs to address the « disconnect » between the perceptions and reality of packaging.

Defining Sustainable Packaging

A sustainable packaging and product supply chain might be defined as 'a system that enables goods to be produced, distributed, used and recovered with minimum environmental impact at lowest social and economic cost'.

Sustainability is not an end in itself, but rather a continuing journey. A consensus definition of sustainability is difficult to reach for any industry sector, and it is unlikely that stakeholders would unanimously agree when an industry such as packaging has become sustainable.

In Australia, the National Packaging Covenant has, since 1999, been the principal national policy instrument for improving the sustainability of packaging. The Covenant's Environmental Code of Practice for Packaging (ECoPP) is also an aid to help companies demonstrate consideration of environmental parameters in packaging decision-making. But beyond these instruments there are many other policy tools and regulations – as well as commercial reality - which are driving the goal of sustainability and forcing companies to respond. These pressures will not diminish.

Sustainability is an increasingly important part of packaging decision-making. Industry must have the flexibility and obligation to use all appropriate materials responsibly.

The Australian Packaging Supply Chain

The industry needs to take the lead in demonstrating that packaging adds environmental value to the Australian community. It contributes to the economic and social well-being of all Australians by providing convenient, safe and cost-efficient delivery of products. It provides consumers with important, often vital, product information.

The Australian packaging supply chain has made steady progress in balancing the social, economic and environmental components of sustainability. While this progress shouldn't be overstated, it shouldn't be overlooked, either. It provides a base for future action.

Companies in the packaging supply chain have made very public improvements in sustainability and, under the auspices of the Covenant, have worked closely with governments to achieve a 56% recycling rate in 2005. This level of recycling delivers an annual net benefit equal to 6.5 million m³ of landfill space saved; 1.4 million tonnes CO₂-equivalent saved; 352,000 cars removed from roads; and 19,792 Olympic pools worth of water savings. However, consumers generally hear only the contrary NGO view of 'bad' packaging without an appropriate context.

Australia's recycling rate of used packaging has been achieved at a substantially lower cost to consumers and governments than the costly recycling infrastructure in much of Europe.

Uncertainties, complex environmental trade-offs and rapidly changing information complicate the task of keeping track of developments in packaging. This has been compounded by the general lack of industry-wide data and a reluctance of some companies in the packaging supply chain to divulge environmental performance data. Increased transparency and ready availability of information beyond waste and recycling performance are needed to change perceptions about packaging.

Results of Australia's life cycle, supply chain approaches to packaging sustainability must be clearly communicated to stakeholders using reliable, verifiable information.

Moving Towards more Sustainable Packaging

A pro-active industry approach to sustainability provides the perfect opportunity for examination and improvement.

Adoption of sustainable practices is increasingly recognized as a demonstration of sound corporate management. Honest, open and thorough evaluation of process flows and life-cycle impacts across the packaging supply chain can also increase efficiency and improve profitability while allowing for risk reduction given the increased threats of a carbon-constrained economy and modified pricing of energy, water and other resources.

Consumers and decision makers increasingly expect to be able to quickly evaluate environmental attributes and impacts of products; industry must respond accordingly.

Prompt dissemination of accurate, verifiable information also helps to counter the electronic distribution of inaccurate or misleading information by packaging opponents and help build market advantage over under-performing competitors. Just as brand identification can provide commercial benefit, it can also present risks if the brand becomes associated with perceived inappropriate practices.

Pursuing sustainable packaging is in industry's best interests to help ensure consumer satisfaction and reduce potential regulatory pressures. Knowledge is power; misguided knowledge is dangerous.

The Australian packaging supply chain can and must demonstrate greater progress towards sustainability through sustainable packaging strategies. This can be achieved through:

- Actively supporting sustainable packaging strategies that evaluate packaging on the Australian market in context; seek consensus on defining sustainable packaging in Australia and on KPIs; and outline actions for demonstrating progress towards sustainability;
- Continuing to work with brand owners/fillers to reduce the impacts of packaging;
- Communicating the broader sustainability aspects of packaging and improved measurement of environmental parameters under Australian conditions for the packaging supply chain, spanning carbon footprint, environmental footprint, material consumption and life-cycle impacts across production, transport, consumer usage and end-of-life management;
- Improving coordination and usage of multi-stakeholder advisory bodies for scoping, joint fact-finding and dissemination of results to help address concerns about perceptions of 'over-packaging' and the achievements on recovery and recycling;
- Improving accountability and transparency in reporting environmental performance, including use of third-party verification, and enabling greater real-time evaluation of performance among industry, policy makers and other key stakeholders;
- Improving the uptake and reporting by companies of activities to help ensure due consideration of sustainability parameters in their packaging decision-making;
- Full and transparent application of the Covenant and the associated ECoPP and the publication of results to the fullest extent possible;
- Greater public awareness of the complex balance between the role of packaging in maintaining product quality and integrity and in reducing overall environmental impacts of product distribution, and the associated cost savings by doing so;
- Support for policies and policy instruments that reflect proper pricing of environmental externalities, both positive and negative, to help optimise market influence and better utilise the packaging industry's position with regard to recycling and minimisation of resource use; and
- Innovative approaches that contribute to supply chain sustainability.

Given the greenhouse gas savings from recycling most packaging types and the importance of packaging to Australian recycling programs, continued commitment to kerbside and Away from Home recycling programs is essential. Recycling is a visible means of demonstrating sustainability and is strongly embraced in Australia.

However, further opportunities for reducing system losses, improving transport efficiencies and developing local markets for recovered packaging should be pursued to further reduce overall environmental impacts while improving the economics of recovery.

Packaging helps reduce greenhouse gases through lighter weight, more efficient material usage, and by ensuring products get safely to consumers. Recycling of

packaging provides significant greenhouse gas reductions and is essential to Australian recycling programs. Consumers and industry must continue to optimise recycling programs to yield further greenhouse benefits.

What the Packaging Council of Australia will Do

The PCA will continue to take a leading role in improving sustainability performance across the packaging supply chain. Our aim is to make a positive contribution to helping consumers live a sustainable lifestyle. To this end the PCA will:

- Actively and constructively engage in the public debate on sustainability as it affects packaging, including defining sustainable packaging in an Australian context and tracking progress toward sustainable packaging;
- Report annually on the overall recycling figures for Australian packaging, broader trends in sustainable packaging and on information and policy gaps that need to be addressed in order to provide more valuable feedback to the packaging industry and broader community;
- Help facilitate and track progress by companies in the packaging supply chain in reducing the environmental impact of packaging, including water, greenhouse and energy issues;
- Continue to encourage companies to commit and actively participate in the National Packaging Covenant and where possible, go beyond the requirements of the Covenant; and
- Continue our programs to develop educational materials for students at the primary, secondary and tertiary levels.

Appendix C: Reporting Principles

The Global Reporting Initiative's Sustainability Reporting Guidelines establish and define the following reporting principles¹¹¹:

Materiality: The information in a report should cover topics and indicators that reflect the organisation's significant economic, environmental, and social impacts, or that would substantively influence the assessments and decisions of stakeholders.

Stakeholder Inclusiveness: The reporting organisation should identify its stakeholders and explain in the report how it has responded to their reasonable expectations and interests.

Sustainability Context: The report should present the organisation's performance in the wider context of sustainability.

Completeness: Coverage of the material topics and indicators and definition of the report boundary should be sufficient to reflect significant economic, environmental, and social impacts and enable stakeholders to assess the reporting organisation's performance in the reporting period.

Balance: The report should reflect positive and negative aspects of the organisation's performance to enable a reasoned assessment of overall performance.

Comparability: Issues and information should be selected, compiled, and reported consistently. Reported information should be presented in a manner that enables stakeholders to analyse changes in the organisation's performance over time, and could support analysis relative to other organisations.

Accuracy: The reported information should be sufficiently accurate and detailed for stakeholders to assess the reporting organisation's performance.

Timeliness: Reporting occurs on a regular schedule and information is available in time for stakeholders to make informed decisions.

Clarity: Information should be made available in a manner that is understandable and accessible to stakeholders using the report.

Reliability: Information and processes used in the preparation of a report should be gathered, recorded, compiled, analysed, and disclosed in a way that could be subject to examination and that establishes the quality and materiality of the information.

Appendix D: INCPEN Environmental Performance Survey

In September 2006, the UK-based Industry Council for Packaging and the Environment, INCPEN, conducted a survey of the current environmental performance of its members in key impact areas. The results were published in November 2006 in *Towards Sustainable Distribution: performance of INCPEN members*. This report measured members' progress on reducing environmental impacts and established a baseline against which to measure progress towards sustainable production, distribution and consumption. This study will be repeated every two years.

INCPEN is a research organisation that draws together an influential group of major packaging and packaged goods manufacturers and retailers. Its aims are to ensure that policy on packaging makes a positive contribution to sustainability, to encourage industry to minimise the environmental impact of its activities and to explain the role of packaging in society. Thus, it is a self-selected group and the results reported are likely to be much closer to best practice than typical practice.

Twelve of INCPEN's 24 members contributed data to the study, which found that:

- Members were undertaking a wide range of environmental initiatives that go above and beyond legal compliance;
- There was a high level of monitoring, target setting, and reporting in key areas among INCPEN members;
- Members had reduced consumption in the key environmental impact areas of energy use water use, CO₂ emissions, and solid waste generation (Figure D-1); and
- 83% of INCPEN members were publicly reporting on energy, 83% on CO₂ emissions, 67% on water, and 83% on waste.

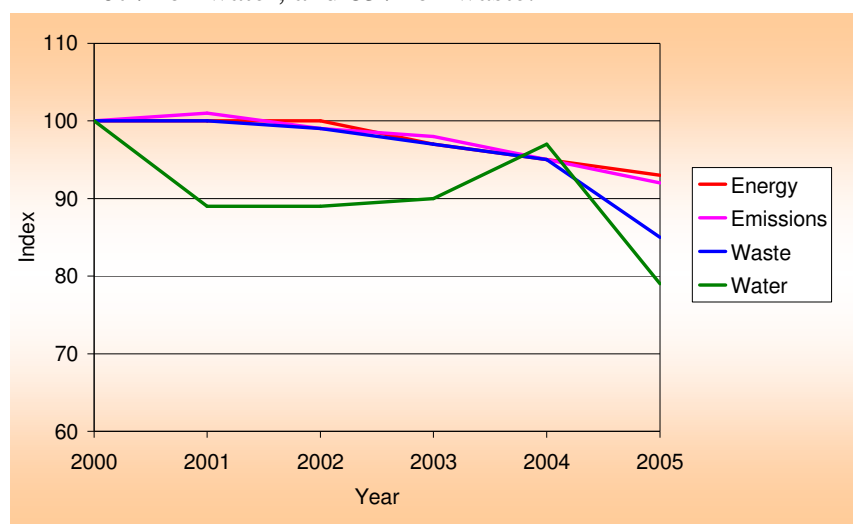


Figure D-1: Summary of trends in INCPEN members' key environmental impacts

There was however significant variation in individual members' performance, and considerable differences in the form of the data being reported by companies – different reporting scales (global or regional), different reporting units (absolute data or relative data), different measurements (e.g. kWh or GJ), different definitions (e.g., solid waste or total waste to landfill), and reporting data for specific products or for a broad product mix.

The report suggested that better progress could be made in making reported data more readily comparable by making more use of the GRI, which aims to make sustainability reporting as routine and as standardised and comparable as financial reporting. The GRI has developed a uniform format for reporting information, made up of Sustainability Reporting Guidelines, Sector Supplements, and Indicator Protocols. The Guidelines recommend disclosure of specific information related to environmental, social and economic performance. This includes a CEO statement, key indicators, descriptions of policies and management systems, stakeholder relationships, management, operational and product performance, and a sustainability overview.

67% of INCPEN members who responded to the survey were then using the GRI guidelines. The same percentage had an Environmental Management System in place at all their sites and had achieved certification to a recognised standard such as ISO 14001.

Energy efficiency and climate change

Energy costs typically make up around 15% of the input costs for packaging manufacturers, so energy efficiency is good business practice. It has been an area of focus for the industry for many years:

- 83% of members responding to the survey were reporting on their energy consumption and greenhouse gas emissions;
- 58% were publishing energy efficiency targets;
- 67% were publicly stating targets for reducing emissions;
- Members typically set themselves a target of around 10% reduction by 2010 but some had already significantly exceeded their targets, having achieved reductions in energy consumption of more than 25% in the period 2001–2005;
- 25% of members responding to the survey were obtaining more than 5% of their energy supply from renewable sources (which was roughly the average share of renewables on the UK grid). Some members cited concern about the traceability of renewable energy as a reason for not taking further action in this area, but recent European Directives now demand fuel source disclosure by electricity suppliers; and
- Respondents had reduced their energy consumption per unit of production by an average of approximately 10% since 2000 (Figure D-2)¹.

¹ These indexed figures were derived from members' reported normalised energy use. The most common unit of measurement was kWh per tonne of product per year.

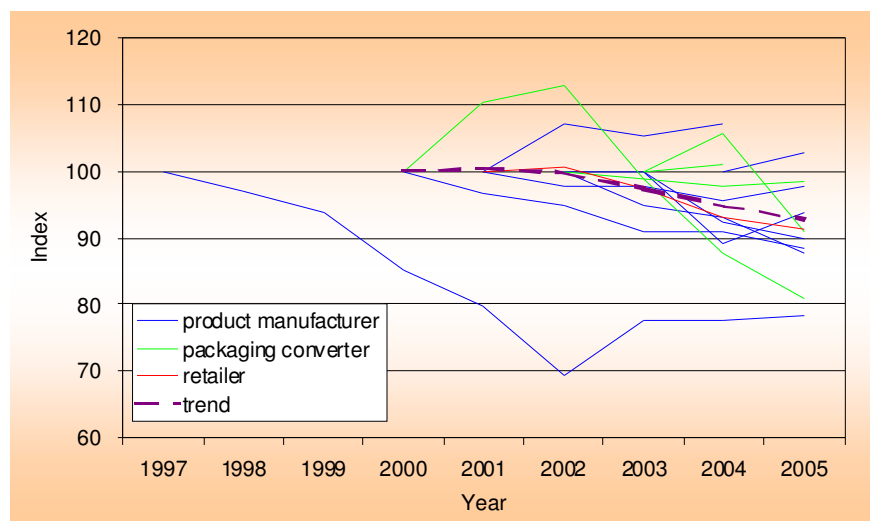


Figure D-2: INCPEN members' energy consumption trend

There was a similar reduction in CO₂ emissions (Figure D-3)².

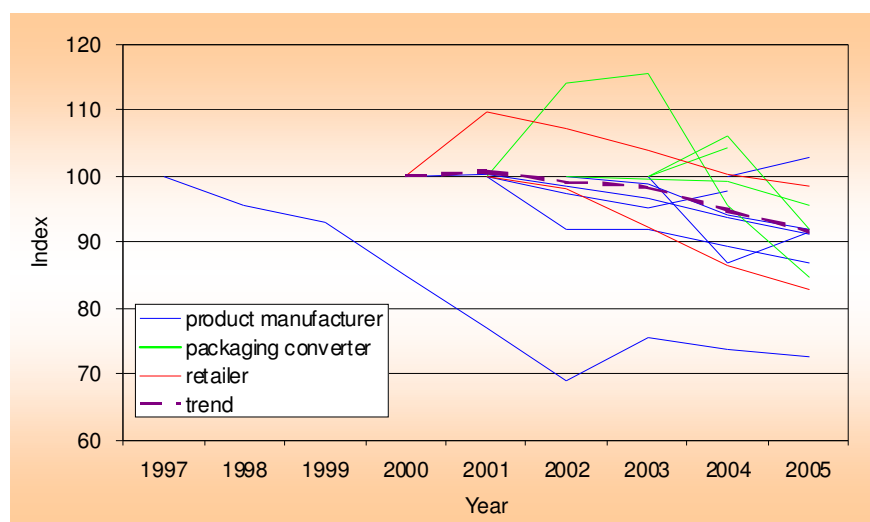


Figure D-3: INCPEN members' CO₂ emissions trend

² These indexed figures were derived from companies' stated normalised carbon dioxide emissions. The common unit of measurement was tonnes of CO₂ per tonne of production per year.

The report cited the following ways in which INCPEN members had achieved these reductions:

- Using third party audits, e.g. by The Carbon Trust, to identify potential savings and acting on their recommendations;
- Developing new packaging materials that require less energy to manufacture;
- Switching from carbon-intensive fuels such as coal and oil to cleaner fuels such as natural gas or bio-fuels;
- Training staff in ways of saving energy and appointing ‘energy champions’ to spread the message;
- Upgrading heating, ventilation and refrigeration systems to improve efficiency;
- Using automated lighting and air conditioning systems to reduce unnecessary usage, e.g. at night;
- Using renewable energy sources such as wind, hydro and biogas;
- Using remote metering in stores and at manufacturing sites to identify and rectify patterns of excessive energy use;
- Sharing ideas and best practice through, e.g. the CBI's Energy Policy Committee and the British Retail Consortium's Energy Forum;
- Using waste products such as wood pulp to produce energy;
- Using combined heat and power (CHP) cogeneration plants and recovering waste heat for reuse;
- Participating in the EU Emissions Trading Scheme (ETS). The scheme sets CO₂ emissions limits on all major energy and emissions intensive plant. These targets may be met by internal energy efficiency measures or by trading emission allowances. There are financial penalties for failing to meet the target; and
- Participating in a sector-wide Climate Change Agreement (CCA). The UK Climate Change Levy (CCL) is an energy tax on business use of energy. Through CCAs, sectors voluntarily commit to specific energy efficiency targets. In return, the government grants an 80% discount on the CCL.

Water

Water treatment is an energy intensive industry. In 2004-05 the UK industry emitted just over 4 million tonnes of GhGs.³ However, UK business demand for water decreased between 2003-04 and 2004-05 from 1.59l/£GDP to 1.47l/£GDP and since 2000, INCPEN members have on average reduced their water use by about 20%.

67% of INCPEN members who responded to the survey monitor and publicly report on their water consumption and discharges (Figure D-4). 25% publish a target for reducing these. Fewer members publish a water reduction target than for any of the other impact areas covered by this study, probably because water is not a resource of equal importance for all members, particularly retailers.

³ Water UK, *Towards Sustainability 2004–2005*, July 2006.

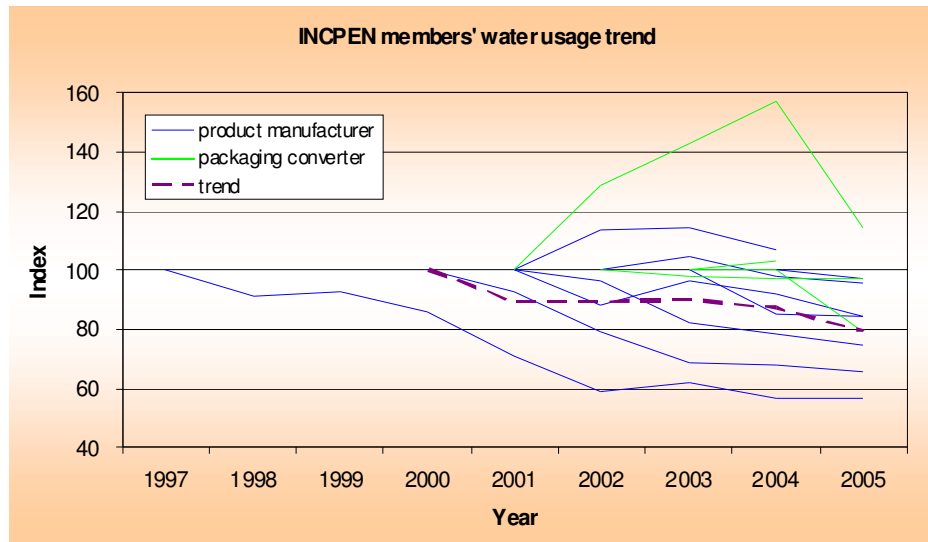


Figure D-4: INCPEN members' water usage trend

Savings on water consumption have been achieved through actions such as:

- Changing manufacturing processes to reduce water demand;
- Reducing flow pressures;
- Eliminating leaks;
- Using advanced water recycling systems;
- Replacing water-based conveyor lines with new water-free conveyor belt technology;
- Installing metering systems to allow detailed analysis of water use;
- Staff education campaigns on the need to save water; and
- Replacing old refillable package production lines with modern non-refillable lines, eliminating the need to wash bottles.

Sustainable resource use

With raw materials typically representing around 45% of the input costs in packaging manufacturing, efficient resource use makes good business sense.

Results of the survey include:

- Most members who responded to the survey were using at least some recycled materials in their packaging. Members reported that the amount used was variable or difficult to define;
- 83% of INCPEN members responding to the survey had sustainable sourcing criteria or guidelines for their suppliers, to enable them to influence the behaviour of others further down the supply chain;
- 58% said that they had systems in place to ensure the traceability of raw materials they use, e.g. FSC certification for wood products used in cardboard manufacture. Members' responses indicated that they did not necessarily record what percentage of their raw materials their traceability covers;
- 83% were monitoring and publicly reporting on their waste, and 42% published a waste reduction target; and
- In the five years to 2005, INCPEN members reduced their back door waste by an average of 15%, and some by more than 40% (Figure D-5). However, a number of members have also seen rises in their disposed waste. This could be due to a number of factors, including changes to definitions of waste and changes in the product mix.

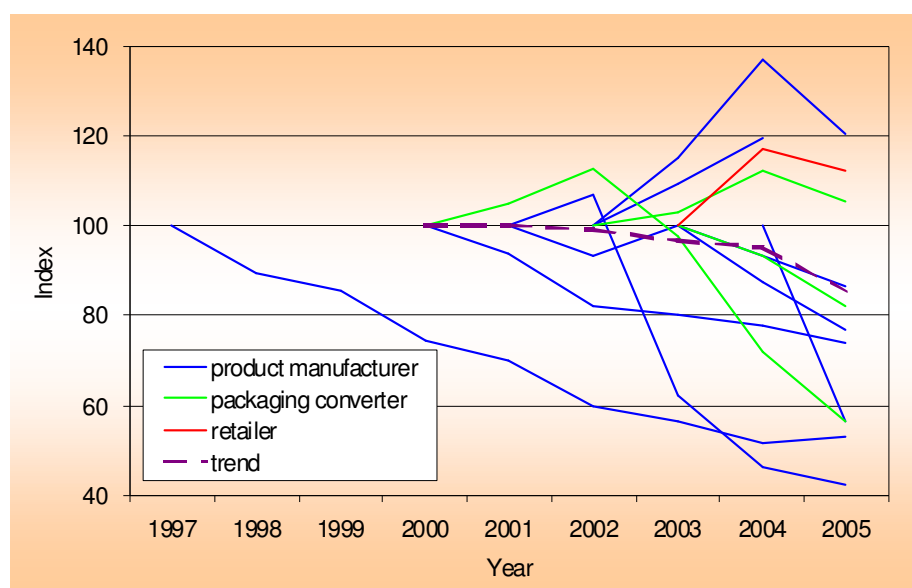


Figure D-5: INCPEN members' disposed of back door waste trend

Recovery rates have remained relatively stable at an average of just over 70% over the period (Figure D-6). This suggests that the reductions in disposed waste have been achieved through material efficiency rather than increasing recovery rates.

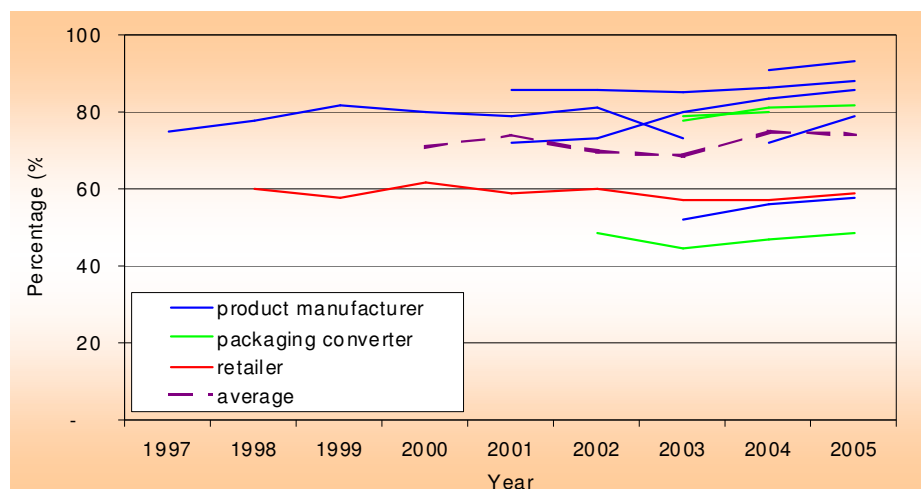


Figure D-6: INCPEN members' back door waste recovery rates

The actions taken to achieve these reductions included:

- Recovering materials received from suppliers for reuse within the business;
- Training staff in optimising material use and recycling, and reinforcing this through newsletters and competitions;
- Using re-useable containers for internal stock movements and for shipments to customers;
- Identifying alternatives to sending waste for final disposal;
- Identifying markets for by-products, e.g. processing into animal feed or agricultural mulch;
- Using waste to generate energy, e.g. making briquettes from dust collected from emissions control systems; and
- Reprocessing rejected materials.

Sustainable distribution

In 2005, Great Britain-registered heavy goods vehicles moved freight 152.7 billion tonne kilometres. The average length of haul has increased by 28% in 25 years, from 68 km in 1980 to 87 km in 2005. However, since 1995 there has been relatively little change.⁴ The 6% increase in total freight moved between 1995 and 2005 was considerably less than the 32% rise in Gross Domestic Product over the same period.

⁴ Department of Transport, *Road Freight Statistics 2005*, June 2006.

83% of INCPEN members who responded to the survey are undertaking initiatives to improve transport efficiency, including:

- Designing packaging systems so that they are most efficient for transport;
- Using sophisticated logistics software to plan routes, optimise loads, and minimise warehousing;
- Backloading – using return journeys from stores to collect goods from suppliers;
- Training drivers in fuel efficient driving techniques;
- Replacing older vehicles with new more efficient models using dual fuel;
- Using new vehicles types such as double deck trailers and ‘wagon and drag’ (a rigid vehicle and box trailer) allowing more goods to be moved per journey; and
- Reusing transport packaging.

Appendix E: EUROOPEN Review of Wal-Mart Packaging Scorecard

EUROOPEN set up a working group to evaluate the Wal-Mart packaging scorecard and commissioned an independent study to analyse its components and evaluate its measurement criteria against European norms. EUROOPEN accepts that the packaging scorecard can be a useful business management tool but cautions that it should not be considered as an environmental evaluation tool, principally because the aggregated result it produces cannot be scientifically validated. For example:

- The greenhouse gas measurement in the scorecard excludes all lifecycle steps except material manufacturing. This is not consistent with the CEN European guidelines for LCA of packaging¹¹² and leads to a substantial underestimation of lifecycle CO₂ emissions. Additionally, the effect of recycled content on CO₂ emissions is not fed back to the greenhouse gas indicator;
- The evaluation of packaging material lacks environmental relevance as it will combine occupational health data with environmental impacts emanating from LCA into one single indicator. This indicator again excludes all life cycle steps except material manufacturing;
- Data requested on distances to transport packaging materials appears inappropriate due to its exclusion of transport distances of finished goods;
- The product-to-packaging ratio component tends to discourage product concentration and the production of smaller portions and so conflicts with current market trends in food and beverage to reduce portion sizes as an obesity reduction measure;
- The recycled content parameter contains default data inconsistent with current practices within food contact materials with respect to food safety issues. The absence of a chance to modify recycled content does not encourage the use of higher amounts of recycled material when possible. The absence of a feedback method into the CO₂ indicator makes recycled content appear to be an environmental good in itself, ignoring environmental impacts incurred in the recycling process and recycling-induced property losses requiring compensation through increased material use;
- The recovery value of packaging excludes primary packaging taken home by the consumer and focuses only on packaging which remains in the custody of Wal-Mart. No credit is given for energy recovery and the incremental scores used do not reflect the official recovery rates of the US market or of common European practice; and
- The use of renewable energy as a criterion in the scorecard is a concern as it does not give credit for energy efficiency which, in present circumstances, would appear to be a higher priority. Also, this criterion may be open to abuse since electrical energy is normally delivered through a national grid system where renewable sources accounts for only a percentage of the total.

Appendix F: National Pollutant Inventory Emissions

MS2 reviewed the National Pollutant Inventory (NPI) database for 2005-06 (the most recent period available) for individual facilities involved in packaging manufacturing. Packaging manufacturing facilities were identified in the following Australian and New Zealand Standard Industrial Classification (ANZSIC) classes:

- 233: Paper and Paper Product Manufacturing (incorporating 2331: Pulp, Paper and Paperboard Manufacturing; and 2333: Corrugated Paperboard Container Manufacturing);
- 2563: Plastic Bag and Film Manufacturing;
- 2564: Plastic Product, Rigid Fibre Reinforced, Manufacturing;
- 2566: Plastic Injection Moulded Product Manufacturing;
- 2610: Glass and Glass Product Manufacturing;
- 2722: Aluminium Smelting;
- 2731: Aluminium Rolling, Drawing, Extruding;
- 2751: Metal Container Manufacturing; and
- 2769: Fabricated Metal Product Manufacturing n.e.c.

NPI reporting was reviewed as of January 2008 to help ensure availability of relevant data. The following tables provide NPI data for the top five substances emitted by each facility, as well as a ranking for each substance emission, with 1 being the lowest and 100 the highest. NPI define the rankings as:

‘Individual substance emissions from each facility are compared against the maximum emission of that substance from all of the facilities reported on the NPI, on a scale of 1-100 (from lowest to highest) - if the total emission of a substance is 10% of the maximum reported to the NPI, the emission ranking would be 10; if the total emission is 95% of the maximum, the ranking would be 95. A score of 100 means that the facility is the highest facility emitter of that substance - in some cases many facilities may score 100, due to rounding. Top substances are those substance emissions that are ranked highest for any individual facility.

‘For example, a small rural sewage treatment plant may report a very small Total nitrogen emission in comparison with a large metropolitan facility. If the rural facility reported an emission that is 7% of the maximum Total Nitrogen emission in Australia it would attract a ranking of 7. This ranking tells you that there are many other facilities that have much larger emissions of Total Nitrogen. On the other hand a metropolitan sewage treatment plant may have a very large Total Nitrogen emission and therefore attracts a ranking of 100 for this substance. This only means that this particular facility has approximately the largest individual emission of that substance in Australia.’

Some abbreviations have been used to simplify reporting. These include:

- CO - Carbon Monoxide;
- NO_x - Oxides of Nitrogen;
- PAH - Polycyclic Aromatic Hydrocarbons;
- PM₁₀ - Particulate Matter 10.0um; and
- VOCs - Total Volatile Organic Compounds.

233: Paper and Paper Product Manufacturing

Amcor Fibre Packaging - Athol Park, SA	NO _x [Low - 1]	VOCs [Low - 1]	CO [Low - 1]	PM ₁₀ [Low - 1]	PAH [Low - 1]
Amcor Cartonboard (Petrie Mill) - Petrie, Qld	Chromium (VI) Compounds [Low - 2]	NO _x [Low - 1]	Hydrochloric acid [Low - 1]	VOCs [Low - 1]	PM ₁₀ [Low - 1]
Amcor Fairfield Fibre Packaging - Alphington, VIC	NO _x [Low - 1]	VOCs [Low - 1]	PM ₁₀ [Low - 1]	CO [Low - 1]	Cadmium & Compounds [Low - 1]
Amcor Fibre Packaging Spearwood Mill – Closed in 2006 - Bibra Lake, WA	PAH [Low - 1]	VOCs [Low - 1]	NO _x [Low - 1]	PM ₁₀ [Low - 1]	CO [Low - 1]
Amcor Fibre Packaging Box Hill Mill – Closed in 2007 - moved to Scoresby - Box Hill South, VIC	NO _x [Low - 1]	VOCs [Low - 1]	CO [Low - 1]	PM ₁₀ [Low - 1]	PAH [Low - 1]
Amcor Fibre Packaging - Brooklyn, VIC	NO _x [Low - 1]	VOCs [Low - 1]	CO [Low - 1]	PM ₁₀ [Low - 1]	PAH [Low - 1]
Amcor Fibre Packaging - Rocklea, Qld	VOCs [Low - 1]	PAH [Low - 1]	NO _x [Low - 1]	CO [Low - 1]	PM ₁₀ [Low - 1]
Amcor Fibre Packaging - Scoresby, VIC	NO _x [Low - 1]	VOCs [Low - 1]	CO [Low - 1]	PM ₁₀ [Low - 1]	PAH [Low - 1]
Amcor Fibre Packaging - Revesby, NSW	NO _x [Low - 1]	PM ₁₀ [Low - 1]	VOCs [Low - 1]	CO [Low - 1]	PAH [Low - 1]
Amcor Fibre Packaging Botany Mill - Matraville, NSW	Cadmium & Compounds [Low - 1]	NO _x [Low - 1]	PAH [Low - 1]	Flouride Compounds [Low - 1]	Nickel & Compounds [Low - 1]
Fibre Containers - Closed in 2006 - West End, Qld	VOCs [Low - 1]	PAH [Low - 1]	NO _x [Low - 1]	CO [Low - 1]	PM ₁₀ [Low - 1]
Visy Board - Wodonga, VIC	NO _x [Low - 1]	VOCs [Low - 1]	PM ₁₀ [Low - 1]	CO [Low - 1]	PAH [Low - 1]
Visy Board - Geppes Cross, SA	VOCs [Low - 1]	NO _x [Low - 1]	CO [Low - 1]	PM ₁₀ [Low - 1]	PAH [Low - 1]

Visy Board – Campbellfield, VIC	VOCs [Low - 1]	NOx [Low - 1]	CO [Low - 1]	PM ₁₀ [Low - 1]	PAH [Low - 1]
Visy Board – Carole Park, Qld	Tetrachloroethylene [Low - 5]	VOCs [Low - 1]	NOx [Low - 1]	CO [Low - 1]	PM ₁₀ [Low - 1]
Visy Board – O'Connor, WA	VOCs [Low - 1]	NOx [Low - 1]	CO [Low - 1]	PM ₁₀ [Low - 1]	PAH [Low - 1]
Visy Board – Dandenong, VIC	NOx [Low - 1]	VOCs [Low - 1]	PM ₁₀ [Low - 1]	CO [Low - 1]	PAH [Low - 1]
Visy Paper – Reservoir, VIC	NOx [Low - 1]	PM ₁₀ [Low - 1]	VOCs [Low - 1]	CO [Low - 1]	Cadmium & Compounds [Low - 1]
Visy Paper – Hemmant, Qld	Magnesium Oxide fume [Low - 6]	NOx [Low - 1]	Hydrochloric acid [Low - 1]	Flouride Compounds [Low - 1]	Sulphur Dioxide [Low - 1]
Visy Paper – Campbellfield, VIC	NOx [Low - 1]	PM ₁₀ [Low - 1]	VOCs [Low - 1]	CO [Low - 1]	Cadmium & Compounds [Low - 1]
Visy Paper – Warwick Farm, NSW	VOCs [Low - 1]	NOx [Low - 1]	CO [Low - 1]	PM ₁₀ [Low - 1]	PAH [Low - 1]
Visy Paper – Smithfield, NSW	CO [Low - 1]	Cadmium & Compounds [Low - 1]	Lead & Compounds [Low - 1]	Sulphur Dioxide [Low - 1]	
Visy Pulp and Paper – Tumut, NSW	Chlorine [Low - 2]	PAH [Low - 2]	Formaldehyde (methyl aldehyde) [Low - 1]	Hydrogen Sulfide [Low - 1]	Acetaldehyde [Low - 1]

2563: Plastic Bag and Film Manufacturing

Amcor Flexibles Kewdale - Kewdale, WA	VOCs [Low - 1]				
Poly Products - Regency Park, SA	Ethanol [Low - 4]	VOCs [Low - 1]			
Shorko Aust P/L - Wodonga, VIC	NOx [Low - 1]	VOCs [Low - 1]	CO [Low - 1]	PM ₁₀ [Low - 1]	PAH [Low - 1]

2564: Plastic Product, Rigid Fibre Reinforced, Manufacturing

Visypak Beverage PET Prestons - Prestons, NSW	NOx [Low - 1]	VOCs [Low - 1]	CO [Low - 1]	PM ₁₀ [Low - 1]	PAH [Low - 1]
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2566: Plastic Injection Moulded Product Manufacturing

Visypak - Kings Park, NSW	NOx [Low - 1]	PM ₁₀ [Low - 1]	VOCs [Low - 1]	CO [Low - 1]	PAH [Low - 1]
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2610: Glass and Glass Product Manufacturing

ACI Adelaide) - West Croyden, SA	(O-I	Organo-Tin Compounds [High - 100]	NOx [Low - 2]	Hydrochloric acid [Low - 1]	PM ₁₀ [Low - 1]	Selenium & Compounds [Low - 1]
ACI Brisbane) - South Brisbane, QLD	(O-I	NOx [Low - 2]	Cadmium & Compounds [Low - 1]	Hydrochloric acid [Low - 1]	PM ₁₀ [Low - 1]	VOCs [Low - 1]
ACI Melbourne) - Spotswood, VIC	(O-I	NOx [Low - 2]	Organo-Tin Compounds [Low - 1]	PM ₁₀ [Low - 1]	Hydrochloric acid [Low - 1]	VOCs [Low - 1]
ACI (O-I Sydney) - Penrith, NSW		NOx [Low - 3]	PM ₁₀ [Low - 1]	Hydrochloric acid [Low - 1]	Chromium (III) Compounds [Low - 1]	Lead & Compounds [Low - 1]
Amcors Glass - Gawler Belt, SA		Magnesium Oxide fume [Low - 5]	Chromium (III) Compounds [Low - 3]	Nickel & Compounds [Low - 2]	Flouride Compounds [Low - 1]	NOx [Low - 1]

2731: Aluminium Rolling, Drawing, Extruding

Amcors Beverage Cans Revesby -Revesby, NSW		VOCs [Low - 1]	NOx [Low - 1]	CO [Low - 1]	PM ₁₀ [Low - 1]	Sulphur Dioxide [Low - 1]
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2751: Metal Container Manufacturing

Amcors Beverage Cans - Dandenong, VIC		VOCs [Low - 1]	NOx [Low - 1]	CO [Low - 1]	PM ₁₀ [Low - 1]	PAH [Low - 1]
Amcors Closure Systems - Thomastown, VIC		NOx [Low - 1]	VOCs [Low - 1]	CO [Low - 1]	PM ₁₀ [Low - 1]	PAH [Low - 1]
Amcors Aerosols Taree - Taree, NSW		Xylenes (individual or mixed isomers) [Low - 1]	Toluene (methylbenzene) [Low - 1]	NOx [Low - 1]	Formaldehyde (methyl aldehyde) [Low - 1]	VOCs [Low - 1]
VisyPak - Coburg, VIC		Xylenes (individual or mixed isomers) [Low - 2]	VOCs [Low - 1]	NOx [Low - 1]	CO [Low - 1]	PM ₁₀ [Low - 1]
Visy Beverage - Clayton, VIC		VOCs [Low - 1]	NOx [Low - 1]	CO [Low - 1]	PM ₁₀ [Low - 1]	PAH [Low - 1]
Visy Beverage Smithfield - Smithfield, NSW		VOCs [Low - 1]	NOx [Low - 1]	CO [Low - 1]	PM ₁₀ [Low - 1]	PAH [Low - 1]
Visy Industrial Packaging - Granville, NSW		Xylenes (individual or mixed isomers) [Low - 3]	Toluene (methylbenzene) [Low - 1]	VOCs [Low - 1]	NOx [Low - 1]	CO [Low - 1]

2769: Fabricated Metal Product Manufacturing n.e.c.

Alcoa Rolled Point Works – Moolap, VIC	Australia Products Henry	Magnesium Oxide Fume [Low - 5]	Chromium (VI) Compounds [Low - 1]	PAH [Low - 1]	Chlorine [Low - 1]	Flouride Compounds [Low - 1]
Alcoa Rolled Yennora – Yennora, NSW	Australia Products	Magnesium Oxide Fume [Low - 2]	VOCs [Low - 1]	Chromium (VI) Compounds [Low - 1]	PAH [Low - 1]	NOx [Low - 1]

Appendix G: EU Recycling Rates

The following tables are taken from the data submitted to the European Commission and published on the Commission's website.

Overall recycling rate										
	1997	1998	1999	2000	2001	2002	2003	2004	2005	Variance 1997-2005
Austria	64%	65%	66%	69%	64%	66%	64%	66%	67%	+3%
Belgium	62%	64%	59%	63%	71%	68%	74%	76%	77%	+15%
Bulgaria									31%	
Cyprus								22%	11%	
Czech Rep.							51%	56%	59%	
Denmark	40%	50%	53%	56%	57%	57%	54%	53%	53%	+13%
Estonia								34%	40%	
Finland	42%	45%	50%	50%	47%	49%	41%	40%	43%	+1%
France	40%	42%	42%	42%	44%	45%	48%	51%	53%	+13%
Germany	81%	80%	79%	78%	76%	78%	71%	70%	68%	-13%
Greece	37%	35%	34%	33%	33%	33%	33%	37%	42%	+5%
Hungary								43%	46%	
Ireland	15%	15%	17%	19%	27%	35%	51%	56%	56%	+41%
Italy	30%	32%	34%	38%	46%	51%	51%	53%	54%	+24%
Latvia								46%	47%	
Lithuania								33%	32%	
Luxembourg	38%	42%	40%	45%	57%	57%	60%	61%	63%	+25%
Malta										
Netherlands	55%	62%	64%	59%	56%	57%	62%	59%	59%	+4%
Poland								28%	30%	
Portugal		35%	35%	31%	38%	36%	38%	41%	44%	
Romania								22%	23%	
Slovakia							36%	38%		
Slovenia								34%	45%	
Spain	34%	34%	38%	40%	44%	44%	43%	47%	50%	+16%
Sweden	58%	75%	65%	58%	63%	65%	60%	50%	48%	-10%
UK	24%	28%	35%	40%	42%	44%	47%	50%	54%	+30%
EU-15	46%	47%	50%	51%	53%	55%	54%	56%	57%	+11%

Glass recycling rate									
	1997	1998	1999	2000	2001	2002	2003	2004	2005
Austria	77%	80%	77%	97%	82%	86%	83%	86%	79%
Belgium	70%	66%	75%	80%	85%	93%	96%	98%	100%
Bulgaria									18%
Cyprus								4%	4%
Czech Republic							63%	69%	75%
Denmark	61%	75%	85%	81%	76%	76%	95%	103%	100%
Estonia								64%	50%
Finland	50%	63%	78%	64%	50%	49%	61%	55%	63%
France	42%	45%	50%	50%	51%	52%	57%	59%	60%
Germany	84%	85%	85%	85%	85%	85%	86%	82%	83%
Greece	25%	21%	19%	24%	24%	24%	25%	35%	24%
Hungary								15%	21%
Ireland	34%	32%	32%	29%	39%	48%	56%	55%	64%
Italy	33%	37%	40%	47%	48%	53%	53%	56%	57%
Latvia								25%	38%
Lithuania								35%	40%
Luxembourg	71%	80%	76%	83%	91%	83%	90%	94%	92%
Malta									
Netherlands	75%	85%	80%	80%	78%	79%	81%	76%	78%
Poland								27%	27%
Portugal		42%	44%	38%	34%	35%	38%	39%	41%
Romania									10%
Slovakia							27%	27%	
Slovenia								18%	41%
Spain	37%	37%	38%	31%	33%	36%	38%	41%	44%
Sweden	76%	84%	84%	86%	84%	88%	92%	104%	95%
UK	19%	23%	30%	39%	35%	34%	38%	44%	53%
EU-15	50%	52%	55%	57%	56%	58%	59%	61%	63%

There are a few examples of member states reported recycling rates of 100% or more. These are small countries where the recycling rates are inflated by significant personal imports of glass packaging from other countries where alcoholic drinks are cheaper. Thus, the tonnage recycled equals or exceeds the tonnage originally placed on the national market.

Metals recycling rate									
	1997	1998	1999	2000	2001	2002	2003	2004	2005
Austria	34%	38%	38%	49%	61%	67%	56%	59%	58%
Belgium	70%	66%	72%	70%	81%	86%	93%	91%	89%
Bulgaria									0%
Cyprus								0%	23%
Czech Republic							37%	35%	34%
Denmark	16%	40%	35%	49%	40%	40%	41%	41%	60%
Estonia								28%	38%
Finland	8%	15%	19%	28%	42%	50%	50%	55%	54%
France	49%	45%	45%	49%	52%	53%	57%	53%	57%
Germany	82%	83%	82%	78%	79%	78%	82%	83%	85%
Greece	13%	11%	11%	11%	10%	10%	10%	15%	38%
Hungary								48%	68%
Ireland	5%	4%	25%	24%	37%	47%	55%	58%	58%
Italy	5%	5%	11%	45%	44%	54%	55%	53%	61%
Latvia								35%	39%
Lithuania								21%	29%
Luxembourg	22%	11%	42%	68%	77%	79%	70%	66%	63%
Malta									
Netherlands	67%	80%	78%	78%	78%	80%	83%	86%	84%
Poland								23%	31%
Portugal			1%	15%	24%	53%	53%	55%	60%
Romania									54%
Slovakia							37%	16%	
Slovenia								24%	35%
Spain	23%	22%	24%	34%	38%	39%	45%	56%	60%
Sweden	45%	77%	50%	43%	69%	68%	70%	65%	64%
UK	24%	23%	38%	42%	35%	39%	41%	42%	47%
EU-15	44%	43%	47%	53%	54%	59%	59%	60%	64%

Personal imports of beverage cans inflate recycling rates in Belgium, Denmark, Finland and Hungary.

Paper & board recycling rate									
	1997	1998	1999	2000	2001	2002	2003	2004	2005
Austria	85%	84%	88%	87%	81%	80%	82%	83%	86%
Belgium	78%	83%	70%	82%	86%	78%	79%	83%	83%
Bulgaria									82%
Cyprus								42%	13%
Czech Republic							62%	71%	84%
Denmark	47%	58%	59%	62%	65%	65%	60%	59%	60%
Estonia								34%	45%
Finland	57%	57%	61%	62%	58%	61%	63%	70%	79%
France	59%	61%	59%	59%	61%	64%	69%	77%	81%
Germany	88%	88%	87%	90%	91%	90%	81%	83%	82%
Greece	67%	66%	67%	67%	68%	68%	70%	70%	73%
Hungary								67%	86%
Ireland	17%	15%	14%	17%	24%	35%	65%	70%	72%
Italy	36%	37%	39%	46%	52%	59%	58%	62%	67%
Latvia								60%	59%
Lithuania								59%	59%
Luxembourg	45%	49%	35%	37%	59%	60%	64%	65%	69%
Malta									
Netherlands	65%	70%	71%	71%	65%	69%	69%	70%	72%
Poland								40%	41%
Portugal		48%	52%	47%	57%	50%	50%	56%	60%
Romania									51%
Slovakia							49%	50%	
Slovenia								76%	77%
Spain	52%	52%	54%	58%	64%	60%	57%	63%	69%
Sweden	66%	84%	72%	63%	69%	70%	88%	71%	72%
UK	41%	47%	49%	50%	53%	59%	65%	68%	74%
EU-15	60%	61%	62%	64%	67%	68%	68%	72%	75%

Plastics recycling rate									
	1997	1998	1999	2000	2001	2002	2003	2004	2005
Austria	20%	27%	25%	26%	29%	30%	31%	33%	33%
Belgium	25%	26%	24%	25%	28%	29%	33%	37%	38%
Bulgaria									8%
Cyprus								9%	9%
Czech Republic							38%	44%	35%
Denmark	6%	7%	11%	12%	14%	14%	17%	16%	19%
Estonia								12%	25%
Finland	10%	10%	13%	14%	15%	15%	14%	15%	14%
France	6%	8%	9%	11%	14%	15%	16%	18%	19%
Germany	61%	59%	59%	53%	52%	53%	53%	44%	39%
Greece	3%	4%	3%	3%	3%	3%	3%	6%	10%
Hungary								14%	19%
Ireland	2%	3%	4%	9%	12%	17%	16%	22%	24%
Italy	10%	11%	16%	16%	19%	23%	24%	26%	26%
Latvia								22%	34%
Lithuania								21%	21%
Luxembourg	6%	9%	26%	36%	34%	28%	24%	35%	30%
Malta									
Netherlands	12%	14%	18%	23%	21%	16%	21%	19%	22%
Poland								17%	19%
Portugal		4%	4%	4%	9%	9%	9%	11%	16%
Romania									11%
Slovakia							12%	16%	
Slovenia								19%	34%
Spain	7%	9%	14%	17%	18%	20%	20%	20%	21%
Sweden	14%	25%	20%	14%	17%	20%	22%	25%	30%
UK	6%	7%	13%	15%	16%	19%	18%	19%	22%
EU-15	17%	18%	21%	22%	23%	24%	23%	25%	25%

Endnotes

¹ GRI 2000-2006

² Verfaillie and Bidwell 2000

³ NPCC 2007

⁴ http://www.afrbiz.com.au/page.asp?E_Page=416401&3649=422964&3648=416513, accessed November 2007.

⁵ NPCC 2007

⁶ NPCC 2005, MS2 2006

⁷ Koojiman 2000

⁸ AFGC 2003, p.5

⁹ AFGC 2003, p.27

¹⁰ INCPEN 1996, p.3

¹¹ CIAA 2007

¹² 15 countries were Member States of the EU from 1997 to 2001.

¹³ European Commission 2008.

¹⁴ MS2 2006

¹⁵ DECC 2007

¹⁶ PACIA 2007a, p.9

¹⁷ Finsia 2007

¹⁸ PR Newswire 2007

¹⁹ GRI 2000-2006, p.2

²⁰ Rowell 2007

²¹ WBCSD 2006b

²² WBCSD 2007a

²³ Kooijman 2000

²⁴ SPC 2005

²⁵ SPA n.d.

²⁶ SPA 2007

²⁷ Lewis et al 2007

²⁸ INCPEN 2006

²⁹ CE Delft and/ KPMG 2004

³⁰ European Commission 2006

³¹ Packaging Federation UK Market Report no. 5, *Competing in the 21st Century*, September 2006.

³² Linde 2006

³³ Cordner 2007

³⁴ European Commission 2006

³⁵ Cordner 2007

³⁶ Cordner 2007

³⁷ EUROOPEN 1997

³⁸ British Soft Drinks Association 2005

³⁹ C4ES 2000

⁴⁰ <http://www.apma.asn.au/?content=109>

⁴¹ PCA 2007

⁴² VAL-I-PAC 2005

⁴³ PR Newswire 2007

⁴⁴ NPCC 2007

⁴⁵ NPCC 2007 based on DEC 2006a

⁴⁶ Visy 2006

⁴⁷ PAC NZ 2007 for all New Zealand packaging data and graphs

⁴⁸ PAC NZ 2007

⁴⁹ European Commission 2006

⁵⁰ NPCC 2007

⁵¹ European Commission 2008

⁵² European Commission 2008

⁵³ European Commission 2008

⁵⁴ European Commission 2008

⁵⁵ Tomra Systems ASA 2005

⁵⁶ NPCC 2007

⁵⁷ Foster's Group 2007

⁵⁸ PSF 2007

⁵⁹ NPCC 2007

⁶⁰ PACIA 2007b

⁶¹ Cadbury Schweppes 2006a

⁶² ACCA and FTSE Group 2007

⁶³ Ai Group 2007

⁶⁴ Data compiled for the NPCC provided market data for Amcor and O-I, who together account for all domestic glass production in Australia. Amcor provided confidential performance data for this report. The NPCC market data was applied to the 852,000 tonnes domestic glass production reported in NPCC 2007 to estimate O-I's domestic glass production in 2005-06. This amount was multiplied by emissions factors in AGO 2006. These estimated greenhouse gas emissions for O-I were added to the confidential data provided by the other packaging manufacturers.

⁶⁵ CEPI 2007

⁶⁶ UNFCCC 2008 and UN Department of Economic and Social Affairs, Population Division, 2008.

⁶⁷ AGO 2006

⁶⁸ Bio Intelligence and O2 report for the European Commission 2003, Study on external environmental effects related to the life cycle of products and services

⁶⁹ Visy 2006

⁷⁰ Gronow 2006.

⁷¹ AEA Technology 2001

⁷² European Commission JRC 2007

⁷³ PlasticsEurope 2008

⁷⁴ European Commission JRC 2007, p.2

⁷⁵ Based in part on recommendations by the Sustainable Forest Products Industry working group

⁷⁶ Ai Group 2007

⁷⁷ ABS 2006

⁷⁸ Data compiled for the NPCC provided market data for Amcor and O-I, who together account for all domestic glass production in Australia. Amcor provided confidential performance data for this report. The NPCC market data was applied to the 852,000 tonnes domestic glass production reported in NPCC 2007 to estimate O-I's domestic glass production in 2005-06. This amount was multiplied by the 0.63 kL/tonne water intensity reported in O-I n.d. for 2005-06. This estimated water consumption for O-I was added to the confidential data provided by the other packaging manufacturers.

⁷⁹ Visy 2007

⁸⁰ Visy 2007

⁸¹ From Visy 2007

⁸² Vienna Economic University 2003

⁸³ Greenpeace 2006, p.36.

⁸⁴ Bickerstaffe 2008

⁸⁵ Environment Victoria 2007

⁸⁶ Recoup 2006

⁸⁷ Cordner 2007

⁸⁸ DEC 2006b

⁸⁹ TRC 2004

⁹⁰ Ecovoice 2006, except as noted

⁹¹ Munro 2006

⁹² Arnold and Larsen 2006

⁹³ <http://beverageindustrybastards.com/?q=corporateprofiles>, accessed January 2008

⁹⁴ ABC News 2007

⁹⁵ ABC News 2007

⁹⁶ DECC 2006b and 2006c

⁹⁷ WBCSD 2007e

⁹⁸ WBCSD 2007f

⁹⁹ Coles Myer 2006, p.7

¹⁰⁰ Linden 2007

¹⁰¹ WBCSD 2007a

¹⁰² Cadbury Schweppes 2006a

¹⁰³ CPA Australia 2007

¹⁰⁴ Cordner 2007

¹⁰⁵ NPCC 2007

¹⁰⁶ WBCSD 2007d

¹⁰⁷ GRI 2000-2006

¹⁰⁸ Verfaillie and Bidwell 2000

¹⁰⁹ GRI 2000-2006

¹¹⁰ Verfaillie and Bidwell 2000

¹¹¹ Verfaillie and Bidwell 2000

¹¹² CEN 2000.