

Waste Generation & Resource Efficiency of Packaging

Submission to the Productivity Commission's Waste Generation & Resource Efficiency Inquiry

Submitted by National Packaging Covenant Industry Association
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CONTENTS

Executive Summary	ii
1.0 Introduction	1
2.0 Policy Instruments for Packaging	3
2.1 Regulatory Approaches.....	4
2.1.1 <i>Self regulation</i>	4
2.1.2 <i>Co-regulation</i>	4
2.1.3 <i>Explicit legislation</i>	5
3.0 National Packaging Covenant	6
3.1 Initial Covenant.....	6
3.2 Revised Covenant.....	7
3.3 Allocation of Roles and Responsibilities.....	8
4.0 EPR and Product Stewardship	8
4.1 Advantages and Disadvantages.....	8
5.0 Targets and KPIs	9
6.0 Recycling	11
7.0 Energy Recovery from Waste	11
8.0 Litter	12
8.1 Advantages and disadvantages of CDL.....	12
9.0 Pricing Measures	13
10.0 Market Failures and Externalities	13
10.1 Resource Extraction and Materials Processing.....	14
10.2 Illegal Dumping and Littering.....	14
11.0 National Coordination of Policies	15
12.0 Data Needs	15
13.0 References	16

Executive Summary

The National Packaging Covenant Industry Association (NPCIA) has prepared this submission to assist in the Productivity Commission's Waste Generation & Resource Efficiency Inquiry (Inquiry), with particular emphasis on resource use efficiency and recovery of packaging and Australia's National Packaging Covenant (NPC or Covenant).

The NPCIA supports the Inquiry's terms of reference to adopt a life-cycle perspective and note that the Covenant's use of 'shared responsibility' and emphasis on reducing overall life-cycle environmental impacts of packaging makes the Covenant an efficient, cost-effective approach to address waste generation and resource efficiency of packaging, especially when compared to alternative policy options such as extended producer responsibility (EPR).

The OECD finds that there is no upper limit on costs of EPR, as EPR costs are incurred even if they exceed benefits. Attempts to apply EPR to packaging, especially in Europe, have introduced significant social and economic costs, yet environmental results may be viewed as mixed at best. Recent reports for the review of the European Packaging and Packaging Waste Directive (PPWD) have found that:

- European packaging taxes such as those under the PPWD are discriminatory and serve mainly as a revenue source, rather than driving environmental improvements.
- European packaging taxes have a significant distortive effect on retail pricing.
- Related programs implementing EPR and product stewardship for packaging also entail high economic and social costs without delivering significant environmental improvements.
- There is general consensus that the highest recycling rates that can practically be reached, from both an environmental and an economic point of view, have already been achieved.

Whilst these last two points may seem contradictory, recycling rates by themselves can represent environmental improvement, but must be understood in context with overall social, economic and environmental impacts, and practicalities of achieving reasonably efficient resource use. Investigations have also found that little of the European gain in recycling and environmental improvement from recycling can be directly attributed to the PPWD (generally 8-9% of improvements).

Research commissioned by the NPCIA with specific regard to the Inquiry finds that in Australia:

- Debate has often confused ends and means, with advocates calling for EPR and artificially high recycling rates rather than seeking reduced overall environmental and social costs by implementing efficient, cost-effective means designed to reduce both the volumes and hazards of solid waste.
- Current attempts by advocates to apply EPR to packaging as a means of shifting or spreading waste management costs are inconsistent with OECD principles and objectives for EPR.
- Given the advanced development of waste and recycling, regulatory approaches are likely to involve high marginal costs for little gains in recycling or other environmental objectives.
- Alternative policy models to the Covenant that are intended to introduce EPR for packaging would likely result in significant economic and/or environmental distortions.

This research has further found that in contrast to EPR, product stewardship or ‘shared responsibility’ approaches such as the recently strengthened Covenant provide an appropriate balance of resource use efficiency and recovery throughout the life-cycle of packaging and therefore warrant continued Government support for a variety of reasons:

- Australia has packaging recycling rates comparable to those of far more costly EPR and product stewardship schemes in other countries, where the highest practical recycling rates have been achieved.
- The Covenant emphasises reduced overall environmental impacts and shared responsibility across the packaging supply chain, consistent with relevant and informed approaches to EPR and product stewardship. In contrast, ‘traditional’ EPR focuses predominantly on producers and end-of-life management of hazardous or difficult to manage products.
- Given the diverse nature of the Australian manufacturing industry, shared arrangements provide capacity and flexibility for companies to innovate and invest where they can make a difference, whilst minimising the costly impost of regulation.
- The new Environmental Code of Practice for Packaging (ECoPP) is a key component of the new Covenant. Its strengthened requirements and linkages to the Covenant provide stronger incentives for ‘design for environment’ (DfE) than alternative EPR approaches.
- Strengthened reporting requirements, use of key performance indicators (KPIs) and a designated data collection system under the new Covenant will provide better data on performance and feedback to address impacts of packaging than alternative approaches.
- European debate has shifted away from EPR as an end in itself and more toward Integrated Product Policy (IPP). Under this approach a range of instruments are targeted to the various stakeholders (such as producers, consumers and governments) in an attempt to send the right signals about environmental performance to each stakeholder and reduce overall environmental impact. The Covenant is therefore broadly consistent with more progressive and relevant IPP principles currently being pursued.

It is important to note that the current overall Australian packaging recycling rate of around 50% under the Covenant and other current approaches is comparable to the European packaging recycling rate of 55% overall, which incorporates material recycling rates viewed by most stakeholders as the highest recycling rates that can practically be reached, from both an environmental and an economic point of view. The Covenant calls for an overall packaging recycling rate of 65% to be achieved by 2010. As Australia pushes up against the point of diminishing returns for packaging recycling, marginal costs of achieving higher recycling rates will continue to increase significantly. Such costs will surely be passed on to consumers. The full social, economic and environmental costs of ‘pushing the envelope’ therefore warrant serious consideration.

For regulatory intervention to be justified, a market failure must exist *and* the benefits of intervention must outweigh its costs. The case has not been made that market failure currently exists in Australia with regard to packaging recycling. In fact, market conditions are especially favourable in that there are no distorting legislation and/or mandatory requirements that dictate inaccurate market conditions. The case for intervention other than to provide underpinning legislation has also not been made.

1.0 Introduction

The National Packaging Covenant Industry Association (NPCIA) has prepared this submission to assist in the Productivity Commission's Waste Generation & Resource Efficiency Inquiry (Inquiry), with particular emphasis on resource use efficiency and recovery throughout the product life-cycle of packaging. The NPCIA represents eight peak industry bodies¹ and all company signatories to Australia's National Packaging Covenant (NPC or Covenant), currently numbering around 350 member companies.

The NPCIA submission and accompanying report (MS2 2006) provide an overview of the Covenant, complementary mechanisms and alternative approaches in context with resource efficiency, extended producer responsibility (EPR) and product stewardship principles. The report recommends appropriate courses of action for strengthening packaging product stewardship in Australia based on this research.

The commonly used working definition of EPR is provided by the Organization for Economic Co-operation and Development (OECD) which defines EPR as 'an environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of a product's life-cycle' (p.9, OECD 2001). EPR is also intended to increase recycling rates and to provide incentives to producers to incorporate environmental considerations into the design of their products, an approach called 'design for environment' (DfE)² (OECD 2005).

In contrast to EPR's emphasis almost exclusively on producers, 'product stewardship' involves sharing responsibility through the life-cycle of products. This includes the environmental impact of the product through to and including its ultimate disposal (EC n.d., NPCC 2005). This approach may also be referred to as 'extended *product* responsibility' (USEPA 1998, Walls 2003).

The NPCIA supports the Inquiry's terms of reference (TOR) to adopt a life-cycle perspective to waste management, particularly as it applies to packaging. The Covenant's use of 'shared responsibility' and emphasis on reducing overall life-cycle environmental impacts of packaging clearly makes the Covenant the most efficient, cost-effective approach to address waste generation and resource efficiency relating to packaging when compared to alternative policy options such as EPR (MS2 2006).

Where appropriate, questions from the Commission's Issues Paper (PC 2005) have been highlighted in bold italics in this submission to facilitate discussion.

In addressing packaging waste generation and efficiency, it is important to first understand the importance of packaging as an environmental issue, and in context with other environmental issues. The Australian Food and Grocery Council (AFGC) *Environment Report 2003* provides useful background to help provide Australia-specific context for food and groceries. For example (AFGC 2003, p.5),

¹ Peak bodies represented on the NPCIA Executive include: Australian Council of Recyclers (ACOR), Australian Food and Grocery Council (AFGC), Australian Industry Group (AiG), Australian Retailers' Association (ARA), Beverage Industry Environment Council (BIEC), Packaging Council of Australia (PCA), Plastics and Chemicals Industries Association (PACIA) and Steel Can Recycling Council (SCRC).

² Under DfE, product environmental performance is improved through packaging decision making by reducing material intensity/toxicity, increasing water and energy efficiency, and/or improving a product's ability to be recovered (Martin 2003).

‘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 recent life-cycle work undertaken by Dairy Australia) (AFGC 2003, p.27),

‘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 study (INCPEN 1996) 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’.

Australian studies, including life-cycle work recently completed for Dairy Australia, previous CSIRO research and the AFGC (2003), show similar findings. Similarly, packaged foods can often generate less total waste than fresh foods. The environmental impact of packaging is relatively small compared to functions of preventing waste, losses and spoilage.

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 a 7% increase in packaging waste generated across the EU as a whole from 1997 to 2001. This is despite the presence of stringent packaging requirements and producer responsibility schemes during that period.

“How effective has the mix of policy instruments been in achieving efficient levels of waste? What policies have produced the most efficient outcomes?”

The current mix of policy instruments, including the original Covenant, has been very cost effective at promoting recovery to divert packaging from landfill. A report commissioned by the NPCIA to help inform discussions on development of the Covenant’s overarching targets identified the 2003 levels of packaging recovery by material type shown in Table 1. With subsequent adjustment of paper and cardboard (to 64% recovery) and glass (to 35% recovery) estimates, the estimates in Table 1 have become viewed as the most accurate current estimates of packaging recovery in Australia. The 48% rate of total recovery has been adopted as the baseline estimates for the Covenant. It is encouraging to note that given the identified shortcomings of the previous Covenant, around half of the packaging generated in Australia is being recycled under approaches that are largely voluntary in nature. This voluntary/co-regulatory approach has been improved and strengthened in the new Covenant to ensure that the performance continues to achieve and provide cost effective and tangible results.

Table 1: 2003 Australian Recovery for Packaging Materials

Material	Kerbside/Municipal Recovery		Away from Home Recovery		Overall Recovery	
	Tonnes	%	Tonnes	%	Tonnes	%
Paper/cardboard	333,300	42%	1,200,000	94%	1,533,300	74%
Glass	320,000	68%	30,000	4%	350,000	30%
Plastics	92,500	28%	42,400	13%	134,900	21%
Steel cans	46,200	44%	46,200	44%	92,400	44%
Aluminium cans	18,000	79%	11,000	48%	29,000	63%
Total	810,000	47%	1,329,600	54%	2,139,600	51%

Source: Reproduced with permission by MS2 and NRS 2005

These impressive results cannot be directly attributed to any one approach. A variety of factors including, but not limited to, policy instruments is responsible:

- strong public support for, and participation in, recycling programs, including kerbside recycling;
- concentration of population in and adjacent to capital cities and other major cities;
- implementation of the original Covenant;
- provision of recycling collection and processing infrastructure by local governments and industry;
- generally strong end use markets for recovered materials, including overseas markets;
- procurement policies and practices by industry and all levels of Government; and
- reasonable jurisdictional support to help optimise recycling programs.

2.0 Policy Instruments for Packaging

Policy instruments for packaging consistent with EPR and product stewardship principles are provided in Table 2, and examined in detail in the accompanying MS2 (2006) report.

Table 2: Overview of Policy Instruments Consistent with EPR and Product Stewardship

Policy Instrument	Comments ³
<p>Take-back requirements</p> <ul style="list-style-type: none"> • Mandatory product take-back • Voluntary or negotiated take-back programs 	<ul style="list-style-type: none"> • Take-back is viewed as the purest form of EPR • Often associated with reuse and/or recycling targets • Responsibilities may be discharged through participation in a Producer Responsibility Organisation (PRO), the approach usually preferred by industry due to lower cost and greater control • Australia’s National Environment Protection Measure (NEPM) on Used Packaging requires take-back for brand-owners not signing or not in compliance with the Covenant
<p>Standards</p> <ul style="list-style-type: none"> • Minimum recycled content standards (often referred to as ‘rates and dates’) • Industry funding organisations (IFOs) 	<ul style="list-style-type: none"> • Recycled content standards have generally been intended to increase local recycling markets • Recycled content standards must deal effectively with the large volume of imports into respective jurisdictions • IFOs solely address funding, not other responsibilities

³ Derived from a range of sources, including OECD 2001; Walls 2003; West and Hogarth 2005 and MS2 experience.

Table 2: Overview of Policy Instruments Consistent with EPR and Product Stewardship (continued)

<p>Economic Instruments</p> <ul style="list-style-type: none"> • Deposit-refund schemes such as container deposit legislation (CDL) • Advance disposal fees (ADFs, increasingly referred to as advance recycling fees, ARFs) • Taxes and/or subsidies • Upstream combination tax/subsidy (UCTS) • Tradeable resource recovery certificates (RRCs) 	<ul style="list-style-type: none"> • Economic instruments provide a direct financial incentive to take desired action(s) • Some CDL programs are viewed as full EPR, rather than as economic instruments • The OECD (2001) states that an ADF does not constitute EPR <i>per se</i>, even though it may serve to recover costs for EPR initiatives; however, ADFs may be viewed as EPR if they transfer sufficient physical or financial responsibility to producers (OECD 2005) • Material taxes aim to reduce the use of virgin or difficult to manage materials in favour of recycled or less difficult materials • Economic instruments may also be referred to as market-based instruments (MBIs)
<p>Other industry-based measures</p> <ul style="list-style-type: none"> • Covenants • Industry Codes of Practice • Leasing 	<ul style="list-style-type: none"> • May be co-regulatory (such as the Covenant) or used in conjunction with other approaches • Leasing is impractical or impossible for products with relatively short life-cycles, such as packaging

Source: MS2 2006.

2.1 Regulatory Approaches

“What are the advantages and disadvantages of the different regulatory options for setting up extended producer responsibility or product stewardship schemes: self regulation, co-regulation and explicit legislation?”

2.1.1 Self regulation

In broad terms, self-regulatory approaches provide significant flexibility for progressive companies but can lead to market distortions due to ‘free riders’, or ‘non-participants’ that gain unfair competitive advantage by not participating in EPR or product stewardship schemes and thus not contributing an appropriate share of the costs of such schemes despite their contribution to the waste stream. In schemes affecting a large number of companies or where responsible parties are difficult to track, free riding can threaten the financial viability of entire schemes (EPHC 2004, OECD 2001).

2.1.2 Co-regulation

Co-regulatory approaches help to address free riders through underpinning legislation such as the NEPM for Used Packaging and the NEPM for Product Stewardship currently under development by the Environment Protection and Heritage Council (EPHC). Co-regulatory approaches such as the Covenant provide an equitable and effective balance of industry initiative and regulatory underpinning to address free riders, as addressed in Section 3.

The OECD (2005) has found that co-regulatory approaches or market-based instruments (MBIs) such as tradable recycling credits allow greater flexibility, help to ensure goal achievement cost-effectively and provide greater transparency, in contrast to explicit legislation such as mandated targets.

2.1.3 Explicit legislation

Regulation and enforcement of explicit legislation is by far the most expensive of the regulatory approaches considered. Further to this, explicit legislation is not inherently more effective at reducing negative social and environmental externalities. Explicit legislation and mandatory take-back programs generally occur where:

- products contain toxic or hazardous substances (such as certain waste electrical and electronic equipment (WEEE));
- the products are integral to established recycling programs; and
- affected industries have failed to respond effectively to Government pressure to accept an appropriate level of responsibility for their products.

A significant disadvantage of explicit legislation such as EPR is that there is no upper limit on costs of such approaches, as EPR costs are incurred even if they exceed benefits (OECD 2005). Attempts to apply EPR to packaging, especially in Europe, have introduced significant social and economic costs, yet environmental results may be viewed as mixed at best. Recent reports for the review of the European Packaging and Packaging Waste Directive (PPWD) have found that (Perchards *et al* 2005, PIRA and ECOLAS 2005):

- European packaging taxes such as those under the PPWD are discriminatory and serve mainly as a revenue source, rather than driving environmental improvements.
- European packaging taxes have a significant distortive effect on retail pricing.
- Related programs implementing EPR and product stewardship for packaging also entail high economic and social costs without delivering significant environmental improvements.
- There is general consensus that the highest recycling rates that can practically be reached, from both an environmental and an economic point of view, have already been achieved.

Whilst these last two points may seem contradictory, recycling rates by themselves can represent environmental improvement, but must be understood in context with overall social, economic and environmental impacts, and practicalities of achieving reasonably efficient resource use. In 2001, the EU-15 recycled 30.7 million tonnes out of 56.3 million tonnes of packaging waste, for a 55% packaging recycling rate overall. However, in 2001 only 9% of total packaging recycling in the EU-15 could be directly attributed to the PPWD and of environmental improvements due to packaging recovery, only 8-9% was directly related to the PPWD (PIRA and ECOLAS 2005). The remainder came from industry initiative and efficiencies undertaken within companies such as lightweighting and innovation, as well as pre-existing recycling programs.

The total 'financing need' (funding necessary to make recycling happen) for recycling packaging for the EU-15 has increased from €2.9 billion (\$4.7 billion) per year in 1997 to €3.7 billion (\$6.1 billion) per year in 2001. PIRA and ECOLAS (2005) found that the compliance costs to industry in 2001 varied significantly by member state, with costs to industry of:

- **Germany:** €2.5 million (\$20.5 million) per % point of recycling;
- **France:** €6.8 million (\$11.1 million) per % point of recycling; and
- **UK:** €2.4 million (\$3.9 million) per % point of recycling.

In comparison, targets under Australia's NPC call for the overall packaging recycling rate to increase from a baseline in 2003 of 48% to 65% in 2010, for a difference of 17 % points of recycling. Applying the above rates, the programs would cost \$348 million, \$189 million and \$66 million to achieve the Covenant's overarching target for the German, French and UK approaches, respectively. The financial commitment to Australian industry to assist in achieving the Covenant targets is \$3 million every year over the Covenant's 5-year term (not including costs for data and time), with this commitment matched by Governments (MS2 2006).

The NPCIA agrees with and supports the claim by the OECD (2005) that recycling targets which sometimes accompany EPR schemes lack cost transparency and that targets are not required under EPR.

3.0 National Packaging Covenant

“How effective has the National Packaging Covenant (in both its initial and subsequent forms) been in promoting optimal levels of packaging wastes?”

The Covenant has been, by far, the most effective national policy instrument for dealing with the management of packaging waste. With more than 600 signatories to the first Covenant and about 350 signatories to the current Covenant, these commitments far exceed material specific agreements prior to the Covenant that covered less than 30 company signatories. Moreover, the Covenant approach has involved all sectors in the packaging supply chain, whereas its predecessors focused on material-specific and/or product-specific bases. The fundamental policy principles underpinning both Covenants are those of continuous improvement and mutual cooperation between all the players – governments, local governments, industry groups and companies.

It is particularly important to note that the Covenant allows those involved to focus on an entire suite of issues – design, production and distribution, as well as the recycling and recovery aspects. Moreover, the Covenant gives scope for influence to be exerted and pressure to be applied throughout the entire packaging supply chain to ensure that all components play a role and practice product stewardship.

3.1 Initial Covenant

The initial Covenant was effective in raising awareness of packaging-related issues within corporations, providing a framework for packaging product stewardship and increasing supply chain collaboration. Whilst the full extent of this awareness is difficult to measure, despite the initial Covenant being the first of its kind, over 600 companies became signatories. This large number of signatories is a compelling indicator of the extent of change brought about by the initial Covenant.

The initial Covenant was not necessarily a strong driver for optimising packaging waste management. A significant number of stakeholders, especially local governments, were not engaged in the process. Reviews of the initial Covenant consistently found that it also 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. It was also felt that while the NEPM was an effective regulatory safety net for signatories, the NEPM enforcement would need to be more visible and rigorous (ISF 2004, Nolan-ITU 2004).

The NPCIA (2004) commissioned an independent review of representative Action Plans submitted under the original Covenant. The review found that more than two thirds (68%) of the Plans reviewed made a clear effort to deliver against at least some of the objectives set out in the Covenant. The review also found that around 20% of Action Plans were good or outstanding but in contrast, 29% of Action Plans adopted a relatively basic response of going through the motions of developing a plan but demonstrating little understanding or commitment to the process. Five plans (2.5%) were considered unacceptable. These findings suggest that nearly 70% of company signatories to a voluntary process (underpinned by a regulatory NEPM) have taken the process seriously as reflected by their efforts in developing and reporting Action Plans under the original Covenant.

3.2 Revised Covenant

It is too early into the revised Covenant to effectively quantify its impacts and progress against overarching targets. However, the NPCIA is of the view that in contrast to EPR, ‘shared responsibility’ approaches such as the recently strengthened Covenant are clearly the most efficient and effective vehicles. The available evidence proves the Covenant provides a realistic and appropriate balance of resource use, efficiency and recovery throughout the life-cycle of packaging. Such a valuable and equitable mechanism therefore warrants continued Government support for a variety of reasons:

- Australia has packaging recycling rates comparable to those of far more costly EPR and product stewardship schemes in other countries, where the highest practical recycling rates have been achieved.
- The Covenant emphasises reduced overall environmental impacts and shared responsibility across the packaging supply chain, consistent with recent approaches to EPR and product stewardship. In contrast, ‘traditional’ EPR focuses predominantly on producers and end-of-life management of hazardous or difficult to manage products.
- Given the diverse nature of the industry shared arrangements provide capacity and flexibility to innovate and invest where they can make a difference, without the costly impost of regulation.
- The Environmental Code of Practice for Packaging (ECoPP) and its strengthened linkages to the Covenant provide stronger incentives for DfE than alternative EPR approaches.
- Strengthened reporting requirement and use of key performance indicators (KPIs) under the Covenant and steps being undertaken by the NPCIA are likely to result in better data and feedback to address impacts of packaging than alternative approaches.
- The Covenant has considerable industry and company support and engagement, which allows investment and innovation and provides industry with flexibility to undertake measures they know will reduce impact across the life-cycle perspective.
- European debate has shifted away from EPR as an end in itself and more toward Integrated Product Policy (IPP). Under this approach a range of instruments are targeted to the various stakeholders (such as producers, consumers and governments) in an attempt to send clear signals about environmental performance to each stakeholder and reduce overall environmental impact. The Covenant is therefore broadly consistent with IPP principles currently being pursued elsewhere.

An independent review of the Covenant’s regulatory impact statement (RIS) carried out by ACCESS Economics found that despite several concerns about the robustness of the RIS and the setting of overarching targets, the Covenant “seems to ACCESS Economics to constitute a prudent evolutionary approach to tightening industry performance requirements” (ACCESS 2005, p.1).

3.3 Allocation of Roles and Responsibilities

“What should be the relative roles of industry and government in the development of such arrangements (as the Covenant)?”

Schedule 1 of the Covenant details appropriate obligations for the packaging supply chain and for governments. Whilst industry must adopt product stewardship principles, jurisdictional governments are responsible for enforcing the NEPM and governments at all levels have responsibilities consistent with achieving Covenant objectives. All participants in the Covenant process have specific obligations to help achieve the overarching targets and KPIs detailed in Schedule 2 of the Covenant. The NPCIA supports the current allocation of roles under the revised Covenant.

The NPCIA strongly supports a whole of system approach to the revised Covenant. The achievement of the targets established under the new Covenant will require each signatory to undertake action and make improvements. This includes governments. The likelihood of achieving the targets will be significantly enhanced if all stakeholders in the process remain committed to the Covenant as the primary policy instrument for packaging waste management.

4.0 EPR and Product Stewardship

For this discussion, this submission will draw heavily on the MS2 (2006) report commissioned by the NPCIA to assist in responding to the Inquiry. The report provides a detailed literature search and strategic approach for approaching EPR and product stewardship in Australia, specifically as it relates to packaging.

4.1 Advantages and Disadvantages

“What are the advantages and disadvantages of extended producer responsibility and product stewardship schemes?” and “Which products are most amenable to these arrangements?”

This submission and the accompanying report have focused on performance against the two principal objectives common to most EPR programs (OECD 2005):

- providing DfE incentives for producers; and
- increasing recycling rates.

Whilst EPR is often touted as a means of shifting or spreading waste management costs, applying EPR to packaging (as opposed to hazardous or difficult-to-manage wastes) is inconsistent with OECD principles and objectives for EPR, and has therefore not been examined in this submission.

Collection and disposal of non-hazardous end-of-life products from households are generally the responsibility of municipal governments and funded through general taxation such as rates or through user charges for households and/or businesses. The system and societal costs that may result from the introduction of problematic materials into such systems are significant, and it therefore makes sense to establish through EPR separate, controlled channels for toxic or hazardous products such as tyres, batteries and mercury-containing products (OECD 2005).

Focus on end-of-life management of household wastes by EPR may be misplaced. For example, it is estimated that the social costs of landfilling waste represent less than 5% of the total societal cost of production and consumption of goods, since a large volume of the waste stream consists of inert or non-harmful materials (MMA and BDA Group 2003). Similarly, landfill benefits of recycling account for less than 2% of the total benefits of recycling (Nolan-ITU and SKM 2001).

The NPCIA especially notes the OECD (2005) finding that there is no upper limit on costs of EPR, as EPR costs are incurred even if they exceed benefits. The primary objective for EPR and product stewardship schemes is to attain an efficient level of the environmental externality (in this case waste management and landfill) in question, and to do so cost-effectively (Walls 2003). The NPCIA find that the conditions required to justify introduction of EPR are not applicable to packaging in Australia. Attempts to apply EPR to packaging, especially in Europe, have introduced significant social and economic costs, yet environmental results may be viewed as mixed at best. Put simply, packaging waste does not justify EPR instruments, either from an economic or an environmental perspective.

5.0 Targets and KPIs

“How are targets being set? What consideration is given to the social, environmental and economic costs of achieving these targets? How should targets be set to optimise social, environmental and economic outcomes?”

With regard to the Covenant, the NPCIA suggests that targets to a large extent and KPIs to a lesser extent were set based primarily on political reality rather than full consideration of their social, economic and environmental costs and benefits. This was also noted in an independent review of the Covenant’s RIS carried out by ACCESS Economics, which stated that the true costs of the proposed Covenant had not been taken into account. Despite concerns about the robustness of the RIS and the setting of overarching targets, the Covenant, “seems to ACCESS Economics to constitute a prudent evolutionary approach to tightening industry performance requirements” (ACCESS 2005, p.1).

Access Economics suggest that the prescribing of over-arching recycling targets, divorced from consideration of how, and at what cost, they are to be achieved at the business-specific level, ranges from being ineffective to, at worst, generating net costs to the community rather than net benefits. The NPCIA strongly supports the argument made by Access that unless targets are linked to practical business specific actions, there are significant questions posed as to how anybody can be sure they will be achieved, and most importantly, at what (social, environmental and economic) cost?

Access Economics suggest that the implementation of targets as contained and reviewed in the RIS associated with the revised Covenant to be completely inconsistent with the spirit and intent of the RIS process itself. This supports the NPCIA view that the setting of targets and the consideration of the social, environmental and economic impacts were not linked to business-specific actions. Accordingly, a robust and rigorous cost benefit analysis, as required under the RIS process, was not undertaken. The targets were set based on inaccurate and shallow (at best) investigation into the actual impacts on business.

The Covenant calls for an overall packaging recycling rate of 65% to be achieved by 2010. This is despite the current overall Australian packaging recycling rate of around 50% being comparable to the European packaging recycling rate of 55% overall. The European material recycling rates are viewed by most stakeholders as the highest recycling rates that can practically be reached. As Australia pushes up against the point of diminishing returns for packaging recycling, marginal costs of achieving higher recycling rates will continue to increase significantly. It is inevitable given the current challenges facing manufacturers of fast moving consumer goods in Australia in terms of increases in input costs and pressure on margins from the retail sector, that such costs will surely be passed on to consumers.

The NPCIA accepts the targets embodied in the revised Covenant, but view their initial establishment as less than desirable. The primary rationale for this view is that most EPR and product stewardship approaches have moved away from mandated targets toward more encompassing approaches addressing a wider range of environmental impacts. The imperative for targets and KPIs under the revised Covenant resulted primarily from the lack of effective monitoring and accountability consistently noted in reviews of the original Covenant.

The NPCIA was fully involved in the development of targets, in close consultation with jurisdictional and Commonwealth representatives. The process was disruptive and disjointed, with advocacy groups seeking target proposals based on unrealistic, unsubstantiated and inaccurate representations of the current state of packaging recovery in Australia and inappropriate comparisons against other programs, especially those in Europe.

The NPCIA developed detailed modeling, based on the best available information, of target recycling rates that could be achieved with substantial effort by industry. Despite the best efforts of the NPCIA, these estimates were only marginally taken into account during the actual establishment of targets. This was largely due to the lack of recognition by some stakeholders involved in the process that Australia performs especially well against world standards for packaging recycling and that the upper limits of practical recycling are being achieved for most packaging materials.

Based on the above experience, the NPCIA cautions against the use of targets based on less than a full consideration of social, economic and environmental costs and benefits, and against failure to understand practical realities of what can be achieved. Where targets are established, they should be reasonable, achievable with an appropriate effort and industry should be allowed the flexibility to achieve the targets in the most cost-effective and resource-efficient manner.

The NPCIA views the 'top down' setting of 'over-arching' targets as was undertaken as part of the revised Covenant as poor policy development. Without consideration of a practical mechanism linking business/consumer/government actions to the achievement of such targets, there is no practical way of assigning responsibility for their achievement or failure to participants in the revised Covenant.

In this respect, NPCIA supports the finding of Access Economics that the RIS itself has been forced to assume specific environmental outcomes in order to evaluate particular policy options in place of the current Covenant. In addition, policy makers have not examined 'the implementation steps, practicality or desirability of achieving (the targets)'. The NPCIA are of the view that any targets should be developed from the 'bottom up' rather than from the 'top down'. By engaging industry participation in their development, and aggregating any 'over-arching targets' from individual targets and actions, all of the practical shortcomings identified will be considered. It is possible to develop waste management policy that 'pushes the envelope' but in a cost-effective, practical manner.

6.0 Recycling

“How useful is full life-cycle analysis in determining the environmental and economic costs and benefits of recycling various products?”

Full life-cycle analysis (LCA) is useful in driving improvements over time for individual products. We do not, however, support the use of LCA to develop policy, as framing and assumptions are easily called into question and policies based primarily on LCA would fail to adequately account for product innovation and changes over time. Policies should be based on full considerations of social, economic and environmental costs and benefits, within which LCA can have a complementary role.

“Are there particular products or locations for which disposal rather than recycling might be a more efficient option?”

In locations where low collection quantities are likely or where transport of recovered materials to end use markets is cost-prohibitive, recycling might not be the preferred option. In such cases, NPCIA preference is for local recycling markets or, where available, energy recovery consistent with the Waste Management Association of Australia’s Sustainability Guide (WMAA 2005).

“How has government procurement policy affected recycling levels? How important is the demonstration effect of government actions?”

Government and business procurement are equally fundamental to creating stable demand for recovered materials and to demonstrating leadership by example. Procurement will be increasingly important to stimulate demand for increased recovery under the Covenant as it strives to achieve the overall targets. The NPCIA acknowledges the success of existing procurement policies and programs and supports their improvement and expansion.

7.0 Energy Recovery from Waste

“What is hindering the greater use of recovering energy from waste in Australia?”

Strong arguments can be made for the use of energy from waste (EFW) or alternative waste technologies (AWT) on economic and environmental grounds. This is despite low gate fees for landfill and relatively low feedstock densities potentially causing these approaches to not be competitive in some areas. Public perceptions and misunderstandings about such approaches, fuelled by some environmental advocates, appear to be the major hindrance.

“Are there particular products or locations for which recovering energy from waste would be the most efficient approach to waste management?”

For residual materials remaining after cost-effective recycling, the NPCIA supports energy recovery and resource utilisation through EfW or AWT consistent with the WMAA (2005) Sustainability Guide.

The NPCIA further supports efforts to better quantify the amount of packaging disposed through EfW or AWT processes in order to better understand packaging material flows, consistent with the NPCIA’s Gap Analysis (MS2 and NRS 2005).

8.0 Litter

8.1 Advantages and disadvantages of CDL

“What are the advantages and disadvantages of container deposit legislation in reducing litter and increasing recycling? What part do they play in optimising waste management outcomes?”

The NPCIA concurs with the Inquiry’s observation that “container deposit schemes can lead to higher levels of recycling for selected products, but can lead to costly duplication of collection systems and adversely affect the viability of kerbside collection for other recyclable materials” (PC 2005, p.30). The NPCIA views CDL as a potential costly and inefficient threat to current recycling activities, without resulting in increased optimisation of waste management and only limited positive impacts on litter.

Various studies have found that there is no direct link between the presence of CDL and optimised waste management outcomes such as increased overall recovery, reduced packaging to landfill or reduced environmental impacts of landfilling (C4ES 2000, Perchards *et al* 2005). In their review of the PPWD, Perchards *et al* (2005, p.130) found that,

“There is no evidence that mandatory deposits improve the efficiency of recycling systems – collection arrangements for non-beverage packaging are still needed, and one system is cheaper to run than two. The results reported by the EU-15 countries show that deposit systems are not necessary for the achievement of high recycling rates.”

CDL can be effective in increasing beverage container recovery and decreasing beverage container litter, which generally accounts for 8-10% of the litter stream, but has no effect on other litter types. However, CDL increases the supply of recovered materials without increasing demand for the materials and requires the establishment of separate, competing systems (C4ES 2000, Perchards *et al* 2005). These conditions introduce market distortions that reduce the cost-effectiveness of recycling programs. Florida repealed CDL provisions due to take effect, in favour of a market-based ADF to promote recycling markets to address this specific concern (MS2 2006).

C4ES (2000) first pointed out that, prior to the introduction of CDL in Germany, CDL had always been introduced first and then comprehensive waste management and recycling programs could be designed around the CDL programs, thus reducing conflicts with recycling programs and contracts.

Germany introduced CDL on top of their comprehensive waste management and recycling program in order to penalise the beverage industry for failure to achieve an arbitrary 72% reuse quota for refillable beverage containers. As a result, the introduction of CDL cost the German industry PRO (DSD) over €300 million (currently around \$490 million) in 2003 and led to a net loss of 9,530 jobs (EUROPEN n.d.). The program has also resulted in a net increase in environmental impacts and significant market distortions. To avoid the additional deposit, consumers frequently buy less expensive refillable bottles, then litter them (Perchards *et al* 2005).

Introducing CDL on top of comprehensive recycling programs such as those in Australia would entail significant conflict. These conflicts are highlighted as recycling programs increase their recycling rates and reduce their costs. For example, C4ES (2002) found that the introduction of CDL in the Australian Capital Territory (ACT) could at best result in a 10% increase in beverage container recovery. However the marginal cost for recycling would increase from \$110 per tonne to \$900-\$1,900 per tonne for a 10% recycling rate increase. Council recycling costs would therefore not go down, even though less material would be recovered. Importantly the evidence suggests council rates could actually rise if CDL was implemented in top of comprehensive recycling programs (C4ES 2000).

Even studies that disagree in their recommendations on CDL are remarkably consistent in estimating that introducing CDL in Australia would double or triple the cost per household of kerbside recycling in Australia (C4ES 2000, EPA Victoria 2003, ISF 2001).

C4ES (2000) further found significant difference in CDL collection depot viability between urban and rural areas. C4ES modelling showed that for NSW rural areas to try to achieve the same coverage as the South Australia CDL system would require \$123 million in establishment costs alone to create 500 depots, despite only 30-60 of the depots being commercially viable on their own. This raises important policy issues – namely introducing CDL in Australia would either require significant subsidisation in rural areas or charging consumers deposits they may not actually be able to redeem.

Although in theory deposit-refund schemes such as CDL can be effective in addressing illegal disposal, they are not suited to high volume waste streams (MMA and BDA Group 2003). The impacts of CDL are also highly dependent on the deposit providing enough incentive to warrant the extra effort to redeem the containers, and the ability of CDL to provide incentives for return is debatable. For example, return rates are especially low for reusable agricultural and veterinary chemical containers, even though they can carry deposits of \$350 or \$1,000 and users can return the containers to the same stores where they purchase new supplies. To keep up with inflation, CDL deposits would have to be in the order of 20-30 cents per container. The question is whether people would redeem containers, and if so, how? Given the strong support for kerbside recycling in Australia and 85-95% access to kerbside recycling, it is less likely that people will go out of their way to redeem containers (MS2 2006).

Martin (2005a, 2005b) has highlighted the potential for significant diversion of revenues from recycling programs under CDL if consumers are motivated to return the containers. Martin (2005a) found that materials covered under CDL contribute 54% of the volume, yet 77% of the financial value of kerbside recycling in Tasmania. In addition, Martin (2005b) found that materials covered under CDL contribute 33% of the volume, yet 59% of the financial value of kerbside recycling in Northern Queensland. Economic viability of such programs would be threatened to the extent that consumers redeem containers through CDL collection depots rather than through kerbside.

9.0 Pricing Measures

“Where unit pricing has been introduced, has this proved efficient and effective? Has it lead to a reduction in waste disposal and/or an increase in recycling?”

The NPCIA supports the implementation of unit-based pricing (UBP) to send appropriate signals to consumers about waste reduction where viable recycling opportunities are accessible.

10.0 Market Failures and Externalities

The NPCIA understands that one of the Inquiry’s objectives is to identify policy options to address market failures and externalities associated with the generation and disposal of waste. The NPCIA strongly support the Inquiry’s view that ‘government intervention can be costly and can introduce its own distortions. Taking this into account, government intervention is only warranted when the benefits it is likely to provide are greater than the costs involved’ (PC 2005, p.19).

The NPCIA does not believe that market failures and resulting externalities currently exist on any significant scale for packaging in Australia. Packaging is an integral part of municipal recycling programs and provides significant revenue to offset costs for implementing such programs.

Non-paper packaging is generally inert in landfill and therefore externalities are limited. Paper that goes to landfill may introduce some externalities, and the volume of paper going to landfill is significant. However, it is important to acknowledge existing paper recovery efforts such as commercial and residential recovery of paper and cardboard, efforts by the Publishers National Environment Bureau to increase newsprint recovery, and current and pending paper industry product stewardship schemes.

Industry funding to increase packaging recovery and litter reduction is an integral component of the Covenant, as is commitment by company signatories to reduce overall life-cycle impacts of packaging. Government intervention is therefore best directed to enforcing the current NEPM for Used Packaging, thus reinforcing effectiveness of the Covenant, and to increasing responsible management for products that are potentially hazardous in nature, difficult to manage or where industries have failed to accept an appropriate level of responsibility for their products (MS2 2006).

10.1 Resource Extraction and Materials Processing

“To what extent do negative externalities associated with resource extraction and materials processing (and other stages of the product life-cycle) result in non-optimal levels of waste?”

It may be worth investigating whether virgin material or related subsidies create any unfair bias against recovered materials and if so, move toward reduction and/or elimination of such subsidies to ensure they are not ‘perverse’ subsidies that are damaging to both the economy and the environment. The OECD (2005) notes that proper pricing of virgin resources to accurately incorporate externalities could result in greater encouragement of DfE and greater use of recycled materials where there is a social case for doing so. We note that the Covenant’s strengthened ECoPP is intended to effectively achieve these objectives.

10.2 Illegal Dumping and Littering

“How large a problem is illegal dumping and littering? What types of waste cause most of the problems?”

Illegal dumping and littering, especially for marine debris, represents a potentially significant yet largely unquantified matter worthy of further consideration. The NPCIA supports a comprehensive and coordinated national approach to litter.

“What are the most cost effective policy and enforcement mechanisms for limiting illegal dumping and littering?”

With regard to packaging litter, the NPCIA supports improved litter reduction education and provision of public place/special event recycling and strengthened anti-litter legislation and enforcement resources, coupled with financial support for anti-littering projects and organisations as cost-effective policy and enforcement mechanisms.

The Covenant contains a number of features intended to reduce environmental impacts from packaging that is illegally dumped or littered:

- Funding through Covenant contributions for litter projects approved by the National Projects Group (NPG).
- One of the ECoPP’s DfE provision specifically addresses propensity to become litter.

- Covenant KPIs contain specifically address measurement of consumer packaging in the litter stream and improvements in littering behaviour, and the NPCIA will continue to work with jurisdictions to help measure and achieve these KPIs.

11.0 National Coordination of Policies

“When is it appropriate to implement uniform national approaches and when is it appropriate for the jurisdictions to pursue their own agendas?”

Companies in the packaging supply chain produce for national and international markets, rather than for individual Australian States and Territories. Lack of a uniform national approach will add to costs and undermine the competitiveness of Australian companies and their packaging products, both within Australia and overseas.

Nationally consistent policy approaches are critical to limiting compliance costs of companies and in recognition that viable trade generally shows little regard for jurisdictional boundaries. The NPCIA also supports jurisdictions working with industry leaders in innovative environmental initiatives and where jurisdictional action is necessary to support underpinning legislation such as NEPMs. However, jurisdictional efforts should be complementary to, rather than undercutting, nationally consistent initiatives and be based on a full understanding of social, economic and environmental considerations.

12.0 Data Needs

“To what extent is the lack of disaggregated data (that is, the lack of information about quality and composition of waste) a problem?” and “What are the most significant data gaps?”

The NPCIA recognised the significant lack of effective data and feedback frameworks and the impacts of data gaps on effective policy development and commissioned the attached Gap Analysis (MS2 and NRS 2005) to identify and document the gaps and inconsistencies in the collection, storage and analysis of packaging materials flow data in order to help inform discussions during revision of the Covenant.

The Gap Analysis (MS2 and NRS 2005, p.ii) found that ‘fundamental changes are needed to provide reasonably accurate, independently verifiable data to determine progress’ against Covenant targets and KPIs and that ‘the use of current datasets and methodologies to determine compliance would clearly be open to considerable challenge for virtually every area examined’.

The NPCIA has supported NPG projects to identified gaps and has committed to conducting an annual Gap Analysis to address problem areas.

“What countries collect and use data on waste more effectively than we do and what are the lessons for Australia?”

The NPCIA has experienced the misuse of differing waste data and inappropriate data comparisons to other countries to advance particular agendas. For example, the Boomerang Alliance claimed that Australia lagged well behind international standards in recycling (BA 2005). Well-respected UK consultancy Perchards reviewed the document and responded that the claims were “based on a comparison with Europe which is inaccurate and misleading” (Perchards 2005).

In this report, Perchards further refuted many of the claims made by the Boomerang Alliance and supported many of the comparisons made by the NPCIA, as well as refuting claims about excessively high waste generation in Australia.

We further refer the Inquiry to our discussion in Section 5 of data use and misuse relating to the establishment of Covenant targets.

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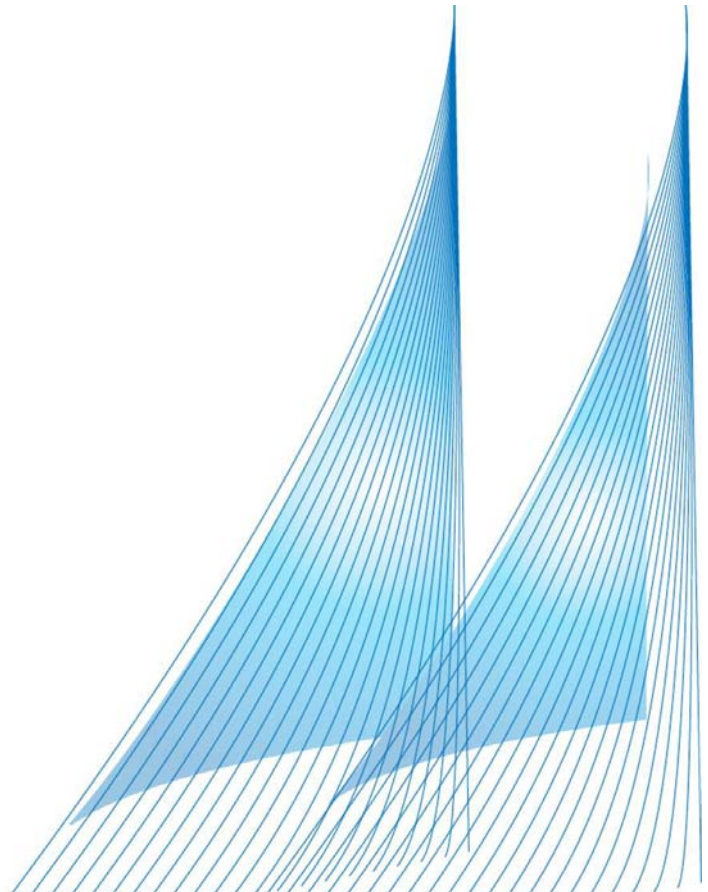
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Strengthening Packaging Product Stewardship in Australia

Final Report

Prepared for National Packaging Covenant Industry Association
February 2006





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CONTENTS

Acronyms	iii
Executive Summary.....	v
1.0 Introduction	1
1.1 Packaging in Context	1
1.1.1 Packaging in modern society	1
1.2 EPR and Product Stewardship.....	2
1.2.1 Packaging recovery in Australia.....	3
1.2.2 Packaging EPR and product stewardship in Australia.....	5
1.3 Overview of Policy Instruments for Packaging.....	5
1.4 Methodology	7
1.5 Report Format	8
2.0 Principles of EPR and Product Stewardship	9
2.1 EPR Principles.....	9
2.1.1 Environmental Benefits	9
2.1.2 Cost-shifting	10
2.1.3 Regulatory underpinnings	11
2.2 Product Stewardship Principles.....	12
3.0 Take-back Requirements	14
3.1 Mandatory Product Take-back	14
3.1.1 European Packaging and Packaging Waste Directive.....	15
3.2 Voluntary or Negotiated Take-back Programs	15
4.0 Standards	16
4.1 Recycling targets	16
4.2 Minimum recycled content standards.....	16
4.3 Industry Funding Organisations	16
4.4 CEN Standards	16
5.0 Economic Instruments	18
5.1 Deposit-refund Schemes.....	18
5.1.1 Container deposit legislation	18
5.1.2 British Columbia CDL program.....	18
5.1.3 California Beverage Container Recovery Program.....	19
5.2 Advance disposal/advance recycling fees	20
5.2.1 Florida’s ADF for containers.....	21
5.3 Taxes and/or Subsidies	22
5.4 Upstream Combination Tax/Subsidy.....	23
5.5 Tradable Resource Recovery Certificates	23
5.5.1 UK Packaging Waste Recovery Notes.....	24
6.0 Other Industry-based Measures.....	25
6.1 Covenants	25
6.1.1 Australia’s National Packaging Covenant.....	25
6.2 Other Measures.....	26
7.0 Costs and Benefits of Policy Framework Alternatives	27
7.1 Take-back Requirements	27
7.1.1 European Packaging and Packaging Waste Directive.....	27
7.2 Standards	29
7.2.1 Recycling targets.....	29
7.2.2 Minimum recycled content standards.....	29
7.2.3 Industry funding organisations	29
7.2.4 CEN standards	30
7.3 Economic Instruments.....	30
7.3.1 Container deposit legislation	30
7.3.2 Advance disposal fees.....	35

Strengthening Packaging Product Stewardship in Australia

7.3.3	<i>Taxes and subsidies</i>	36
7.3.4	<i>UCTS</i>	36
7.3.5	<i>Tradable certificates</i>	36
7.4	Other Industry-based Measures.....	36
7.4.1	<i>National Packaging Covenant</i>	36
8.0	Productivity Commission Inquiry	38
8.1	Life-cycle Approach.....	38
8.2	Regulatory Approaches.....	39
8.3	Roles and Responsibilities	39
8.4	Data Collection and Transparency.....	39
8.5	Understanding Diminishing Returns.....	40
8.6	Energy Recovery.....	41
8.7	Litter.....	41
8.8	Summary	41
9.0	Strengthening Packaging Product Stewardship in Australia	43
9.1	Principles for Packaging Product Stewardship	43
9.2	Continued Support of the Covenant.....	44
9.3	Exploring Complementary Mechanisms to the Covenant	44
	References	45
	Glossary	49

Acronyms

ACOR	Australian Council of Recyclers
ACT	Australian Capital Territory
ADF	Advance disposal fee
AFGC	Australian Food and Grocery Council
AfH	Away from home
ARF	Advance recycling fee
AWT	Alternative waste technology
BPEC	Beverage Packaging Environment Council
C&I	Commercial and institutional
CDL	Container deposit legislation
CEN	The European Committee for Standardisation
CRF	Container recycling fee
CRV	California redemption value
DEC	Department of Environment and Conservation (NSW)
DfE	Design for environment
DOC	Department of Conservation (California)
DSD	Duales System Deutschland
ECOPP	Environmental Code of Practice for Packaging
EfW	Energy from waste
EPHC	Environment Protection and Heritage Council
EPR	Extended producer (or product) responsibility
EU	European Union
IFO	Industry funding organisation
Inquiry	Productivity Commission's Waste Generation & Resource Efficiency Inquiry
IPP	Integrated Product Policy
IRWA	Industry Waste Reduction Agreements
IWRP	Industry Waste Reduction Plans
KPI	Key performance indicator
LCA	Life-cycle analysis

MBI	Market-based instrument
MS2	Martin Stewardship & Management Strategies Pty Ltd
NEPM	National Environmental Protection Measure
NPC or Covenant	National Packaging Covenant
NPCC	National Packaging Covenant Council
NPCIA	National Packaging Covenant Industry Association
NPG	National Projects Group
NRS	New Resource Solutions
NSW	New South Wales
OECD	Organization for Economic Co-operation and Development
PERN	Packaging waste export recovery notes
PPWD	Packaging and Packaging Waste Directive (94/62/EC)
PRN	Packaging waste recovery note
PRO	Producer responsibility organisation
RCBC	Recycling Council of British Columbia
RIRDC	Rural Industries Research & Development Corporation
RIS	Regulatory impact statement
RRC	Resource recovery certificate
SA	South Australia
TOR	Terms of reference
UBP	Unit-based pricing
UCTS	Upstream combination tax/subsidy
USEPA	US Environmental Protection Agency
WEEE	Waste electrical and electronic equipment
WMAA	Waste Management Association of Australia
WTE	Waste to energy

Executive Summary

Martin Stewardship & Management Strategies Pty Ltd (MS2) has been commissioned by the National Packaging Covenant Industry Association (NPCIA) to investigate options for strengthening packaging product stewardship in Australia, including complementary and alternative approaches to Australia's National Packaging Covenant (NPC or Covenant).

The primary objective is to provide an overview of the Covenant, complementary mechanisms and alternative approaches in context with resource efficiency, extended producer responsibility (EPR) and product stewardship principles and recommend appropriate courses of action for strengthening packaging product stewardship in Australia based on this research.

This report highlights program performance against the two principal objectives common to most EPR programs: 1) providing 'design for environment' (DfE) incentives for producers and 2) increasing recycling rates. A primary objective for EPR and product stewardship schemes is to attain an efficient level of the environmental externality in question, and to do so cost-effectively. Seeking this balance for packaging in Australia has therefore been a core approach in this research. Whilst EPR is often touted as a means of shifting or spreading waste management costs, applying EPR to packaging (as opposed to hazardous or special wastes) is inconsistent with OECD principles and objectives for EPR.

The OECD finds that there is no upper limit on costs of EPR, as EPR costs are incurred even if they exceed benefits. Attempts to apply EPR to packaging, especially in Europe, have introduced significant social and economic costs, yet environmental results may be viewed as mixed at best. Recent reports for the review of the European Packaging and Packaging Waste Directive (PPWD) have found that:

- European packaging taxes such as those under the PPWD are discriminatory and serve mainly as a revenue source, rather than driving environmental improvements.
- European packaging taxes have a significant distortive effect on retail pricing.
- Related programs implementing EPR and product stewardship for packaging also entail high economic and social costs without delivering significant environmental improvements.
- There is general consensus that the highest recycling rates that can practically be reached, from both an environmental and an economic point of view, have already been achieved.

Whilst these last two points may seem contradictory, recycling rates by themselves can represent environmental improvement, but must be understood in context with overall social, economic and environmental impacts, and practicalities of achieving reasonably efficient resource use. Investigations have also found that little of the European gain in recycling and environmental improvement from recycling can be directly attributed to the PPWD (generally 7-9% of improvements).

This report finds that in contrast to EPR, product stewardship or 'shared responsibility' approaches such as the recently strengthened Covenant provide an appropriate balance of resource use efficiency and recovery throughout the life-cycle of packaging and therefore warrant continued Government support for a variety of reasons:

- Australia has packaging recycling rates comparable to those of far more costly EPR and product stewardship schemes in other countries, where the highest practical recycling rates have been achieved.

- The Covenant emphasises reduced overall environmental impacts and shared responsibility across the packaging supply chain, consistent with relevant and informed approaches to EPR and product stewardship. In contrast, ‘traditional’ EPR focuses predominantly on producers and end-of-life management of hazardous or difficult to manage products.
- Given the diverse nature of the Australian manufacturing industry, shared arrangements provide capacity and flexibility for companies to innovate and invest where they can make a difference, whilst minimising the costly impost of regulation.
- The new Environmental Code of Practice for Packaging (ECoPP) is a key component of the new Covenant. Its strengthened requirements and linkages to the Covenant provide stronger incentives for DfE than alternative EPR approaches.
- Strengthened reporting requirements, use of key performance indicators (KPIs) and a designated data collection system under the new Covenant will provide better data on performance and feedback to address impacts of packaging than alternative approaches.
- European debate has shifted away from EPR as an end in itself and more toward Integrated Product Policy (IPP). Under this approach a range of instruments are targeted to the various stakeholders (such as producers, consumers and governments) in an attempt to send the right signals about environmental performance to each stakeholder and reduce overall environmental impact. The Covenant is therefore broadly consistent with more progressive and relevant IPP principles currently being pursued.

Research is also intended to address issues (generally focused on packaging) raised by the Waste Generation & Resource Efficiency Inquiry (Inquiry) currently being undertaken by the Productivity Commission. With specific regard to the Inquiry, this report finds that in Australia:

- Debate has often confused ends and means, with advocates calling for EPR and artificially high recycling rates rather than seeking reduced overall environmental and social costs by implementing efficient, cost-effective means designed to reduce both the volumes and hazards of solid waste.
- Current attempts by advocates to apply EPR to packaging as a means of shifting or spreading waste management costs are inconsistent with OECD principles and objectives for EPR.
- Given the advanced development of waste and recycling, regulatory approaches are likely to involve high marginal costs for little gains in recycling or other environmental objectives.
- Alternative policy models to the Covenant that are intended to introduce EPR for packaging would likely result in significant economic and environmental distortions.

These findings are based on evaluation of the following options:

- Take-back Requirements
 - mandatory product take-back; and
 - voluntary or negotiated take-back programs.
- Standards
 - minimum recycled content standards; and
 - industry funding organisations (IFOs).

- Economic Instruments (some may also be known as market-based instruments or MBIs)
 - deposit-refund schemes such as container deposit legislation (CDL);
 - advance disposal fees (ADFs, increasingly referred to as advance recycling fees, ARFs);
 - taxes and/or subsidies;
 - upstream combination tax/subsidy (UCTS); and
 - tradable resource recovery certificates (RRCs).
- Other Industry-based Measures
 - covenants such as Australia's National Packaging Covenant; and
 - industry Codes of Practice

A range of approaches are potentially complementary to the Covenant and may warrant further consideration that is beyond the scope of this report:

- enhanced data frameworks to provide more effective feedback; and
- greater implementation of user-based pricing (UBP).

This report also proposes a range of product stewardship principles for packaging in Australia.

1.0 Introduction

Martin Stewardship & Management Strategies Pty Ltd (MS2) has been commissioned by the National Packaging Covenant Industry Association (NPCIA) to provide a detailed literature search and strategic support to complement the submission MS2 is drafting on behalf of the NPCIA for the Productivity Commission's Waste Generation & Resource Efficiency Inquiry (Inquiry).

The primary objective of this report was to provide an overview of the Covenant, complementary mechanisms and alternative approaches in context with extended producer responsibility (EPR) and product stewardship principles and recommending appropriate courses of action for strengthening packaging product stewardship in Australia based on this research. This approach is consistent with the Inquiry's objective 'to identify policies that will enable Australia to address market failures and externalities associated with the generation and disposal of waste, including opportunities for resource use efficiency and recovery throughout the product life-cycle (from raw material extraction and processing, to product design, manufacture, use and end of life management)' (PC 2005, p.8).

Secondary objectives include:

- Explore underlying principles of EPR and product stewardship, and understand packaging and its associated environmental impacts¹ in context with these principles.
- Examine a broad range of policy instruments and other options in Australia and overseas.
- Determine relative costs and benefits of alternative approaches.
- Recommend principles and approaches for strengthening packaging product stewardship for packaging consistent with NPCIA and Inquiry objectives such as economically and environmentally efficient resource recovery and waste management.

A comprehensive examination of EPR, product stewardship, environmental externalities of waste management and resource efficiency is beyond the scope of this report. The intention here is to explore alternative approaches to resource recovery and efficient waste management and understand them in context, with particular emphasis on packaging.

1.1 Packaging in Context

Before exploring options for managing packaging, it is worth understanding packaging and Australian product stewardship in context and packaging in context with other environmental issues.

1.1.1 Packaging in modern society

Key roles of packaging in modern society include (NPCC 2005):

- Consumer safety and information;
- Product quality, shelf life, integrity and safety;
- Logistical and supply chain considerations such as transport efficiency;
- Theft prevention; and

¹ Throughout this report, reference to environmental impacts refers to impacts that may be viewed as positive and/or negative.

- Marketing and sales.

In addressing packaging waste generation and efficiency, it is important to first understand the importance of packaging as an environmental issue, and in context with other environmental issues. The Australian Food and Grocery Council (AFGC) *Environment Report 2003* provides useful background to help provide Australia-specific context for food and groceries. For example (AFGC 2003, p.5),

'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 recent life-cycle work undertaken by Dairy Australia) (AFGC 2003, p.27),

'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 study (INCPEN 1996, p.3) 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'.

Australian studies, including life-cycle work recently completed for Dairy Australia, previous CSIRO research and the AFGC (2003), show similar findings. Similarly, packaged foods can often generate less total waste than fresh foods. The environmental impact of packaging is relatively small compared to its functions of preventing waste, losses and spoilage.

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 a 7% increase in packaging waste generated across the EU as a whole and 8% in the EU-15² from 1997 to 2001 (derived from PIRA and ECOLAS 2005 data). This is despite the presence of stringent packaging requirements and producer responsibility schemes during that time.

1.2 EPR and Product Stewardship

Most EPR programs are intended to shift financial and/or physical responsibility for products to the producer and away from municipalities (OECD 2001). The commonly used working definition of EPR is provided by the Organization for Economic Co-operation and Development (OECD) which defines EPR as 'an environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of a product's life-cycle³' (OECD 2001, p.9). EPR is also intended to increase recycling rates and to provide incentives to producers to incorporate environmental

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

³ As defined in (EC n.d.b.), 'a product's life cycle is made up of the activities that go into making, using, transporting and disposing of that product. The life cycle is commonly shown as a series of stages, from "cradle" (raw material extraction and harvesting), through fabrication, manufacturing, packaging, transportation, consumption, and recycling, to the "grave" (disposal).'

considerations into the design of their products, an approach called ‘design for environment’ (DfE)⁴ (OECD 2005).

Despite the OECD finding that EPR is most appropriate for problematic products that are toxic or hazardous and therefore warrant separate collection and recovery schemes (such as waste oil, tyres or lead acid batteries), packaging has still been subject to a variety of EPR schemes. Over time, these schemes have shifted from being draconian for producers and focused on end-of-life management to reflecting broader environmental objectives across supply chains.

Rather than focus responsibility solely on producers as EPR does, ‘product stewardship’ involves sharing responsibility through the life-cycle of products, including the environmental impact of the product through to and including its ultimate disposal (EC n.d.b., NPCC 2005). This approach, also referred to as ‘extended *product* responsibility’, is increasingly being adopted in the US (USEPA 1998, Walls 2003).

Key drivers for product stewardship and EPR include (Martin 2003, OECD 2001, Snir 2001):

- Increased consumer influence due to consumers and industries being better informed about the environmental impacts of products.
- Reducing supply chain liabilities through reducing potentially hazardous or difficult-to-manage materials.
- Increased prominence of the environment.
- Greater interest and involvement of legislators and other decision makers.
- Driving waste avoidance and associated pollution reduction throughout many sectors of the economy.
- Calls for re-allocating costs for waste management and recycling away from municipalities.
- Extra momentum to environmental activists resulting from recent pushes for stronger corporate governance.
- Corporate market advantages from improved environmental performance.

Martin (2003) further notes that a larger number of multinational corporations believe that increased market presence and profitability can result from effectively responding to legislative and consumer pressures around the world.

1.2.1 Packaging recovery in Australia

A report commissioned by the NPCIA to help inform discussions on development of the Covenant’s overarching targets identified the 2003 levels of packaging recovery by material type shown in Table 1 (MS2 and NRS 2005). With subsequent adjustment of paper and cardboard (to 64% recovery) and glass (to 35% recovery) estimates, the estimates in Table 1 have become viewed as the most accurate current estimates of packaging recovery in Australia and the baseline estimates for the Covenant (estimated at 48% overall recovery).

⁴ Under DfE, product environmental performance is improved through packaging decision making by reducing material intensity/toxicity, increasing water and energy efficiency, and/or improving a product’s ability to be recovered (Martin 2003).

Table 1: 2003 Australian recovery for packaging materials

Material	Kerbside/Municipal Recovery		Away from Home Recovery		Overall Recovery	
	Tonnes	%	Tonnes	%	Tonnes	%
Paper/cardboard	333,300	42%	1,200,000	94%	1,533,300	74%
Glass	320,000	68%	30,000	4%	350,000	30%
Plastics	92,500	28%	42,400	13%	134,900	21%
Steel cans	46,200	44%	46,200	44%	92,400	44%
Aluminium cans	18,000	79%	11,000	48%	29,000	63%
Total	810,000	47%	1,329,600	54%	2,139,600	51%

Source: MS2 and NRS 2005

Packaging is integral to municipal kerbside recycling and away from home (AfH) programs throughout Australia. In Australia and internationally, ease of access to municipal recycling programs such as kerbside recycling provides sufficient incentive for public participation in recovery efforts (OECD 2005).

Recycling aluminium, glass and steel (all prominent in packaging) results in benefits that significantly outweigh costs while recycling of other materials also provides benefits. Environmental benefits from kerbside recycling in Australia were estimated at \$420 million per year in 1999/2000, substantially higher than financial costs of recycling (ACOR 2006, ISF 2001, Nolan-ITU and SKM 2001).

Indicative 'Ecodollar' values for the environmental value/service for materials recovered in Australian kerbside recycling programs are shown in Table 2.

Table 2: Indicative Ecodollar Values for Kerbside Recycling

Material	Ecodollars/tonne
Paper	400
Glass	200
Aluminium	3,000
Steel cans	800
HDPE	1,000
PET	1,000
Garden Waste	110
Food Waste	140
Timber	80

Source: ACOR 2006

The financial and environmental benefits of recycling from both the municipal and Commercial and Institutional (C&I) waste streams have recently been examined for New South Wales (NSW) by the Australian Council of Recyclers (ACOR 2006). Table 3 shows the financial and environmental values of NSW recycling in 2002/03, assuming that only 20% of the Ecodollar environmental value of recycling the materials was achieved (ACOR 2006). As illustrated in Table 3, the contribution of packaging materials is significant in these streams, especially when compared to other recovered materials such as garden organics, food and timber.

Table 3: 2002/03 NSW Financial and Environmental Value of Municipal and C&I Material Recovery

Material	Recovered Material (t)	Financial Value (\$)	Environmental Value (20%)
Paper & cardboard	764,000	\$53,480,000	\$61,120,000
Plastic	59,000	\$17,700,000	\$11,800,000
Glass	171,000	\$12,312,000	\$6,840,000
Ferrous (incl. steel cans)	515,000	\$38,625,000	\$82,400,000
Aluminium	2,000	\$3,605,000	\$1,442,000
Other recyclables	74,000	\$736,000	\$0
Subtotal	1,585,000	\$126,457,000	\$163,602,000
Garden Organics	842,000	\$16,840,000	\$18,524,000
Food	46,000	\$910,000	\$1,274,000
Timber	49,000	\$485,000	\$776,000
Subtotal	936,000	\$18,235,000	\$20,574,000
Total	2,521,000	\$144,692,000	\$184,176,000

Source: ACOR 2006

1.2.2 Packaging EPR and product stewardship in Australia

Australia began focusing on waste management and resource efficiency for packaging in the mid-1970's with the introduction of CDL in South Australia (SA). Then the Commonwealth Government negotiated Industry Waste Reduction Agreements (IWRAs) across a range of products in the mid-1990's. This was followed in 1995 by NSW negotiating an Industry Waste Reduction Plan (IWRP) for beer and soft drinks and mandating an IWRP for the dairy industry (Martin 2003).

Shared responsibility across the packaging supply chain was then embodied in the 1999 National Packaging Covenant and strengthened significantly in a revised Covenant in 2005 (NPCC 2005). The revised Covenant includes overarching targets for packaging recovery and minimisation, and its Environmental Code of Practice for Packaging (ECoPP) is intended to ensure that DfE principles are incorporated in the packaging decision making process.

1.3 Overview of Policy Instruments for Packaging

Policy instruments for the management of packaging span a broad continuum of approaches whose classifications vary significantly. Table 4 provides an overview of those instruments viewed as consistent with EPR and product stewardship principles (Section 2), using broad categories from the OECD (2001) and Environment Canada (EC n.d.b.) and in descending order by level of regulation involved. These policy instruments are detailed in Sections 3-6.

Table 4: Overview of Policy Instruments for Packaging

Policy Instrument	Comments ⁵
<p>Take-back requirements (refer Section 3)</p> <ul style="list-style-type: none"> • Mandatory product take-back • Voluntary or negotiated take-back programs <p>Examples</p> <ul style="list-style-type: none"> • 1991 German Packaging Ordinance • Green Dot in Europe, Canada and UK 	<ul style="list-style-type: none"> • Take-back is viewed as the purest form of EPR • Often associated with reuse and/or recycling targets • Responsibilities may be discharged through participation in a Producer Responsibility Organisation (PRO), the approach usually preferred by industry due to lower cost and greater control • Australia’s National Environment Protection Measure (NEPM) on Used Packaging requires take-back for brand-owners not signing or not in compliance with the Covenant
<p>Standards (refer Section 4)</p> <ul style="list-style-type: none"> • Minimum recycled content standards (often referred to as ‘rates and dates’) • Industry funding organisations (IFOs) <p>Examples</p> <ul style="list-style-type: none"> • California’s recycled content standard for rigid plastic containers • Stewardship Ontario 	<ul style="list-style-type: none"> • Recycled content standards have generally been intended to increase local recycling markets • Recycled content standards must deal effectively with the large volume of imports into respective jurisdictions • IFOs solely address funding, not other responsibilities
<p>Economic Instruments (refer Section 5)</p> <ul style="list-style-type: none"> • Deposit-refund schemes • Advance disposal fees (ADFs, increasingly referred to as advance recycling fees, ARFs) • Taxes and/or subsidies • Upstream combination tax/subsidy (UCTS) • Tradable resource recovery certificates (RRCs) <p>Examples</p> <ul style="list-style-type: none"> • Container deposit legislation (CDL) • Florida’s ADF on cans, bottles, jars and beverage containers • UK’s packaging recovery notes (PRNs) 	<ul style="list-style-type: none"> • Economic instruments provide a direct financial incentive to take desired action(s) • Some CDL programs are viewed as full EPR, rather than as economic instruments • The OECD (2001) states that an ADF does not constitute EPR <i>per se</i>, even though it may serve to recover costs for EPR initiatives; however, ADFs may be viewed as EPR if they transfer sufficient physical or financial responsibility to producers (OECD 2005) • Material taxes aim to reduce the use of virgin or difficult to manage materials in favour of recycled or less difficult materials • Economic instruments may also be referred to as market-based instruments (MBIs)
<p>Other industry-based measures (refer Section 6)</p> <ul style="list-style-type: none"> • Covenants • Industry Codes of Practice • Leasing <p>Examples</p> <ul style="list-style-type: none"> • Australia’s National Packaging Covenant • Leasing arrangements for carpets 	<ul style="list-style-type: none"> • May be co-regulatory or used in conjunction with other approaches • Leasing is impractical or impossible for products with short life-cycles, such as packaging

⁵ Derived from a range of sources, including OECD 2001; Walls 2003; West and Hogarth 2005 and MS2 experience.

Policy instruments such as those in Table 4 may be complemented by government programs such as landfill bans; environmental labelling requirements; education; and environmental or green procurement and environmental information or labelling (e.g., recycled content, product durability) (EC n.d.a. and OECD 2001).

Although a variety of early CDL programs could be regarded as having applied EPR principles, Germany's implementation in 1991 of the German Packaging Ordinance is viewed as the first real example of EPR (Fishbein 1996, Hanisch 2000, Martin 2003, OECD 2005)⁶. In response to the Ordinance, German industry established the *Duales System Deutschland* (DSD), precursor to the development of PROs and the Green Dot licensing scheme for funding waste management and recycling, to discharge the requirements of individual companies to undertake product take-back. Since then EPR has been applied to a broad range of products beyond packaging, including paint, lead acid batteries, electronics, mobile phones, tyres, appliances and end-of-life vehicles (OECD 2005).

As Walls (2003) notes, although a wide range of policy instruments are viewed as consistent with EPR, the principles of EPR provide little guidance on which instruments are best for particular products or under a given set of circumstances. Section 7 provides information on costs of alternative policy instruments and compares alternative approaches for packaging product stewardship.

1.4 Methodology

This report has been based on a literature search, desktop review and in-house resources and experience of MS2. OECD (2005) principles for assessing costs and benefits of alternative policy approaches have been incorporated to help ensure a more robust assessment framework. In particular, this approach includes comparing alternative policy approaches to achieve desired outcomes and assessing which of the approaches is better or more cost-effective in achieving the intended outcome(s).

The OECD (2005, pp.11-12) recognises the need to specifically address material recovery under alternative approaches:

“(m)ost EPR programmes are designed to achieve changes in the pattern of waste management and not just in the incentives for waste generation. Many EPR programmes stipulate requirements for rates of recovery and/or recycling, higher than the rates achieved in previous waste management systems. Recycling targets and similar provisions are such a common feature of EPR programmes, and exert such a powerful influence on the way that, in practice, EPR operates, that any comparison between EPR and alternative instruments needs to consider the attainment of these recycling goals, as well as producer waste-generation incentives.”

Especially given the targets contained in the revised Covenant, this report emphasises cost-effectiveness of achieving specified recovery rates under alternative approaches in accordance with OECD (2005, p.26) assessment frameworks:

“If the instrument comparison can be defined in such a way that the two instruments have equivalent environmental impact (e.g. both achieve the same effect on the percentage of recycling), then the assessment can be considerably simplified. Essentially, it becomes a comparison of the costs of achieving the same outcome through alternative routes. Assessing the social value of the outcome itself can be side-stepped, and it may therefore be possible to avoid some of the more difficult questions in evaluation, such as assessing the social benefits from changes in the pattern of waste management.”

⁶ Franklin (1997) disagrees, citing several other pieces of European legislation, including Swedish efforts as early as 1975.

The availability of a mix of alternative policy approaches and the potential combinations of such approaches is noted (Martin 2003, OECD 2005), although a full exploration of such combinations is beyond the scope of this report. No single policy instrument can substitute for EPR, although a wide range of approaches are available to achieve EPR's objectives. This report highlights program performance against the two principal objectives common to most EPR programs (OECD 2005): 1) providing DfE incentives for producers and 2) increasing recycling rates. Performance against other objectives is noted where appropriate.

A primary objective for EPR and product stewardship schemes is to attain an efficient level of the environmental externality in question, and to do so cost-effectively (Walls 2003). Seeking this balance for packaging in Australia has therefore been a core approach in this research.

1.5 Report Format

This report is based primarily on desktop research and professional experience of MS2 staff. The report is formatted as follows:

Section 2 examines the principles of EPR and product stewardship.

Sections 3 through 6 examine alternative policy instruments for implementing EPR and product stewardship for packaging.

Section 7 compares relative costs and benefits of the alternative policy instruments.

Section 8 examines issues specific the Inquiry by the Productivity Commission.

Conclusions and recommendations for strengthening packaging product stewardship in Australia based on the above research are provided in Section 9.

2.0 Principles of EPR and Product Stewardship

2.1 EPR Principles

The OECD defines EPR as ‘an environmental policy approach in which a producer’s responsibility for a product is extended to the post-consumer stage of a product’s life-cycle’ (OECD 2001, p.9) with the objective of reducing ‘the volume and hazard from products at the post-consumer stage’ (OECD 2005, p.8).

The US Environmental Protection Agency (USEPA) has coined a similar term, extended *product* responsibility, in broadening EPR beyond product end-of-life management in recognition that producers have significant ability to reduce life-cycle impacts of their products through programs addressing supply chain commitments and energy efficiency (USEPA 1998, EC n.d.a.). Whilst this report recognises the value of extended *product* responsibility in approaches such as the Covenant, use of the phrase EPR refers to the OECD-consistent application of extended *producer* responsibility unless stated otherwise.

In broad terms, there are five basic types of producer responsibility (RCBC 2005, EC n.d.b., Franklin 1997, Snir 2001):

- **Liability (or Environmental liability)** – the producer is responsible for environmental damage caused by the product(s) in question in its post-consumer phase.
- **Economic responsibility** – the producer covers all or part of costs for collection, recycling or final disposal of product(s) manufactured.
- **Physical responsibility** – collection and management of the product(s) are the sole responsibility of the producer, in activities ranging from developing collection and recycling technology, to managing take-back systems for collecting or disposing of products manufactured.
- **Ownership** - producers assumes both physical and economic responsibility for product(s) into the post-consumer phase (e.g., through leasing and other arrangements).
- **Informative responsibility** – the producer is responsible for providing public education and information on the product(s), including its effects at various stages of its life cycle and/or available collection and management schemes.

These various forms of responsibility may be combined, depending on the approach used, and rely on cost signals motivating producers to reduce product environmental impacts and hence reduce costs. In most cases, producers pass on fees or charges to cover their costs. Some programs may also involve passing responsibility even further up the supply chain, beyond producers to material converters, material manufacturers, or raw material extractors (EC n.d.b., Hanisch 2000).

2.1.1 Environmental Benefits

The OECD (2001, 2005) cites additional benefits of EPR in a broader environmental context as including:

- reducing the number of landfills and incinerators and their accompanying environmental impacts;
- fostering recycling and reuse of products or parts thereof;

- improving the ease and timeliness of disassembling products for recycling or reuse;
- reducing or eliminating potentially hazardous chemicals in products;
- greater control over the management of hazardous wastes;
- promoting cleaner production and products;
- minimisation or elimination of environmental risks associated with improper disposal;
- promoting more efficient use of natural resources;
- improving relations between communities and firms;
- encouraging more efficient and competitive manufacturing;
- promoting more integrated management of the environment by placing an emphasis on the product's life-cycle; and
- improving materials management.

Walls (2003) contends reducing the volume of solid waste disposal should be the primary objective of EPR and that evaluations of EPR policies should focus primarily on whether the policies cost-effectively reduce the volume of waste. Walls views other environmental benefits such as reducing upstream externalities associated with resource extraction or production (through DfE), promoting recycling and greater use of recycled content as worthwhile but secondary in nature to reducing solid waste disposal, as such approaches are means to an end, rather than ends in themselves. Similarly, MMA and BDA Group (2003a, 2003b) assess various MBIs against the objectives of reducing the volume of waste to landfill and reducing the environmental impacts of post-consumer waste disposal⁷.

Whilst the OECD (2005) incorporates DfE as an objective of EPR, they also note that not all EPR programs encourage DfE and incentives must be properly structured to encourage DfE innovation. There is general agreement that any single policy instrument is unlikely to simultaneously address both the volume and hazard of end-of-life waste (OECD 2005, Walls 2003), however this situation is more directly applicable to hazardous materials in products such as certain electronics rather than in packaging.

2.1.2 Cost-shifting

The costs of implementing EPR are inevitably passed on to consumers through higher product prices. In theory, under EPR citizens pay for waste management as consumers, rather than as taxpayers (Fishbein 1996, West and Hogarth 2005), resulting in reduced overall waste management costs. Whilst this distinction may be applicable for applying EPR to problem wastes, it does not withstand scrutiny from a packaging perspective.

Collection and disposal of non-hazardous end-of-life products from households are generally the responsibility of municipal governments and funded through general taxation such as rates or through user charges for households and/or businesses. The system and societal costs that may result from the introduction of problematic materials into such systems are significant, and it therefore makes sense to establish through EPR separate, controlled channels for toxic or hazardous products such as tyres, batteries and mercury-containing products (OECD 2005).

⁷ It should be noted that this emphasis was more appropriate for their report, given the project scope.

Focus on end-of-life management of household wastes is also misplaced. For example, it is estimated that the social costs of landfilling waste represent less than 5% of the total societal cost of production and consumption of goods, since a large volume of the waste stream consists of inert or non-harmful materials (MMA and BDA Group 2003a). Similarly, landfill benefits of recycling account for less than 2% of the total benefits of recycling (Nolan-ITU and SKM 2001).

Consumer packaging (including packaging generated or consumed AfH) is different from such problematic wastes for a range of reasons, including:

- consumer packaging is not regarded as toxic or hazardous and common law liabilities provide strong incentives for producers to ensure packaging is safe for consumers;
- all ratepayers and companies use packaging in some form and are therefore all packaging consumers, with the main distinction being the amount of packaging consumed;
- companies generating significant amounts of packaging have inherent financial incentives to manage the packaging responsibly;
- municipal recycling programs provide collection of recovered packaging materials that is widely regarded as cost-effective and popular with ratepayers;
- recovered packaging materials provide significant financial and environmental benefits (section 1.2.1); and
- costs for commercial waste management and recycling are already passed on in the prices of products, services and rental prices.

Therefore current attempts by advocates to apply EPR to packaging as a means of shifting or spreading waste management costs are inconsistent with OECD principles and objectives for EPR. Indeed, the NSW Government, which leads Australian jurisdictions in evaluating EPR and product stewardship, does not reference cost-shifting in selection criteria for nominating products to be subject to EPR or in deferring to the Covenant as the principal instrument for managing packaging waste in Australia (DEC 2004, 2005).

2.1.3 Regulatory underpinnings

Addressing the free rider dilemma is fundamental to developing and implementing product stewardship and EPR schemes. ‘Free riders’, or ‘non-participants’ are companies that gain unfair competitive advantage by not participating in EPR or product stewardship schemes and thus not contributing an appropriate share of the costs of such schemes despite their contribution to the waste stream. In schemes affecting a large number of companies or where responsible parties are difficult to track, free riding can threaten the financial viability of entire schemes (EPHC 2004, OECD 2001).

Purely voluntary schemes have a greater possibility of free riding, as do schemes with ineffective underpinning legislation and/or ineffective enforcement of the underpinning legislation, although mandatory schemes must still address the free rider dilemma (OECD 2005).

Government assistance in ensuring that participating companies are not competitively disadvantaged by participating in product stewardship or EPR schemes can often cause a ‘Catch-22’ situation. Governments want to ensure a reasonable uptake by industry participants to help justify regulatory intervention against free riders, yet participants are reluctant to commit to such schemes without having regulatory underpinnings in place. Australia’s Environment Ministers, acting as the Environment Protection and Heritage Council (EPHC), have initiated the development of comprehensive underpinning legislation to help address this concern through a NEPM for product stewardship.

2.2 Product Stewardship Principles

In contrast to EPR's emphasis almost exclusively on producers, 'product stewardship' involves sharing responsibility through the lifecycle of products, including the environmental impact of the product through to and including its ultimate disposal (EC n.d.a., NPCC 2005). This approach may also be referred to as 'extended *product* responsibility' (USEPA 1998, Walls 2003).

ACOR has adopted principles for EPR that are consistent with 'shared responsibility' and the USEPA approach to 'extended product responsibility' (ACOR 2004):

- "Must be National in coverage
- No one standard model or approach
- Definition of the liable parties
- Broad stakeholder engagement
- Total chain involvement in the process and the outcome
- A voluntary approach is the first preference
- Any program must be sustainable and viable
- Underpinned by legislation to stop "freeloaders"
- Must aim towards a market based solution
- The Producer Responsibility Organisations must be independent and administer their own funds
- Key Performance Indicators with measurable targets must be included
- Product design principles incorporated
- Focused on the product not necessarily the producer – renamed Extended Product Responsibility”.

In 1996, the Canadian Ministers of the Environment endorsed principles for packaging stewardship (EC n.d.b.). The following principles are generally consistent with use of the phrases 'shared responsibility' and 'product stewardship' and with Australia's approach to shared responsibility for packaging under the Covenant:

1. "Packaging stewardship initiatives should ensure that packaging has a minimal effect on the environment.
2. Packaging stewardship initiatives should recognize and promote the hierarchy of source reduction, reuse, and recycling, in support of general resource conservation, unless in specific cases environmental interests are proven to be better served by a change in the hierarchy.
3. In keeping with a mutual goal to reduce packaging waste, consumers, industry and governments share responsibility for the environmental impacts of packaging waste and for making packaging stewardship programs viable (in Canada).
4. All stakeholders should be involved and responsible in developing and implementing stewardship programs.
5. Packaging stewardship initiatives should be comprehensive and apply to all packaging used (in Canada).
6. Packaging stewardship should be based on the establishment and maintenance of programs that are inclusive and fair.
7. Packaging stewardship programs should strive for national consistency, balanced with flexibility to respond to regional differences.
8. True cost pricing is essential so that stewardship internalizes the costs of managing packaging waste, and sends the correct signals to the consumers and producers of packaged goods.
9. Packaging stewardship recovery systems should consider markets, as well as other economic and environmental factors.
10. Packaging stewardship should promote market development and the use of recovered materials.
11. Packaging stewardship includes a responsibility for monitoring, evaluation, and education.
12. A packaging stewardship initiative should meet its environmental objectives in the most efficient, cost-effective manner.
13. Stewardship of packaging extends beyond national borders.
14. Every stewardship program should clearly define the scope of the program including which products are covered by the initiative, the conditions under which those products will be covered, and the extent of stewardship."

In addition to establishing industry responsibility, Canada has established roles for Governments and consumers as (EC n.d.a.):

“Governments have a responsibility to promote packaging stewardship and to encourage the widespread recognition and adoption of the principles as outlined. Consumers have a responsibility to make appropriate packaging choices when purchasing products and, where facilities exist, to divert packaging from disposal.”

The above principles have been applied when evaluating EPR and product stewardship schemes in this report. MS2 has also applied the principle of giving preference to industry-driven or co-regulatory schemes, and pursuing regulation only where it effectively underpins product stewardship schemes or where such schemes have clearly failed to deliver intended results (DEC 2004, EPHC 2004).

3.0 Take-back Requirements

Direct product take-back is viewed as the purest form of EPR (OECD 2001), and is intended to provide producers with sufficient incentive to improve end-of-life management of their products. This may take the form of a mandatory, voluntary or negotiated take-back program, as discussed in this section.

The threat of mandatory take-back requirements has been used by Governments to force industries to accept greater responsibility for their products or to underpin co-regulatory arrangements such as the Covenant.

Rather than undertake take-back requirements separately, industry sectors may initiate one or more PROs. PROs are independent, not for profit organisations collectively responsible for satisfying industry obligations under product stewardship or EPR schemes (EPHC 2004, OECD 2001, OECD 2005).

3.1 Mandatory Product Take-back

Mandatory take-back programs are generally targeted at products containing toxic or hazardous substances (such as waste electrical and electronic equipment (WEEE) programs in Europe, Japan, China and other countries) or where the products are integral to established recycling programs (white goods in Japan) (Martin 2003).

However, in 1991 the German Packaging Ordinance was introduced to make industry responsible for handling its packaging waste. At the time, Germany was facing a severe shortage of landfill capacity and packaging represented 30% by weight and 50% by volume of Germany's total municipal waste stream (Hanisch 2000).

German producers could either undertake direct take-back of their post-consumer packaging or join DSD, an industry PRO responsible for packaging waste management. The program initiated development of the 'Green Dot', under which producers paid licensing fees to DSD in exchange for inclusion under the DSD collection system. The Green Dot program spread throughout Europe, although only Austria adopted the stringency and related high costs of the German program. In France, for example, producers and municipalities share responsibility for waste management (Hanisch 2000).

Structures and operations of the PROs can vary significantly. In some programs one PRO is responsible for all collection and waste management activities, while in other programs multiple PROs may compete for business from individual companies. Costs of having the PRO discharge take-back responsibilities can vary significantly depending on factors such as administration, scope and value of recovered materials, level of industry involvement and enforcement costs. PRO license fees vary per product, often by material type and volume or weight, in order to assign responsibility for environmental impacts or address varying collection and recycling costs (Martin 2003, OECD 2005).

Asian countries such as Japan, Taiwan and Korea have also implemented EPR programs requiring product take-back. Under the Korean form of EPR, the Ministry of Environment annually specifies total mandatory recycling obligations per product or packaging material. Producers must submit annual recycling plans for approval, and producers failing to meet their obligations are assessed a charge of less than 130% of the actual recycling cost (MoE n.d.).

3.1.1 European Packaging and Packaging Waste Directive

Implementation of the German Packaging Ordinance's recycling targets led to European recycling markets being flooded and spurred protectionist responses from other European Union (EU) Member States. The European Commission adopted the Packaging and Packaging Waste Directive (PPWD) in 1994 to help harmonise the different responses. The PPWD originally aimed to, by 2001, achieve the following targets (Perchards *et al* 2005, PIRA and ECOLAS 2005):

- 50-65% recovery and incineration at waste to energy (WTE) plants; and
- achieve an overall packaging recycling rate of 25-45%, including a minimum of 15% for each type of specified material.

While the same targets were required for Ireland, Portugal, and Greece, their targets dates were deferred until end 2005 due to their geographical, demographic and economic situations (Hanisch 2000, Perchards *et al* 2005).

The PPWD also contained DfE requirements referred to as the Essential Requirements and concentration limits for heavy metals in packaging. The CEN standards (Section 4.3) were subsequently developed to help companies discharge these obligations.

Subsequent revisions resulted in the following targets for 2008 (Defra 2005):

Overall recovery	60%
Overall recycling	55%

Material specific recycling:

Paper	60%
Glass	60%
Metals	50%
Plastic	22.5%
Wood	15%

Although the PPWD does not require any Member States to introduce EPR, a variety of producer responsibility schemes have been developed to achieve its targets.

3.2 Voluntary or Negotiated Take-back Programs

Voluntary or negotiated take-back programs intended to achieve EPR and product stewardship principles may be tied to regulation or result from the threat of regulation if program targets are not achieved (Franklin 1997, NPCC 2005).

A range of voluntary or negotiated take-back programs are in place or under development in Australia. The EPHC has recently determined that industries had made significant progress in the development of these schemes for tyres, televisions, mobile phones and printed products, but expressed concern about slow progress in the development of such schemes by the computer industry (EPHC 2005).

Voluntary or negotiated take-back programs are frequently funded by separate line item charges or 'eco-fees', such as those that have been implemented for tyres, paint, solvents, pesticides and used chemical containers. Establishment and collection of the eco-fees are generally managed by PROs or industry associations. Although Government involvement is usually minimal, some level of financial and/or environmental reporting to Government is usually required.

4.0 Standards

Standards are blunt policy instruments intended to achieve minimum approaches to achieve a given desired outcome such as a base amount of recycling activity within a given location.

4.1 Recycling targets

Recycling targets are an especially blunt approach to achieve a given amount of recycling. Targets can be useful for clarifying priorities and actions, but successful achievement of targets would require a combination of approaches discussed elsewhere in this report.

4.2 Minimum recycled content standards

Minimum recycled content standards are intended to maintain a base level of recycling market development. California's minimum recycled content requirements under the California Rigid Plastic Container Law is a prime example of such standards. Under the program rigid plastics containers, with a few exemptions, must be (Bell 2005, Leon 2005):

- certified as using 25% post-consumer recycled content;
- source reduced by 10%;
- reusable or refillable five times; or
- recycled at a level of 45% for the containers (a repealed option called for an overall recycling rate to be achieved for the containers).

4.3 Industry Funding Organisations

IFOs focus almost exclusively on funding as a means of demonstrating EPR. The IFO is responsible for calculating and obtaining fee contributions from member companies and ensuring that funding is channeled to designated organisations such as municipalities. The principal example of an IFO is Stewardship Ontario, through which industry funds half of the cost of kerbside recycling in Ontario, Canada.

4.4 CEN Standards

CEN (the European Committee for Standardisation) developed a set of six standards that are intended to help ensure continuous improvement across the packaging supply chain. Packaging that complies with the standards (once they take effect) would in effect be in compliance with the Essential Requirements of the PPWD.

The *Umbrella Standard (EN 13427)* provides a framework for producers to follow and shows how the standards interact and emphasises cooperation along the packaging supply chain.

The *Prevention Standard (EN 13428)* requires the minimisation of dangerous substances in packaging, regardless of their source, through source reduction. This standard is highly reliant on the use of Material Safety Data Sheets and risk analysis. Earlier standards focused more strongly on avoiding the deliberate introduction of hazardous substances.

The *Reuse Standard (EN 13429)* requires packers/fillers to obtain written confirmation of reuse from their suppliers and written confirmation from customers that the packaging will be placed in reuse systems. The Reuse Standard contains a nine-point verification procedure for reuse systems and the suitability of the packaging for those systems.

The *Material Recovery Standard (EN 13430)* calls for the specification of the percentage of the package that can be recycled, while allowing for potential barriers or negative influencers on recycling.

The *Energy Recovery Standard (EN 13431)* calls for net calorific gain of packaging to allow for energy recovery in addition to identifying potential barriers to energy recovery of packaging.

The *Organic Recovery Standard (EN 13432)* defines the requirements for packaging to be considered recoverable through composting and biodegradation.

5.0 Economic Instruments

Market-based instruments are often cited as a means of implementing EPR. In general, economic instruments or MBIs are intended to provide financial incentive and resources for producers or broader supply chains to achieve desired environmental objectives.

5.1 Deposit-refund Schemes

Deposit-refund schemes provide a monetary incentive for consumers to return given products or containers to collection centres for appropriate recycling or disposal (Franklin 1997, OECD 2005). Deposit-refund systems work especially well for products where there is a significant risk of illegal dumping and where the hazardous nature of the product warrants collecting the products through a separate collection system, or to assist in recovering products that have end-of-life value (OECD 2005).

Refund values can either be for the full deposit paid or part of the refund may be withheld to offset the social costs of disposal or recycling (OECD 2005). Palmer and Walls (1999) cite deposit-refund systems as an example of product tax/recycling subsidy policy, but note the high administrative and transaction costs to implement such schemes.

5.1.1 Container deposit legislation

Voluntary deposits on beverage containers were integral to most early take-back programs in order to ensure their return and reuse in refillable bottle schemes. Eventually, these programs were either phased out or became mandatory as CDL. Several early CDL programs were introduced to protect market share for local refillable bottlers and were subsequently targeted at reducing beverage container litter, although recent attempts to introduce CDL have focused more its role in EPR and product stewardship (C4ES 2000, Martin 2003).

CDL currently operates in eleven of the fifty US states, eight of the ten Canadian provinces and a variety of European countries (CRI 2003).

5.1.2 British Columbia CDL program

Figure 1 provides an overview of the British Columbia CDL program, which is one of the CDL models viewed as most effective under current Australian conditions, if CDL were to be introduced (C4ES 2000).

British Columbia has had 'traditional' CDL on soft drinks since 1970. In 1988, the program was broadened to include all other beverages except milk and milk products. An industry consortium, Encorp Pacific, is responsible for ensuring proper container returns, thus ensuring that industry has reasonable flexibility in running the program.

In addition to the deposits, a container recycling fee (CRF) may be charged to help ensure the full costs of recycling each type of container are being recovered. In January 2005, the Consumers' Association of Canada brought a Supreme Court challenge against the CRF, arguing that the CRF causes consumers to bear the full costs of recycling, rather than producers (CAC 2005). The suit appears to still be pending.

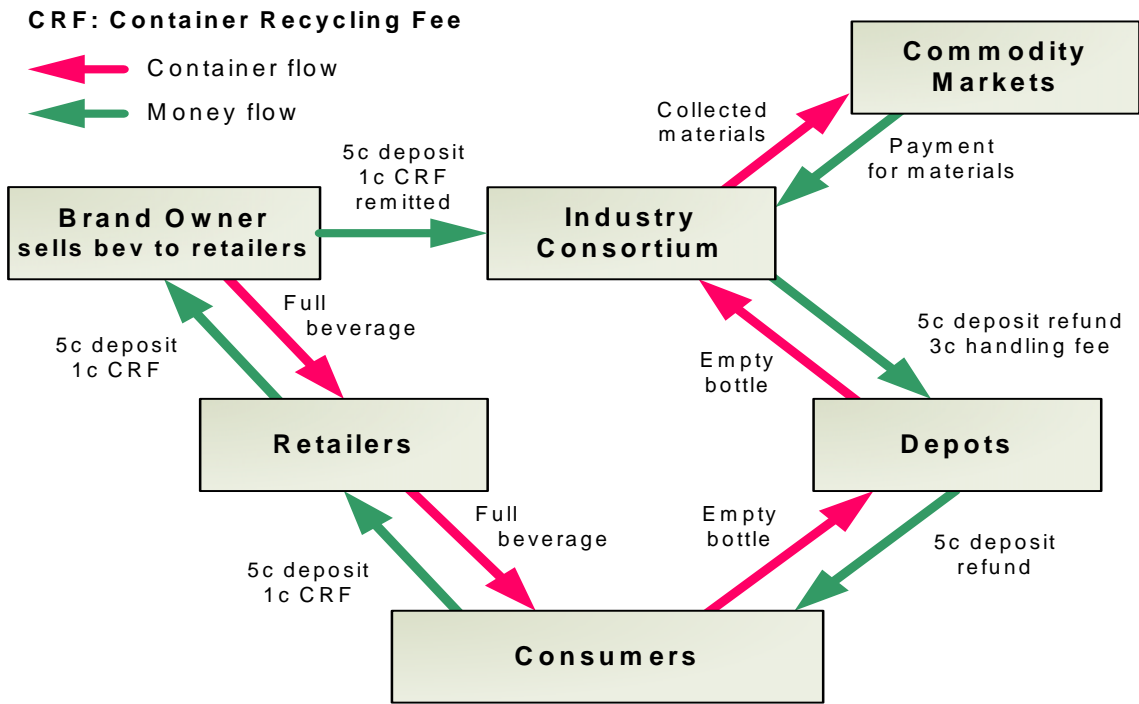


Figure 1: CDL in British Columbia

5.1.3 California Beverage Container Recovery Program

Figure 2 shows container and financial flows for the California Beverage Container Recovery program. Although the California Government argues that the system of redemption payments makes it different, California is often categorised as CDL.

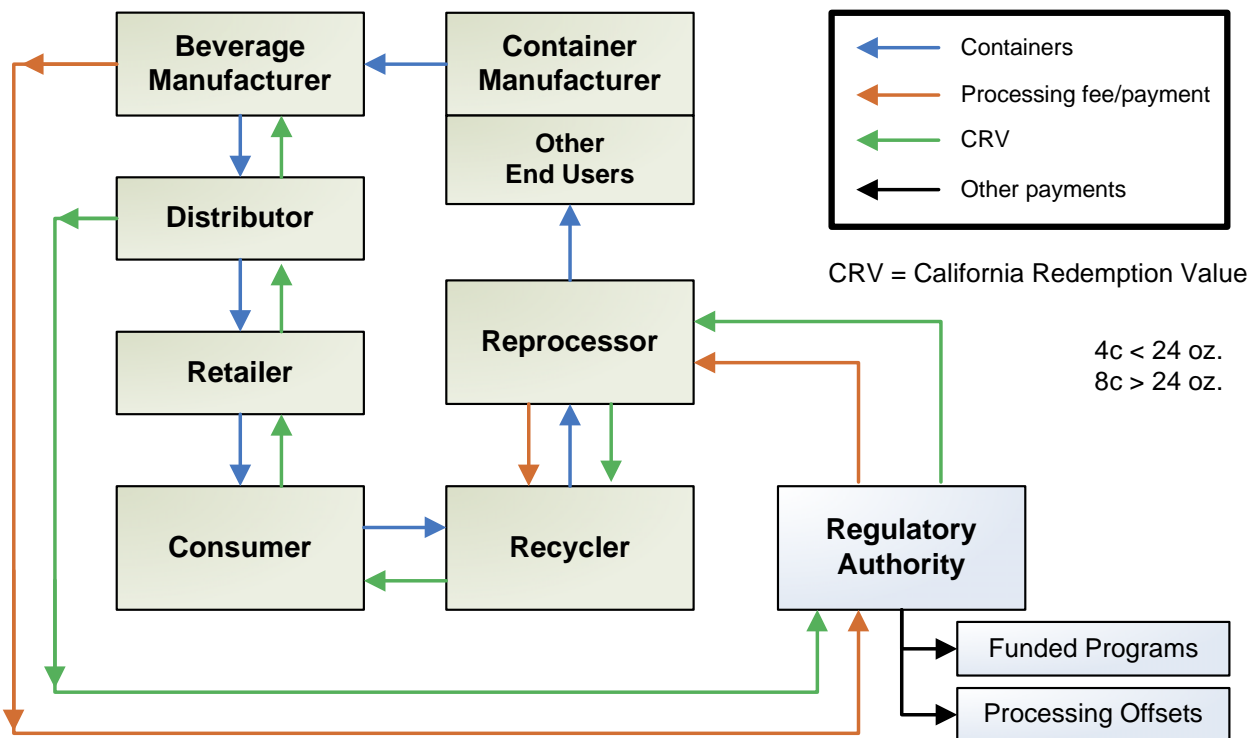


Figure 2: California Container and Financial Flows

Source: Diagram based on R.W. Beck et al 2002, DOC 2005a, DOC 2005b and DOC 2005c.

Most CDL programs require some amount of sorting by brand in order to ensure effective flows of containers, deposits and handling fees. This sorting is part of the redemption process run by industry. The California program shifted this responsibility to the State Government by requiring periodic auditing throughout the state in order to track flows. Whilst this is a somewhat questionable use of Government resources, the detailed audit provisions means that a significant amount of reliable data is available on the California program and the California data is more robust than that from other CDL programs.

As with most CDL programs, after an initial increase with program introduction, California’s beverage container recycling rate generally declined over time as the deposits lost their value. California has seen a slight resurgence since January 2004 due to program expansion and an associated education campaign associated with an increase in the redemption value for the containers⁸. Figure 3 shows the general California decline in recycling rates from 1991 to 2003, similar to the general declines in recovery rates observed in other CDL programs (Section 7.3.1).

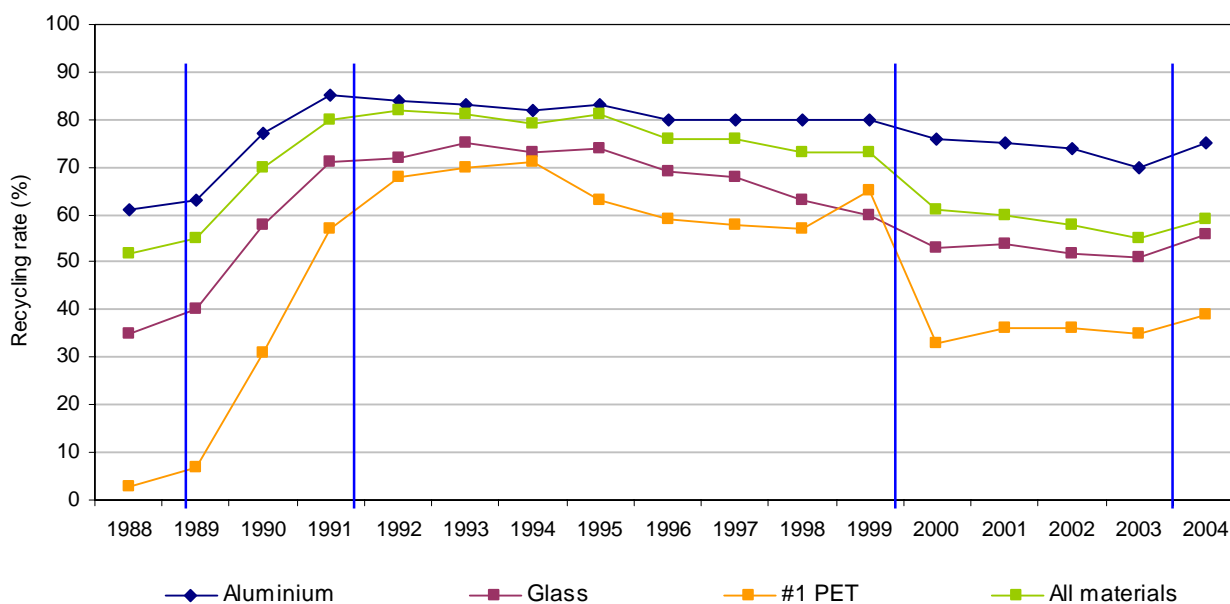


Figure 3: California Decline in Recycling Rates 1991 to 2003

Source: DOC 2004 as analysed by MS2.

5.2 Advance disposal/advance recycling fees

ADFs are intended to influence producer choices toward particular policy objectives and/or to provide a source of revenue for end-of-life management of the products or for other environmental projects. Consumers may or may not be aware that they are paying the fee in the product price.

Under ADFs or ARFs⁹, producers pay an amount per item sold that is intended to cover future end-of-life disposal or recycling costs of the product. ADFs are considered to be EPR if there is a significant shift of financial or physical responsibility to the producer (OECD 2005).

⁸ Effective January 2004, the California Redemption Value (CRV) increased from 2.5 cents to 4 cents for containers less than 24 ounces and from 5 cents to 8 cents for containers greater than 24 ounces.

⁹ Whilst new policy instruments (especially those for electronics or PRO establishment) are increasingly referred to as ARFs, this report uses the term ADF for consistency with most of the available literature.

Products subject to ADFs range from beverage containers to tyres and lead acid batteries. Under the Australian DrumMUSTER program, an ADF of 4 cents is charged per L or kg of agricultural and veterinary chemical containers and funding is made available to municipalities to set up drop off points. Rinsed empty, non-returnable containers can be returned at no extra cost to council collection centres. Refrigerant Reclaim Australia also funds recovery of used refrigerants through an ADF.

5.2.1 Florida's ADF for containers

In 1988, the US state of Florida legislated an ADF with a delayed implementation date to provide incentive for industry to develop markets for materials recovered under the state's fledgling kerbside recycling program. The original ADF contained CDL deposit-refund provisions. A review of the ADF prior to its taking effect raised significant concerns about conflicts between the ADF and kerbside recycling very similar to current concerns about implementing CDL on top of comprehensive waste management and recycling programs (Section 7.3.1). Florida was also concerned that CDL would simply increase supply of, rather than demand for, recovered materials (Martin 1998, Martin 2003).

Florida subsequently repealed the deposit-refund provisions of the ADF and made it an MBI intended to stimulate demand for recovered materials and implemented the program from 1993 to 1995. The fee was one or two cents per can, bottle jar or beverage container within a given size range. The market incentives of the ADF included exemptions for achieving specified recycling and recovery targets designed to be achievable but ramp up over time¹⁰:

- 50% material recycling rate exemption (aluminium and steel cans were never subject to the ADF due to recovery rates greater than 50%).
- Recycled content exemptions:
 - 25% for plastic;
 - 30% for paper; and
 - 35% for glass.
- Tradable recycling credits exemption (producers could gain exemption by documenting they had caused recycling in Florida at least equivalent to the amount of material required under the recycled content exemptions).

The ADF was not intended as an ongoing revenue source; it was intended to provide appropriate incentives for recycling to producers and the broader supply chain. Figure 4 shows the impacts of the exemptions on revenue raised under the Florida ADF. The top line indicates revenue that would have been generated were it not for the exemptions, while the bottom area indicates actual revenue. Even with these exemptions for achieving recovery targets, the Florida ADF raised US\$64 million (around A\$100 million) in two years for various environmental programs, including recycling market development, improved landfill management in smaller councils and helping rural areas transition from septic tanks to sewer systems (Martin 1998, Martin 2003).

Whilst most ADFs require that revenues be used to address the material or product to which the levy applies, this was not necessary in Florida due to funding for recycling programs from other sources.

The Florida ADF highlights the importance of supply chain influence. Although most supermarkets indicated the ADF as a separate line item, other retailers tended not to and consumers were therefore generally not aware they were paying the ADF on a range of items. The primary incentives for producers to seek exemption came from supply chain influences.

¹⁰ Initial rates only are shown.

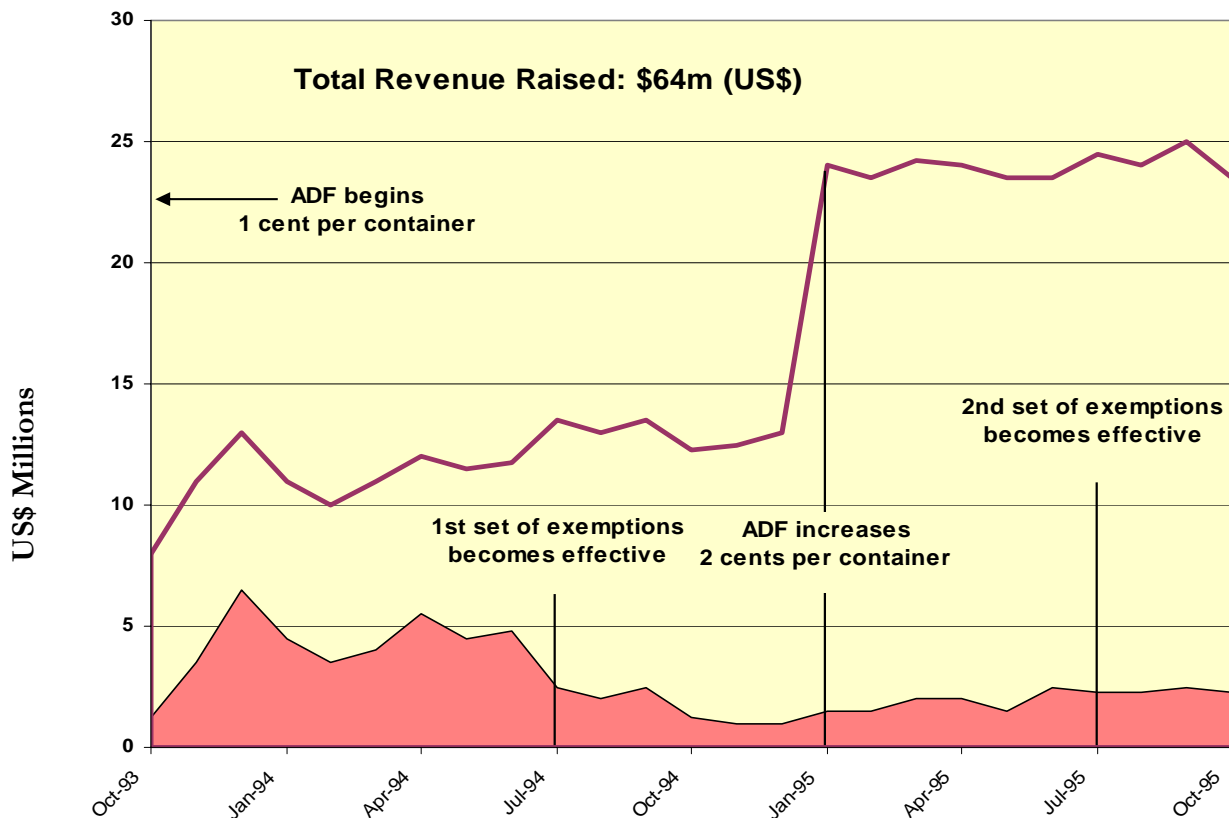


Figure 4: Impacts of Exemptions on Revenue from Florida ADF

Source: Martin 1998.

5.3 Taxes and/or Subsidies

The OECD (2005) recognises that prices of natural resources may understate the social costs of their use for two principal reasons:

- virgin materials are often seriously under-priced due to heavy subsidisation of resource extraction and processing activities in many countries; and
- market price alone may not reflect significant externalities associated with resource extraction and processing.

Pigovian emissions taxes can address these inequities by requiring polluters to pay a tax per unit of emissions on all of their emissions. Such taxes have a variety of advantages over standard “command and control” policies (MMA and BDA Group 2003a, Palmer and Walls 1999):

- especially when coupled with marketable pollution permits, such taxes can result in reduced emissions at least cost;
- ‘dynamic efficiency’ effects, with polluters having incentive to develop cheaper, easier means of reducing their impacts; and
- resulting revenues can be used to reduce other distortionary taxes.

Subsidies are more commonly used where intervention may lead to spillover costs such as illegal dumping, for equity reasons or where it is difficult to identify, monitor or enforce tax approaches (as with diffuse sources of emissions) (MMA and BDA Group 2003a).

However, Palmer and Walls (1999) show that disposal of solid and hazardous waste is the prime example of where Pigovian emissions taxes are infeasible, as the potential for illegal dumping may increase significantly in order to avoid the taxes and effective enforcement of the taxes while minimising illegal dumping would be ‘difficult and extremely costly’.

The OECD (2005) argues that where there is a social case for doing so, EPR can encourage producers to reduce use of virgin resources and to make greater use of recycled materials. Although EPR may be targeted at reducing resource use, taxes or subsidies to do so may cause distortive or perverse effects. So-called ‘perverse’ subsidies are damaging to both the economy and the environment¹¹.

It is beyond the scope of this study to examine the impacts of taxes and/or subsidies on resource use from waste management and recycling of packaging in Australia. However, ACOR (2006) has found that Australian virgin material subsidies greatly exceed any support for competing recycled materials.

The OECD (2005) has examined the potential for ‘eco-fees’ or ‘eco-taxes’ to achieve desired outcomes, such as using charges for mercury-containing batteries to cause consumers (and hence producers) to switch to other types of batteries. However, research indicates that PROs or even material phase-outs may be more effective, as direct fees may increase the incidence of illegal disposal and therefore increase management, disposal and enforcement costs.

5.4 Upstream Combination Tax/Subsidy

Palmer and Walls (1999) have proposed an upstream combination tax/subsidy (UCTS) under which producers pay taxes on a weight basis that varies by material and recycling collectors receive a subsidy as the materials are recovered. Palmer and Walls (1999) argue that imposing an upstream tax based on weight of intermediate goods (such as aluminium ingots or grades of paper) creates incentive to reduce product weights and waste disposal to landfill, thus encouraging DfE. The accompanying subsidies for recovered materials (such as used beverage containers and consumer paper) would be intended to promote recycling (Palmer and Walls 1999).

5.5 Tradable Resource Recovery Certificates

Tradable RRCs are intended to complement programs requiring that a specified level of recycling occur, as with the achievement of specified targets. Companies facing technical difficulties or high costs to recycle their products could buy credits to achieve their targets from companies that find it easier or more cost-effective to recycle at a level higher than that required of them. Companies could have financial incentive to increase the recyclability of their products through DfE or other measures.

Tradable RRCs are similar to emissions trading schemes in that they provide a means for industries to achieve desired environmental outcomes at a lower cost than other options (C4ES 2002a, Walls 2003). Tradable RRCs or similar instruments are not likely to encourage illegal disposal, as they do not penalise products or materials that are not recovered (MMA and BDA Group 2003b).

In addition to increasing recovery, tradable RRCs can be designed to reduce other environmental impacts. C4ES (2002a) have proposed tradable RRC programs as a means of reducing greenhouse gas emissions through publicly popular programs such as recycling. In contrast to emissions trading schemes to reduce costs of achieving maximum emissions levels, tradable RRCs could seek to maximise recycling rates or to achieve specified recycling targets at least cost.

¹¹ An excellent discussion of the impacts of perverse subsidies in Australia can be found in RIRDC 2003.

Implementing a tradable RRC system in Australia would require Commonwealth legislation, national administration and a strong regulatory framework to ensure robust, legitimate use of the scheme (MMA and BDA Group 2003b). Detailed investigation would be necessary to address key concerns such as establishing targets, allocating credits, and monitoring and enforcement activities. Walls (2003) contend that an optimal scheme of tradable RRCs would likely include a complementary ADF.

5.5.1 UK Packaging Waste Recovery Notes

The U.K. Packaging Waste Recovery Notes (PRN) scheme is the only tradable RRC program currently in operation. The scheme, under the Producer Responsibility Obligations (Packaging Waste) Regulations 1997 (as amended), involves establishing annual recovery and recycling targets for producers to assist the UK in achieving its targets under the PPWD.

The only legal forms of demonstrating compliance against the targets are for producers to purchase evidence of compliance from an accredited reprocessor in the form of PRNs or from an accredited exporter in the form of Packaging Waste Export Recovery Notes (PERNs). PRN prices vary by material and are weight-based, which could create material substitute and dematerialisation incentive, but other DfE incentives are minimal (Defra 2005, Walls 2003).

6.0 Other Industry-based Measures

6.1 Covenants

Covenants, such as the Dutch Packaging Covenant and Australia's National Packaging Covenant move beyond traditional EPR to address broader product life-cycle concerns via negotiated agreements between industry and Governments.

6.1.1 Australia's National Packaging Covenant

Debate over CDL and EPR led to the development of Australia's NPC in 1999 as a co-regulatory approach emphasising shared responsibility across the packaging supply chain (Martin 2003). To address the free rider dilemma, industry insisted on underpinning legislation in the form of a NEPM for Used Packaging. Under the NEPM, companies that did not sign the NPC and commit to product stewardship initiatives for packaging (including funding for municipal recycling programs) could be compelled by jurisdictions to implement take-back schemes and meet other regulatory requirements.

In 2005, the Covenant was strengthened and renewed for another five-year period, with a mid-term review by end-2008 of progress against overarching targets for increased recovery and recycling of used packaging. The Covenant's overarching targets for 2010 include:

- post-consumer recycling rate of 65% (up from 2003 baseline of 48%);
- 25% recycling rate for designated 'non-recyclable'¹² packaging (up from 2003 baseline of 10%); and
- no new packaging top landfill (against 2003 baseline).

The revised Covenant also strengthens public reporting requirements and key performance indicators (KPIs) for Covenant signatories, and endorses Government powers under the NEPM to track down and prosecute companies whose packaging fails to meet appropriate standards. The revisions resulted from over 18 months of extensive consultations.

Under the Covenant, industry has committed to investing at least \$15 million to recover and recycle used packaging, with industry funding matched by government. The funding is committed to a central pool of funds to be distributed by an independent body, the National Projects Group (NPG) to provide funding to reduce the environmental impacts of used packaging. The funding is in addition to the direct cost to companies of Covenant reporting and their own programs to improve packaging.

The revised Covenant strengthened the industry ECoPP and its enforcement provisions, and developed detailed guidelines to assist companies in incorporating DfE in the packaging decision making process. Under the ECoPP, seven environmental impacts must be considered across the packaging supply and recovery chains, including (NPCC 2005):

- source reduction;
- potential for packaging reuse;
- recovery and recycling;

¹² Refers to materials that are either not currently recycled in Australia or recycled at very low rates.

- ability to incorporate recycled content;
- minimising impacts of packaging;
- propensity to become litter; and
- consumer information.

The ECoPP recognises that some of these objectives may be conflicting, and where such conflicts exist, companies must optimise positive environmental impacts and minimise negative environmental impacts, without compromising the ability of the packaging to serve its purpose. In this way, the Covenant addresses DfE and broader environmental concerns than EPR's emphasis on end-of-life management.

The Covenant contains a number of features intended to reduce environmental impacts from packaging that is illegally dumped or littered:

- Funding through Covenant contributions for litter projects approved by the NPG.
- The Australian Retailers' Association Code of Practice for the Management of Plastic Bags.
- One of the ECoPP's DfE provision specifically addresses propensity to become litter.
- Covenant KPIs specifically address measurement of consumer packaging in the litter stream and improvements in littering behaviour, and the NPCIA will continue to work with jurisdictions to help measure and achieve these KPIs.

In 2004, NSW deferred further consideration of EPR for packaging, pending the review and subsequent revision of the Covenant, stating "as the EPHC has agreed that the National Packaging Covenant and supporting NEPM should be the principal instruments for managing consumer packaging waste, further action on this waste in NSW will await the outcome of the full review of the Covenant" (DEC 2004, p.12). In 2005 after renewal of the Covenant, the NSW EPR Expert Reference Group recommended supporting the effective implementation of the Covenant, but pursuing immediate regulatory action if the Covenant's mid-term review finds unsatisfactory progress against overarching targets and KPIs (DEC 2005).

An independent review of the Covenant's regulatory impact statement (RIS, Nolan-ITU 2005) carried out by ACCESS Economics stated that although the true costs of the proposed Covenant had not been taken into account and despite concerns about the robustness of the RIS and the setting of overarching targets, the Covenant, "seems to ACCESS Economics to constitute a prudent evolutionary approach to tightening industry performance requirements" (ACCESS 2005, p.1).

6.2 Other Measures

Other industry-based approaches are often cited for EPR, such as leasing arrangements for carpets. These approaches are appropriate for some durable goods. However, since they are not appropriate for relatively short life products such as packaging, they are not addressed further in this report.

7.0 Costs and Benefits of Policy Framework Alternatives

Given the limited scope and short time available, this report is not intended to provide a comprehensive cost-benefit assessment of alternative approaches. Rather, the following sections are intended to provide indicative means of comparison.

It is crucial to note that responses to fees under product stewardship schemes and economic instruments such as ADFs effectively limit the social costs in relation to the fees and penalties involved. In other words, waste reduction efforts that are more costly than the fees in question are not likely to be pursued. However, the OECD (2005, p.17) notes that,

“there is no upper limit to the potential cost of meeting the requirements of an EPR program. If meeting the targets set by the program is substantially more costly than expected, these costs will be incurred, even if they are excessive in relation to the benefits achieved.”

This lack of cost limits for EPR is especially evident in the costs of European implementation of the PPWD (Section 7.1.1).

Although a broad range of policy approaches are consistent with EPR, product stewardship and ‘polluter pays’ principles, they do not impose the same societal costs and only a handful might be efficient socially, economically and environmentally (OECD 2005, Walls 2003). It is therefore desirable to seek an efficient level of the environmental externality in question in a cost-effective manner (Walls 2003).

The OECD (2005) recognises the need to specifically address material recovery under alternative approaches and this report therefore emphasises cost-effectiveness of achieving specified packaging recovery rates under alternative product stewardship and EPR approaches in accordance with OECD assessment frameworks.

7.1 Take-back Requirements

Palmer and Walls (1999) note that take-back requirements coupled with a PRO closely resemble the UCTS or ADFs and that PRO fees could provide the same incentives for production efficiencies, DfE and waste minimisation that an ADF would provide. However, since the PRO fees do not encourage recycling, they would not be cost-effective at reducing waste disposal.

Palmer and Walls (1999) also note that mandating product take-back has no inherent advantages over transferring Government ADF revenues, with respect to alleviating costs of municipal waste management and recycling programs. The same would hold true with transferring Government revenues from unredeemed CDL deposits to municipalities, as California does.

7.1.1 European Packaging and Packaging Waste Directive

A recent review of the PPWD for the European Commission (PIRA and ECOLAS 2005) has identified the effectiveness and costs of implementing the PPWD. The study found that in 2001, the EU-15 recycled 30.7 million tonnes out of 56.3 million tonnes of packaging waste, for a 55% packaging recycling rate overall.

PIRA and ECOLAS (2005) found that in 2001 only 9% of total packaging recycling in the EU-15 could be directly attributed to the PPWD and that of environmental improvements due to packaging recovery, only 8-9% was directly related to the PPWD in:

- Diversion from landfill (2.8 million tonnes);
- Recycling (2.8 million tonnes);
- Oil equivalents (1 million tonnes); and
- CO₂ (3 million tonnes).

PIRA and ECOLAS (2005, p.v) also found that,

'for most environmental impacts, the specific cost of environmental benefits that can be attributed to the Packaging Directive is significantly higher than the specific cost of environmental benefits of packaging in general.'

PIRA and ECOLAS (2005) have estimated that the total 'financing need'¹³ (funding necessary to make recycling happen) for recycling packaging for the EU-15 has increased from €2.9 billion (\$4.7 billion) per year in 1997 to €3.7 billion (\$6.1 billion) per year in 2001¹⁴. PIRA and ECOLAS (2005) also found that the compliance costs to industry in 2001 varied significantly by member state, with costs to industry¹⁵ of:

- **Germany:** €2.5 million (\$20.5 million) per % point of recycling;
- **France:** €6.8 million (\$11.1 million) per % point of recycling; and
- **UK:** €2.4 million (\$3.9 million) per % point of recycling.

In a complementary review to PIRA and ECOLAS (2005), Perchards *et al* (2005) evaluated impacts of implementing the PPWD on functioning of the EU Internal Market and other related matters. Perchards found that EU packaging taxes, including those related to the PPWD, tend to discriminate against beverage containers (or are biased in favour of refillables) and serve mainly as a revenue source, rather than driving environmental improvements. Another significant finding was that such taxes also have a significant distortive effect on retail pricing (Perchards *et al* 2005).

Distortions in reported recovery figures can result from producers trying to avoid paying PRO fees and as a result of PRO tracking systems. For example, the German Green Dot program reports overall recovery rates of 103% because actual amounts recovered are reported not against total production but against the amounts produced by licensees (Martin 2003).

The OECD (2005) has noted that EPR can inhibit product innovation and reduce competition as producers develop products that are favoured by the rules of the EPR program. Such impacts would be even more pronounced in trying to apply EPR to packaging, where innovation is critical.

One limitation of voluntary or negotiated take-back schemes is that occurrence of free riders (Section 2.1.3) may undercut the economic and environmental viability of the programs. In contrast the ability of firms to avoid a well-enforced statutory ADF is much more limited (OECD 2005).

¹³ Defined as 'The gross costs minus the revenue from the sale of secondary raw materials or energy. The financing need equals the funds that need to be injected into the market in order to render recovery economical or, in other words, to make recovery happen. This is the relevant cost from the point of view of the recovery chain.' (PIRA and ECOLAS 2005).

¹⁴ In real 1998 prices.

¹⁵ As of December 2005, A\$1 = €0.61; using historical values would generally show an even higher cost in A\$.

7.2 Standards

Standards are especially blunt instruments intended to achieve a minimal desired outcome. They frequently do not effectively reflect a diverse range of product types, including imports, and enforcement must often be substantial to achieve desired results. Industries generally adopt a minimalist, compliance-oriented approach to standards, so standards are not especially effective in fostering innovation or in optimising desired outcomes.

7.2.1 Recycling targets

The OECD (2005) has identified a range of impacts associated with requiring higher percentages of recovery and recycling through EPR, as in mandated recycling targets:

- Greater collection effort could increase the cost per unit collected as materials could be harder to collect or require collection from more remote locations.
- Greater burden placed on households to separate wastes, rather than disposing of the products through municipal waste collection.
- Although higher recycling volumes may reduce the costs of recycling per tonne of material, the higher recycling volumes may depress the price per unit obtained for recycled materials as when Germany flooded European recycling markets.
- There may be offsetting cost savings for collection cost and treatment (including reduced landfill and incineration externalities) for conventional waste disposal.

The OECD (2005) has also found that using recycling targets to achieve EPR objectives has a drawback of lacking cost transparency, due to inability to effectively estimate compliance costs in advance of establishing the targets.

7.2.2 Minimum recycled content standards

Compliance approaches for standards often fail to capture the current status of the subject products. For example, California's Rigid Plastics Container Law was recently modified as the rates failed to measure the law's effectiveness, meaningful data were not available in an accessible form and data that could be obtained was not timely (Leaon 2005).

Palmer and Walls (1997) have found that recycled content standards cannot achieve socially optimal levels of disposal and recycling, even if complemented by an ADF, and that taxes on other production inputs are necessary. Palmer and Walls (1997) further found that recycling standards and output taxes would need to be company-specific. Such an approach would not be cost-effective for packaging in Australia, given the diverse range of companies involved.

The OECD (2005) finds that recycling targets which sometimes accompany EPR schemes lack cost transparency and that targets are not required under EPR. The OECD has also found systems such as tradable recycling credits allow greater flexibility, help to ensure goal achievement and provide greater transparency, in contrast to targets.

7.2.3 Industry funding organisations

Martin (2003) cites Stewardship Ontario as an example of how IFOs can focus on funding to the detriment of recycling or other environmental issues. Stewardship Ontario is an IFO through which industry funds half of the cost of kerbside recycling in Ontario. Although simple in theory, in practice such approaches can send the wrong signals to industry by:

- Focusing on funding costs of municipal recycling without seeking to minimise those costs.
- Distorting incentives, since producers of products with higher recovery rates or recycled content often have to pay more in fees than competitors that are not as responsible for their products.
- Serving mainly as a funding vehicle, rather than focusing on recovery or broader environmental objectives.

As shown in Section 2.1.2, emphasis of such programs on cost-shifting for non-hazardous or readily managed materials is inconsistent with OECD principles and EPR objectives.

7.2.4 CEN standards

Although the CEN standards are too recent for reliable implementation cost data to be available, they are generally regarded by industry as providing a more flexible, less costly approach to complying with the mandated Essential Requirements of the PPWD than other approaches. The CEN standards rely on having systems in place to demonstrate that given environmental considerations were effectively considered and therefore complement quality assurance and environmental management systems. Were it not for the CEN Standards, compliance costs for the PPWD would likely be even higher than those identified in Section 7.1.1.

7.3 Economic Instruments

MMA and BDA Group (2003a) argue that ADFs are useful for raising revenue to address particular materials but are generally too indirect to improve waste collection or recycling. However, Florida's ADF resulted in Florida's desired market development and stabilisation of recycling markets. ADFs on more potentially hazardous materials have also proven effective in addressing the targeted products and ARFs are becoming core components of a variety of product stewardship schemes for products such as electronics. Industry support for such approaches has generally been contingent on flexibility of implementation; specific uses of funds to address targeted products; and ability to reduce fees/levies as costs are lowered and desired results are achieved.

Economic instruments that reward diversion to beneficial uses (such as UCTS, ARFs or tradable RRCs) would likely result in less illegal dumping than alternative regulatory or prescriptive approaches (MMA and BDA Group 2003a).

7.3.1 Container deposit legislation

CDL schemes can be effective in increasing beverage container recovery and decreasing beverage container litter (C4ES 2000, Perchards *et al* 2005). However, the introduction of CDL on top of modern waste management and recycling programs in Australia would create a duplicate system that would undercut recycling programs by creating competing systems and increase the costs of implementing both approaches, while reducing their effectiveness. C4ES (2000) first pointed out that (prior to the introduction of CDL in Germany) CDL had always been introduced first and then comprehensive waste management and recycling programs could be designed around the CDL programs, thus reducing conflicts with recycling programs and contracts.

Germany introduced CDL on top of their comprehensive waste management and recycling program in order to penalise the beverage industry for failure to achieve an arbitrary 72% reuse quota for refillable beverage containers. As a result, Germany's PRO, DSD, reports that the introduction of CDL cost over €300 million (currently around \$490 million) in 2003 and led to a net loss of 9,530 jobs (EUROPEN n.d.). The program has also resulted in a net increase in environmental impacts and significant market

distortion. To avoid the additional deposit, consumers frequently buy less expensive refillable bottles, then litter them (Perchards *et al* 2005).

Introducing CDL on top of comprehensive recycling programs such as those in Australia would entail significant conflict. These conflicts are highlighted as recycling programs increase their recycling rates and reduce their costs. For example, C4ES (2002b) found that the introduction of CDL in the Australian Capital Territory (ACT) could at best result in a 10% increase in beverage container recovery. However the marginal cost for recycling would increase from \$110 per tonne to \$900-\$1,900 per tonne for the 10% increase. Council recycling costs would therefore not go down, even though less material would be recovered; in fact, Council rates could actually rise if CDL was implemented in top of comprehensive recycling programs (C4ES 2000).

In their review of the PPWD, Perchards *et al* (2005, p.130) found that,

“There is no evidence that mandatory deposits improve the efficiency of recycling systems – collection arrangements for non-beverage packaging are still needed, and one system is cheaper to run than two. The results reported by the EU-15 countries show that deposit systems are not necessary for the achievement of high recycling rates.”

Even studies that disagree in their recommendations on CDL are remarkably consistent in estimating that introducing CDL in Australia would double or triple the cost per household of kerbside recycling (C4ES 2000, EPA Victoria 2003, ISF 2001). C4ES (2000) further found significant difference in CDL collection depot viability between urban and rural areas when C4ES modelling showed that for NSW rural areas to try achieve the same coverage and convenience of the SA CDL system would require \$123 million in establishment costs alone to create 500 depots, however only 30-60 of the depots would be commercially viable on their own. This raises important policy issues – introducing CDL in Australia would either require significant subsidisation in rural areas or charging consumers deposits they may not actually be able to redeem.

Although in theory deposit-refund schemes can be effective in addressing illegal disposal, they are not suited to high volume waste streams (MMA and BDA Group 2003a). The power of incentives can also be called into question. For example, representatives of DrumMUSTER have told MS2 staff that return rates are especially low for reusable agricultural and veterinary chemical containers, even though they can carry deposits of \$350 or \$1,000 each and users can return the containers to the same stores where they purchase new supplies.

To keep up with inflation, CDL deposits would have to be in the order of 20-30 cents per container. The question is whether people would redeem containers, and if so, how? Given the strong support for kerbside recycling in Australia and 85-95% access to kerbside recycling, it is less likely that people will go out of their way to redeem containers.

Martin (2005a, 2005b) has highlighted the potential for significant diversion of revenues from recycling programs under CDL if consumers are motivated to return the containers. Martin (2005a) found that materials covered under CDL contribute 54% of the volume, yet 77% of the financial value of kerbside recycling in Tasmania. Martin (2005b) further found that materials covered under CDL contribute 33% of the volume, yet 59% of the financial value of kerbside recycling in Northern Queensland. Economic viability of such programs could be threatened to the extent that consumers redeem containers through CDL collection depots rather than through kerbside.

The SA CDL approach involves built in inefficiencies. At least 18 different sorts by brand, colour and material are required to track container and deposit flows, even though the brands ultimately end up at a handful of end users for recycling (C4ES 2000). A recent study commissioned by the SA Government has found that these inefficiencies alone amount to \$4.1 million p.a., or around \$35,000 per collection depot p.a. (Hudson Howells 2005).

Recovery Rates under CDL

CDL does not result in higher overall recycling rates. Just as C4ES (2000) found no connection between presence of CDL and levels of waste diversion, Perchards *et al* (2005, p.x) found that in the EU-15,

“overall recycling rates in Member States with deposit systems are not higher than those of comparable EU countries where there are no special arrangements for beverage containers”

and Perchards *et al* (2005, p.132) further found that

“It is clear that deposit systems for non-refillable beverage containers are not necessary to meet the recovery and recycling targets in the Directive. Member States without deposit systems have met the Directive’s 2001 targets, and in some countries were already meeting the material specific targets set for 2008.”

As highlighted in Section 5.1.3, recovery rates of CDL programs such as California’s show a clear decline over time. Studies have shown that under CDL, beverage container recovery rates tend to decline over time for a range of reasons (NRC 2005, R.W. Beck *et al* 2002):

- declining value of CDL deposits over time;
- general failure of CDL programs to keep pace with market changes and innovations in beverage packaging;
- generally short-lived influence of education and awareness programs on consumer behaviour; and
- difficulty in competing for consumers’ attention.

The US Beverage Packaging Environment Council (BPEC) has also cited a range of additional factors in the declining recovery rates (NRC 2005):

- lack of sustained leadership on the issue;
- value of recycling not measured in true costs;
- deteriorating economics for recycling;
- consumer disconnect with recycling;
- community economic challenges;
- underutilised residential collection infrastructure;
- limited commercial collection infrastructure for beverage containers;
- volatile end-use markets; and
- inefficient processing infrastructure.

It should be noted that the above conditions are generally not applicable to the current state of recycling in Australia.

California’s CDL Approach

California’s beverage container recycling program, a modified form of CDL, is cited by advocates as a model for implementing CDL in Australia under current conditions and provides a useful means for comparing recovery rates given the high quality of the California data (Section 5.1.3). Table 5

compares 2003 recovery rates by packaging material type for Australia (MS2 and NRS 2005) and California (DOC 2004)¹⁶.

Table 5: Comparison of 2003 Australian and Californian Recovery Rates by Packaging Type

Packaging Material	2003 Recovery Rates	
	Australia	California
Paper/cardboard	64% adjusted	N/A
Glass Packaging	35.3%	50.2%
Steel cans	44.0%	6.0%
Aluminium beverage cans	63.4%	69.6%
Plastics Packaging		
PET (#1)	35.4%	35.1%
HDPE (#2)	32.3%	33.6%
PVC (#3)	16.1%	4.2%
L/LDPE (#4)	14.6%	0.0%
PP (#5)	5.6%	0.7%
PS (#6)	5.5%	0.0%
ABS/SAN (#7)	8.3%	1.1%

In comparison, glass is the material with the greatest need for improvement in Australia, aluminium is second (yet only 6% behind California’s) and plastic recycling meets or exceeds California’s results for 2003. For PET and HDPE, Australia is within 1% of California’s recycling rates. For the other plastics, Australia’s recovery rates clearly exceed California’s. However, Australia’s program is voluntary and California’s is mandated.

Administrative costs of the California program are not readily available but are believed to be substantial, due to the ongoing requirements for program auditing and enforcement. In 2004, California conducted 3,616 recycler inspections, 167 compliance audits and 29 investigations related to the program (DOC 2005c).

As shown previously, the potential for diversion of revenues from recycling programs under CDL is significant if consumers are motivated to return the containers to collection depots instead of through municipal recycling programs (Martin 2005a, 2005b). The California data in Figure 5 shows that where CDL and kerbside occur together, there may be a significant shift in materials, with easy to collect or higher value items returned through CDL and others left in kerbside recycling.

¹⁶ Australia is by weight and California is by container number, so overall rates are not comparable and have therefore not been cited. Individual material recovery rates should be roughly comparable. More recent data for California shows increased recycling rates, but an ‘apples with apples’ comparison was made on 2003 data as the Australian Gap Analysis cited was agreed by Government, industry, and community groups as being the best available. More recent data for Australia would probably also show increased recovery.

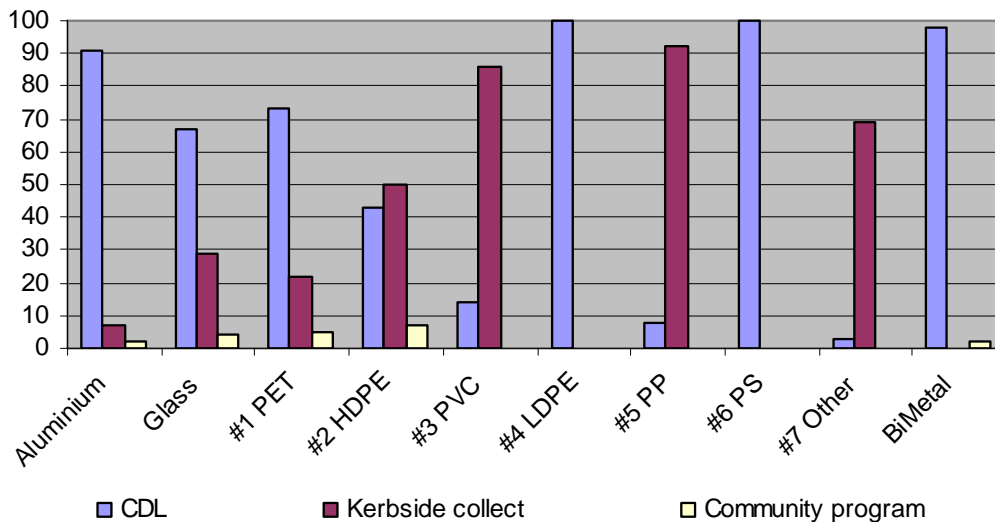


Figure 5: California Material Recovery Pathways 2004 – CRV

Source: DOC 2004 as analysed by MS2.

In California, with CDL and kerbside together, virtually all the materials with value (especially glass, aluminium, steel¹⁷ and PET) get diverted to CDL. The kerbside programs are left primarily with PVC, PP, other plastics and of course paper.

Implementation of CDL in Europe

Some additional findings from Perchards *et al* (2005) are relevant when examining costs and benefits of CDL:

- As shown earlier, CDL-recycling program conflicts are least where CDL was implemented before more comprehensive recycling was developed. CDL programs in Nordic countries are “stable and relatively uncontroversial. However, they started operating before there were recovery organisations for non-beverage packaging. Grafting beverage containers legislation onto a mature recycling system for all packaging appears to be much less successful.” (pp.x).
- In Germany (which introduced CDL on top of comprehensive recycling), “the introduction of mandatory deposits has caused a great deal of disruption in the market” (p.71).
- Extensive conflicts in trade and implementation occur between CDL and other producer responsibility efforts.
- Applying CDL on some containers or some beverages and not others results in competitive distortions.
- CDL fails to keep pace with new product lines and packaging innovation, which leads to inequities.
- CDL systems are more susceptible to fraud than other recovery approaches (pp.122-123).
- Litter is best addressed comprehensively, rather than singling out certain packaging types such as beverage containers, and litter should not be addressed through packaging waste legislation.

¹⁷ Steel cans are referred to as bimetals in California.

7.3.2 Advance disposal fees

Palmer and Walls (1999) contend that ADFs have output effects but no input substitution effects, and are therefore especially costly for materials recycled at relatively low cost, such as paper.

MMA and BDA Group (2003a) contend that unless the fees paid are directly related to producer behaviour (as was the case with Florida's ADF) they have no advantage over a product tax. Such performance-based ADFs would be comparable to tradable RRCs, except they are more likely to address a broader range of recycling activities (MMA and BDA Group 2003b).

MMA and BDA Group (2003a) contend that ADFs that incorporate performance requirements are narrow in focus and indirect in reducing the volume of waste to landfill, and would therefore be relatively ineffective, have little influence on illegal dumping and come at a high cost. However, as indicated in Section 5.2, ADFs can be effective in promoting recovery of problem wastes such as tyres and lead acid batteries. Such wastes may represent low volumes in landfill, but environmental considerations warrant separate collection through EPR and instruments such as ADFs.

The OECD (2005) notes that end-of-life waste management fees such as ADFs cause consumers to have a greater understanding that their purchasing practices may have a direct result on their disposal costs. There is also similarity between an ADF and EPR, in that PRO fees are generally related to sales volumes or market share. Either way, the charges will be passed on to consumers through higher prices and price impacts will be determined by the elasticities of supply and demand in the market.

Florida's ADF on Containers

The Florida ADF achieved its objectives to stimulate demand for recovered materials. In the two years the program was implemented, the Florida ADF resulted in:

- over 13,000 tonnes of plastic recycled through take-back;
- new glass and plastic plants located in the state;
- 61% of take-back petitioners initiating recycling efforts; and
- 25% of recycled content petitioners initiating recycling efforts.

Affected industries showed strong support for repealing the deposit provisions of the original Florida ADF and the incorporation of market-based incentives. Industry therefore responded accordingly. One trade journal, Bottlemaking Technology and Market News noted that, "on the day that Florida's ADF was dropped, demand for food-contact recycled content vanished overnight" and that after the program sunset, two recycled PET plants relocated to Europe.

Active stakeholder engagement and providing industry significant flexibility in their recovery efforts were instrumental to the success of Florida's ADF. The state agency worked closely with potentially affected industries in legislative development, incorporating market-based incentives and in documenting industry performance under the program.

When looking at lessons from Florida's ADF for Australia, it is important to note that the program was intended to ensure a backstop level of recycling activity to counteract generally poor recycling markets that existed at the time. In contrast, Australia enjoys strong end use demand both domestically and overseas for recovered materials and the general market outlook is much stronger. In addition, the Covenant currently provides the regulatory certainty and appropriate incentives that Florida officials and industry representatives were seeking when they crafted the ADF.

7.3.3 Taxes and subsidies

Recycling subsidies encourage substitution of recycled for virgin materials, as intended, but may represent perverse subsidies in that output of such materials may actually increase due to decreased production costs resulting from the subsidy. Recycling subsidies must therefore overcompensate to achieve waste reduction goals and are especially costly for materials such as aluminium with high costs of additional recycling. Policy approaches such as recycling subsidies are more costly means of achieving waste reduction targets than are market based approaches (Palmer and Walls 1999).

7.3.4 UCTS

Palmer and Walls (1999) argue that a UCTS is more cost-effective and imposes fewer transaction costs than product take-back. They also argue that unit-based pricing (UBP) of residential waste can deliver significant reductions in solid waste without directly targeting producers.

Palmer, Sigman and Walls (1997) estimate that a 10% reduction in material disposal can be achieved with a UCTS of US \$45/ton, and ADF of US\$85/ton and a recycling subsidy of US\$98/ton, and that a UCTS is therefore the most cost-effective of the three options examined.

Palmer and Walls (1999) contend that combining emissions standards with product taxes addresses multiple upstream pollution issues and downstream waste disposal simultaneously. However, they vastly oversimplify the process of setting the tax level by suggesting that the tax is ‘simply adjusted to reflect the marginal environmental costs associated with each externality’ (Palmer and Walls 1999, p.5). Obtaining agreement on such externalities for packaging is highly unlikely and as Martin (2003) notes, impacts (and therefore their externalities) can change over time as products and consumer demands change. Therefore, a UCTS approach to packaging would either fail to accurately reflect externalities at a given time or would involve substantial administrative and transaction costs to accurately reflect the externalities.

7.3.5 Tradable certificates

Tradable RRCs or similar instruments are not likely to encourage illegal disposal, as they do not penalise products or materials that are not recovered (MMA and BDA Group 2003b). However, if not properly structured they can lead to other problems such as shifting an undue amount of responsibility. For example, due to small business exemptions under the UK PRN scheme, producers that are affected must achieve a 70% recovery target in 2008 to meet the PPWD target of 60%. The UK scheme has also failed to increase recovery capacity in the UK (Perchards *et al* 2005).

Tradable RRCs provide greater flexibility and potential cost reductions than mandated recycling targets, while ensuring target achievement. Tradable RRCs also provide transparency because the tradable-credit price per unit can be observed (OECD 2005).

Walls (2003) highlights that tradable RRCs offer minimal incentives for DfE efforts and suggests that an optimal tradable RRC scheme would need to be accompanied by an ADF.

7.4 Other Industry-based Measures

7.4.1 National Packaging Covenant

The RIS for the Covenant found that the Covenant was the best “allrounder” of policy options evaluated and would provide significant environmental benefits through increased resource recovery and improved product stewardship (Nolan-ITU 2005).

The RIS found that the Covenant motivates a greater level of environmental performance than “more lenient” approaches by providing guidance on compliance, performance targets and KPIs and by penalising those that fail to act (Nolan-ITU 2005).

Implementation and achievability grounds were also responsible for the Covenant being rated higher than EPR in the RIS. The RIS further found that while greater environmental benefits could be achieved with other approaches, the Covenant and NEPM would result in less economic and social impact (Nolan-ITU 2005).

The financial cost to industry to assist in achieving the Covenant targets is \$3 million every year over the Covenant’s 5-year term¹⁸, with this commitment matched by Governments. However, the Covenant’s full financial costs across all sectors were estimated at \$31-46 million (Nolan-ITU 2005).

Although this report shows in Section 2.1.2 that attempts by advocates to apply EPR to packaging as a means of shifting or spreading waste management costs are inconsistent with OECD principles and objectives for EPR, it is worth noting that the RIS showed the Covenant would provide a net financial benefit to municipalities of \$8.5-\$37 million (Nolan-ITU 2005).

Whilst there are many factors that limit the applicability of direct comparisons, the compliance costs of the PPWD shown in Section 7.1.1 can provide a rough, indicative means for evaluating relative cost-effectiveness of the Covenant. Targets under the Covenant call for the overall packaging recycling rate to increase from a baseline in 2003 of 48% to 65% in 2010, for a difference of 17 % points of recycling. Roughly, using the German, French and UK approaches to achieve the Covenant’s overarching targets would cost \$348 million, \$189 million and \$66 million, respectively.

Again noting the limitations of direct comparisons, it is worth noting indicative comparisons against the costs of complying with the PPWD:

- **Germany:** \$20.5 million per % point of recycling.
- **France:** \$11.1 million per % point of recycling.
- **UK:** \$3.9 million per % point of recycling.
- **Covenant:** \$1.8-\$2.7 million per % point of recycling.

It is worth noting that although the UK approach is intended to be a more cost-effective means of achieving recycling targets under the PPWD, the scheme still costs 1.5 to 2 times as much per % point of recycling as the Covenant. In addition, as of 2001, the UK’s packaging recycling rate was 42%, compared to Australia’s rate of 48% in 2003. The UK’s recycling rate is also lower than all members of the EU-15, except for the three countries (Greece, Ireland and Portugal) granted special longer timeframes to achieve the PPWD targets due to their limiting circumstances.

Strengthening of the ECoPP and enforcement provisions under the revised Covenant helps address the difficulty of identifying cost-effective, feasible policies that motivate DfE. When coupled with the Covenant’s product stewardship principles, the ECoPP provides a comprehensive approach to addressing life-cycle environmental concerns for packaging. Palmer and Walls (1999) highlight that single policy approaches such as UCTS, ADFs and take-back requirements are not efficient in addressing these life-cycle environmental concerns.

¹⁸ Direct financial commitment, not including administration and reporting costs.

8.0 Productivity Commission Inquiry

Under the current Productivity Commission Waste Generation & Resource Efficiency Inquiry the Productivity Commission is to (PC 2005, pp. 8-9), “examine and report on current and potential resource efficiency in Australia, having particular regard to:

- The economic, environmental and social benefits and costs of optimal approaches for resource recovery and efficiency and waste management, taking into account different waste streams and waste related activities;
- Institutional, regulatory and other factors which impede optimal resource efficiency and recovery, and optimal approaches to waste management, including barriers to the development of markets for recovered resources;
- The adequacy of current data on material flows, and relevant economic activity, and how data might be more efficiently collected and used to progress optimal approaches for waste management and resource efficiency and recovery;
- The impact of international trade and trade agreements on the level and disposal of waste in Australia; and
- Strategies that could be adopted by government and industry to encourage optimal resource efficiency and recovery.”

The Productivity Commission’s Issues Paper (PC 2005) contains a series of questions related to the Inquiry’s terms of reference (TOR). Where appropriate, the questions and suggested responses have been included in this Section.

8.1 Life-cycle Approach

MS2 recommends the NPCIA support the Inquiry’s TOR to adopt a life-cycle perspective and note that the Covenant’s use of ‘shared responsibility’ and emphasis on reducing overall life-cycle environmental impacts of packaging makes the Covenant a more efficient, cost-effective approach to address waste generation and resource efficiency of packaging when compared to alternative policy options such as EPR.

“How useful is full life-cycle analysis in determining the environmental and economic costs and benefits of recycling various products?”

Here it is important to draw a distinction between a comprehensive life-cycle approach to reduce overall environmental impacts and full life-cycle assessment (LCA). Full LCA is useful in driving improvements over time for individual products. The NPCIA should not, however, support the use of LCA to develop policy, as framing and assumptions are easily called into question and policies based on LCA would fail to adequately account for product innovation and changes over time. Policies should be based on full considerations of social, economic and environmental costs and benefits, within which LCA can have a complementary role.

8.2 Regulatory Approaches

“What are the advantages and disadvantages of the different regulatory options for setting up extended producer responsibility or product stewardship schemes: self regulation, co-regulation and explicit legislation?”

In broad terms, self-regulatory approaches provide significant flexibility for progressive companies but can lead to market distortions due to free riders that gain unfair competitive advantage by not participating in EPR or product stewardship schemes and thus not contributing an appropriate share of the costs of such schemes despite their contribution to the waste stream.

Co-regulatory approaches help to address free riders through underpinning legislation such as the NEPM for Used Packaging and the NEPM for Product Stewardship currently under development by the EPHC. Co-regulatory approaches such as the Covenant provide an effective balance of industry initiative and regulatory underpinning to address free riders.

The OECD (2005) has found that in contrast to explicit legislation such as mandated targets, co-regulatory approaches or MBIs such as tradable RRCs allow greater flexibility, help to ensure goal achievement cost-effectively and provide greater transparency..

Regulation and enforcement of explicit legislation is by far the most expensive of the regulatory approaches considered. Further to this, explicit legislation is not inherently more effective at reducing negative social and environmental externalities.

8.3 Roles and Responsibilities

“What should be the relative roles of industry and government in the development of such arrangements (as the Covenant)?”

Schedule 1 of the Covenant details appropriate obligations for the packaging supply chain and for governments. Whilst industry must adopt product stewardship principles, jurisdictional governments are responsible for enforcing the NEPM and governments at all levels have responsibilities consistent with achieving Covenant objectives. All participants in the Covenant process have specific obligations to help achieve the overarching targets and KPIs detailed in Schedule 2 of the Covenant. The NPCIA should therefore support the current allocation of roles under the revised Covenant.

8.4 Data Collection and Transparency

Understanding and transparency of data methodologies and research is essential to comparing and evaluating options for product stewardship approaches, as is consistency of definitions. Even definitions of fundamental terms such as “recovery” can vary significantly. For example, West and Hogarth (2005) refer to recovery rates in Europe for certain packaging types (including beverage containers) exceeding 90%, without recognising that most European use of the phrase includes energy recovery, which is not included in Australian use of the phrase.

In contrast, the Covenant and NEPM do not define “recovery”, but define “recovered materials” as “used packaging materials that have been separated from the waste stream for reprocessing and used in the manufacture of consumer packaging or other products.” The ECOPP defines “recovery” as the system whereby materials are diverted from the waste stream for reuse or reprocessing for use as a raw material for the manufacture of a new product.

“To what extent is the lack of disaggregated data (that is, the lack of information about quality and composition of waste) a problem?” and “What are the most significant data gaps?”

The NPCIA recognised the significant lack of effective data and feedback frameworks and the impacts of data gaps on effective policy development. The NPCIA then commissioned the Gap Analysis (MS2 and NRS 2005) to identify and document the gaps and inconsistencies in the collection, storage and analysis of packaging materials flow data in order to help inform discussions during revision of the Covenant. The Gap Analysis (MS2 and NRS 2005, p.ii) found that “fundamental changes are needed to provide reasonably accurate, independently verifiable data to determine progress” against Covenant targets and KPIs and that “the use of current datasets and methodologies to determine compliance would clearly be open to considerable challenge for virtually every area examined”. The NPCIA has supported NPG projects to identified gaps and has committed to conducting an annual Gap Analysis to address problem areas.

8.5 Understanding Diminishing Returns

As product stewardship and EPR schemes reach high recycling rates, they begin to reach a point of diminishing returns or ‘practical recyclability’¹⁹ that will vary by material type, due to factors such as technical barriers, contamination levels and consumer usage and willingness to recover. Higher recycling targets and rates also require collecting packaging that is marginal or less suited for recycling (ACOR 2006, MMA and BDA Group 2003a, PIRA and ECOLAS 2005).

These diminishing returns are increasingly understood by policy makers. Perchards *et al* (2005, p.236) notes,

“There appears to be a consensus among policymakers that the Member States that have taken a lead on packaging waste management policy, have reached the highest recycling rates that can practically be reached, from both an environmental and an economic point of view”.

Being mindful of the numerous difficulties in trying to make direct comparisons between significantly different datasets, Table 6 provides an indicative comparison between general recycling rates for various packaging types for the most recent data available for Australia and the EU-15. It is worth noting how favourably Australia’s largely voluntary results compare to the EU-15’s over-regulatory, more expensive approaches.

Table 6: Comparison of 2003 Australia and 2001 EU-15 Recycling Rates by Packaging Type

Packaging Material	2003 Australia Recycling Rates (MS2 and NRS 2005)	2001 EU-15 Recycling Rates²⁰ (derived from PIRA and ECOLAS 2005)
Paper/cardboard	64% adjusted	66.7%
Glass	35.3%	56.2%
Steel	44.0%	53.6%
Aluminium	63.4%	53.6%
Plastics	20.5%	22.9%
Overall	48% adjusted	55%

¹⁹ Appendix C of the consultation RIS for the Covenant (Nolan-ITU 2005) addresses practical recyclability of packaging in Australia.

²⁰ Based on mechanical recycling figures, not the recovery figures that include EfW.

8.6 Energy Recovery

“What is hindering the greater use of recovering energy from waste in Australia?”

Strong arguments can be made for the use of energy from waste (EFW) or alternative waste technologies (AWT) on economic and environmental grounds. This is despite the issues of low gate fees for landfill and relatively low feedstock densities potentially causing these approaches to not be competitive in some areas. Public perceptions and misunderstandings about such approaches, fuelled by some environmental advocates, appear to be the major hindrance.

“Are there particular products or locations for which recovering energy from waste would be the most efficient approach to waste management?”

For residual materials remaining after cost-effective recycling, MS2 recommends that the NPCIA support energy recovery and resource utilisation through EfW or AWT (where available), consistent with the WMAA Sustainability Guide (WMAA 2005).

It would also be prudent for the NPCIA to monitor and/or support efforts to better quantify the amount of packaging disposed through EfW or AWT processes in order to better understand packaging material flows, consistent with the NPCIA’s Gap Analysis (MS2 and NRS 2005).

8.7 Litter

“What are the most cost effective policy and enforcement mechanisms for limiting illegal dumping and littering?”

With regard to packaging litter, MS2 recommends the NPCIA support improved litter reduction education and provision of public place/special event recycling and strengthened anti-litter legislation and enforcement resources, coupled with financial support for anti-littering projects and organisations as cost-effective policy and enforcement mechanisms.

The Covenant contains a number of features intended to reduce environmental impacts from packaging that is illegally dumped or littered:

- Funding through Covenant contributions for litter projects approved by the NPG.
- One of the ECoPP’s DfE provision specifically addresses propensity to become litter.
- Covenant KPIs contain specifically address measurement of consumer packaging in the litter stream and improvements in littering behaviour, and the NPCIA will continue to work with jurisdictions to help measure and achieve these KPIs.

8.8 Summary

With specific regard to the Inquiry, this report further finds that in Australia:

- Debate has often confused ends and means, with advocates calling for EPR and artificially high recycling rates rather than seeking reduced overall environmental and social costs by implementing efficient, cost-effective means designed to reduce both the volumes and hazards of solid waste.
- Current attempts by advocates to apply EPR to packaging as a means of shifting or spreading waste management costs are inconsistent with OECD principles and objectives for EPR.

- Given the advanced development of waste and recycling, regulatory approaches are likely to involve high marginal costs for little gains in recycling or other environmental objectives.
- Alternative policy models to the Covenant that are intended to introduce EPR for packaging would likely result in significant economic and environmental distortions.

9.0 Strengthening Packaging Product Stewardship in Australia

9.1 Principles for Packaging Product Stewardship

Building on principles put forward by ACOR (2004) and the Canadian Ministers of the Environment principles for packaging stewardship (EC n.d.c.) and applying this project's research, MS2 propose the following principles for packaging product stewardship in Australia:

- Packaging stewardship initiatives should ensure that packaging has a minimal effect on the environment, when viewed from a full life-cycle perspective.
- All sectors in the packaging supply and recovery chains share responsibility for reducing the environmental impacts of packaging waste and for making packaging stewardship programs viable.
- Intended policy objectives need to be made clearer and prioritised, and options to achieve those objectives must strive to effectively balance social, economic and environmental outcomes.
- Active stakeholder engagement, joint fact finding and constructive, good-faith commitment to achieving optimal outcomes are needed in clarifying objectives and priorities and in developing and implementing packaging product stewardship programs.
- A comprehensive, carefully considered approach is necessary as no single policy approach can deliver all desired outcomes nor reflect the full diversity of packaging.
- Intended approaches should incorporate existing infrastructure, policies and programs to the fullest extent possible and seek to minimise negative impacts on existing programs.
- Industry leaders should be rewarded for improving sustainable practices, while laggards should be sent clear messages about need for improvement and be given the opportunity to respond accordingly. Innovation should be encouraged, not stifled.
- Approaches requiring greater levels of regulation should be pursued only after market-based, voluntary and co-regulatory approaches have been clearly shown to not be effective in achieving desired outcomes.
- Industry should be provided significant flexibility to ensure environmental objectives are achieved in a sensible, cost-effective manner.
- National consistency is critical, and should reflect regional differences, available resources and commitment to common objectives.
- Underpinning legislation should be developed in cooperation with industry and effectively enforced by Governments.
- Appropriate incentives must be designed to send appropriate signals to all affected parties.
- The potential impacts of external influencers such as changing demographics should be understood and recognised.
- Packaging stewardship should promote market development and the use of recovered materials.
- Appropriate mechanisms should be instituted to ensure effective, transparent monitoring, data collection and public reporting.

- Packaging stewardship initiatives should meet their environmental objectives in the most efficient, cost-effective manner.
- Where available, energy recovery and resource utilisation through EfW or AWT consistent with the WMAA Sustainability Guide is appropriate for residual materials remaining after cost-effective recycling.

Australia's National Packaging is generally consistent with these principles, although there is room for greater incorporation of these principles in the Covenant's implementation.

9.2 Continued Support of the Covenant

The Covenant was recently strengthened and renewed to provide a framework for packaging product stewardship in Australia. The Covenant's RIS determined the Covenant was the best "allrounder" of the policy options considered, and that it would provide significant environmental benefits. The Covenant has strong industry support for providing a comprehensive life-cycle approach for packaging and an emphasis on shared responsibility.

The Covenant contains a mid-term review in 2008 to evaluate its progress against overarching targets. Therefore, for reasons cited throughout this report, support for the Covenant as the principal instrument for packaging product stewardship in Australia should continue through to at least end 2008, when the mid-term review will be complete.

9.3 Exploring Complementary Mechanisms to the Covenant

A range of approaches are potentially complementary to the Covenant and may warrant further consideration that is beyond the scope of this report:

- Enhanced data frameworks to provide more effective feedback on current status and areas for improvement, consistent with the NPCIA's Gap Analysis (MS2 and NRS 2005), which will now be conducted on an annual basis. There may also be scope to incorporate ongoing assessment frameworks now available from the OECD (2005).
- Greater implementation of user-based pricing to help send waste reduction signals to consumers. However, such schemes often require greater enforcement against illegal dumping.

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Glossary

The following definitions, cited directly from their sources, generally reflect the use of the following terms in this report.

Cost The economist's notion of cost, which is used in cost-benefit analysis, goes wider than simply the lay person's notion of monetary expenditure. Economic cost could include both monetary and non-monetary costs. (Thus, for example, the cost of disposing of waste through incineration could include both the monetary costs of building and operating the incinerator, and non-monetary costs, such as the impact of the emissions from the incinerator on the health of local residents. (OECD 2005)

Cost-benefit Analysis An economic technique for assessing the full social costs and benefits of a particular policy decision or course of action. Cost-benefit analysis aims to assess all of the consequences of the action on a consistent basis. Except where externalities arise, marketed goods and services (including resources used) are valued in terms of their market prices. Other costs and benefits (such as the effects of externalities) are then valued on a basis which allows their value to be compared to goods and services which are priced by the market. (OECD 2005)

Disposal means landfilling, physical-chemical destruction and incineration (without energy recovery) of waste. (OECD 2005)

Eco-labeling/Environmental Labeling Within a product group, eco-labels are meant to distinguish between products, to identify ones which are deemed environmentally preferable to others. The label is meant to indicate the overall environmental quality of a product, in order to encourage consumers to purchase it. Eco-labeling programs are often government-supported, third party certification programs. They are voluntary since manufacturers have the choice of whether or not to apply for the eco-label. (EC n.d.c.)

Extended Producer Responsibility An environmental policy approach in which a producer's responsibility, physical and/or financial, for a product is extended to the post-consumer stage of a product's life cycle. There are two key features of EPR policy: (1) the shifting of responsibility (physically and/or economically, fully or partially) upstream to the producer and away from municipalities, and (2) to provide incentives to producers to take environmental considerations into the design of the product. (OECD 2001)

Extended Product Responsibility Recognizes that manufacturers have considerable ability to reduce the life-cycle impacts of their products. It also recognizes that lasting and substantial environmental improvements in product systems can only occur with the combined expertise, ingenuity, cooperation, and commitment of all the actors in the product chain—from suppliers, designers, manufacturers, and distributors to retailers, customers, recyclers, remanufacturers, and disposers. While reducing end-of-life product waste is an important part of extended product responsibility (EPR), identifying other important life-cycle environmental impacts of products, such as energy efficiency, is also integral to the concept. In this sense, EPR applies a life-cycle approach to "greening" product systems. (EC n.d.c.)

External Cost Costs incurred as a result of individual decisions, but which are borne by an individual other than the person making the decision. (For example, a private landfill operator which allows the site to contaminate groundwater may impose costs on neighbouring residents or businesses, in terms of health damage, the costs of water purification, or the costs of obtaining alternative uncontaminated sources). (OECD 2005)

Externality The effects of a production or consumption decision which are experienced by individuals or businesses which did not consent in the initial decision. Externalities may be either “positive” or “negative”. A negative externality is one in which costs are imposed on other people (as when a person dumps litter in the countryside, imposing costs on others whose aesthetic sense is disturbed by the litter, or imposing clean-up costs on the landowner or public authorities). A positive externality is one in which benefits are experienced by others. For example, if patent protection is incomplete, many firms may be able to benefit from the results of research expenditures by one firm. (OECD 2005)

Free Rider Free riders benefit from the EPR system without contributing an appropriate share of the costs. There is scope for all kinds of participants (consumers, producers, importers, retailers, collectors and recyclers) to free ride one way or another. ...The scope for free riding is greater and more complicated to deal with when a large number of producers (packaging material manufacturers, brand owners, wholesalers, retailers, etc.) are part of a long production chain. In some cases, the scale of free riding does not threaten the financial viability of an EPR system but does raise equity concerns, as the free riders obtain a competitive advantage. In others, however, even a small amount of free riding can compromise the entire system. (EC n.d.c.)

Green Procurement/Environmentally Responsible Procurement Choosing materials, products and systems (i.e. inputs) that offer environmental advantages. Also, green procurement criteria are rapidly evolving from single-issue concerns (e.g., recyclability) to comprehensive life cycle considerations. (EC n.d.c.)

Integrated Product Policy Public policy that explicitly aims to modify and improve the environmental performance of product systems. Integrated product policy addresses the whole life-cycle of a product, thus avoiding shifting environmental problems from one medium to another, as opposed to specific product policy, which addresses one particular environmental effect. (EC n.d.c.)

Marginal Cost The cost of an *additional* unit of some commodity. (OECD 2005)

Market-based Instruments MBIs occupy the middle ground between voluntary agreements and command-and-control approaches. In the waste arena, they are designed to provide financial signals and/or incentives to reduce waste and/or increase the level of reuse/recycling. (ACOR 2006)

Net Benefit Total benefits from some course of action, minus the cost. Depending on the context “net benefit” may be the “bottom line” of a cost-benefit analysis, or may refer to a more restricted set of costs and benefits. Frequently, “net cost” and “net benefit” are used as interchangeable terms, differing only in terms of the sign. Thus a course of action with a “net cost” of one million dollars may equivalently be described as having a “net benefit” of minus one million dollars. (OECD 2005)

Net Cost Total cost of some course of action, minus benefits which act to reduce the cost. (For example, the costs of recycling may be partly or completely offset by revenues from selling the recycled material). Depending on the context, “net cost” may refer to private costs only, or to other cost concepts such as social costs. (OECD 2005)

Opportunity Cost A powerful economic concept, meaning 'what has to be foregone in order to have some specified commodity', or “what alternative has to be foregone if some commodity or resource is used for a specified particular purpose”. For example, the workers employed to collect waste for recycling have an opportunity cost, in the form of the goods and services that they would produce in an alternative employment. (OECD 2005)

Price Generally used to mean the *monetary expenditure* needed to obtain one unit of a commodity. Occasionally wider concepts of “price” may be used. For example, we may “impute” a price for some commodity which is not usually bought and sold. In doing this we are estimating what the price would be if the commodity was, in fact, traded for money.

Private Cost The costs incurred by the individual decision-maker. These are the costs which would be taken into account by individuals motivated by self-interest, or by businesses aiming to maximise profit. Private cost may be contrasted with a wider measure of costs, such as social cost, which includes costs (“external costs”) borne by individuals other than the decision-maker. (OECD 2005)

Product Life Cycle A product's life cycle is made up of the activities that go into making, using, transporting and disposing of that product. The life cycle is commonly shown as a series of stages, from “cradle” (raw material extraction and harvesting), through fabrication, manufacturing, packaging, transportation, consumption, and recycling, to the “grave” (disposal). (EC n.d.c.)

Product Stewardship means the ethic of shared responsibility through the lifecycle of products including the environmental impact of the product through to and including its ultimate disposal. (NPCC 2005)

Recovery means energy recovery (in EU part of energy recovery is considered final disposal) and material recovery (= recycling). (OECD 2005)

Social Cost The sum of private costs and external costs. (OECD 2005)

Stewardship The act of entrusting the careful and responsible management of the environment and natural resources to one's care for the benefit of the general community. (EC n.d.c.)

Treatment covers recovery and disposal. (OECD 2005)

Value Economists use “value” to mean the level of human happiness, satisfaction or “utility” derived from the consumption of particular commodities. It should be noted that “value” is not a synonym for “price”. Some commodities, such as those that give rise to substantial externalities, may have a value which is very different from their price. Nevertheless, given the difficulties of defining a unit of measurement for human happiness, value is typically assessed with reference to the prices of marketed commodities. The value of non-marketed commodities or commodity attributes is then expressed in terms of the monetary expenditures which would achieve an equivalent impact on human happiness (“utility”). (OECD 2005)

Waste Management means collection, transport, recovery and disposal of waste. (OECD 2005)

Waste Prevention (waste avoidance, reduction at source) means strict avoidance of waste generation both qualitatively (elimination of hazardous substances) and quantitatively, *i.e.* reducing material and energy intensity. Prevention includes: i) strict avoidance; ii) minimisation of hazardous substances, and material and energy intensity; and iii) re-use of products. (OECD 2005)