Environment Protection & Heritage Council

Consultation Regulatory Impact Statement (RIS) on Revised National Packaging Covenant

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TABLE OF CONTENTS

TABLE OF CONTENTS (cont.)

TABLE OF CONTENTS (cont.)

TABLE OF CONTENTS (cont.)

1 EXECUTIVE SUMMARY

The Environment Protection & Heritage Council (EPHC) is currently considering the appropriate future policy approach for managing packaging's environmental impacts.

The National Packaging Covenant (Covenant) and the related National Environment Protection Measure (NEPM) for Used Packaging Materials are the current leading framework for the management of the environmental impacts of the life-cycle of packaging in Australia.

This Regulatory Impact Statement (RIS) for the revised Covenant is intended to assist stakeholders and decision-makers in understanding the key impacts - expressed as economic, social and environmental costs and benefits - associated with the proposal to enhance the Covenant, including the potential introduction of performance targets.

1.1 Structure of the RIS

1.1.1 Scope

In keeping with the guidelines issued by the Council of Australian Governments (COAG), the RIS is structured to address problems in managing the environmental impacts of consumer packaging throughout its lifecycle, as well as to consider public policy objectives and options, including the potential role of regulation in addressing these problems.

The RIS also assesses the impacts of the potential changes resulting from the preferred approach. This includes the net economic, social and environmental costs and benefits to our society, quantifying them wherever possible given data limitations. In terms of potential changes from the preferred approach, the RIS has assumed the achievement of specific environmental management performance levels to enable meaningful analysis. It is important to do this to determine whether it is worthwhile and justifiable to pursue the preferred approach.

1.1.2 Method

The main method used in the RIS is known as the "triple bottom line" assessment method. This method was selected because conventional cost / benefit analysis is generally limited to consideration of largely financial and economic aspects, and does not suitably account for the costs and benefits of a policy approach to the environment and society more broadly. "Triple bottom line" assessment enables insights in terms of broader sustainability, including the inter-generational equity of decision-making.

The "triple bottom line" method has three components. First, the economic cost / benefit of the selected approach was established, including direct and indirect costs / benefits and their distribution. Secondly, the environmental costs and benefits of the selected approach were calculated in environmental externality terms. Thirdly, social impacts are considered. If the social impacts are deemed significant, an adjustment is made to the overall economic / environmental valuation. In total, the method enables a general estimation of the net welfare impact of a given proposal.

It is noted that the environmental assessment for this RIS is strategic in nature and based on existing data sets and methodologies. Economic valuation of environmental gains and impacts (as applied for this impact assessment) aims to aggregate complex information in a more meaningful way. This approach is particularly challenging as it requires a seemingly definitive assessment of systems that are dynamic and indeterminate. On balance, the approach is increasingly used for environmental decision making in Australia.

Economic environmental values from the Independent Assessment of Kerbside Recycling undertaken at the commencement of the current Covenant have been applied as the basis for assessing the environmental benefits of the revised Covenant proposal, including its four target areas. In this context, it is important to note that the final dollar valuation is not intended to represent actual environmental benefits but rather to indicate the relative significance of environmental results for different targets and financial costs.

1.2 Evaluation of Options

The RIS evaluated the following options to address the lifecycle management of used consumer packaging:

- Do Nothing – revert to pre Covenant management; or
- Do Nothing Further – renew the Covenant in its current form; or
- Enhanced Covenant – adopt a strengthened Covenant, addressing shortcomings identified in various evaluations; or
- Alternative Approaches – adopt options other than voluntary or co-regulatory approaches. These included mandated approaches such as advanced recycling fees, container deposits, take back and utilisation and increased landfill levies.

Each policy option has been assessed against a range of evaluation criteria which cover detailed critical success factors for environmental public policy including a range of administrative and operational issues, cost issues, environmental outcomes and stakeholder perspectives. Each option was assessed against evaluation criteria at three linked levels:

- a general or overview level;
- using a point scale based on performance indicators which reflect best practice guidelines for impact assessment; and

- in terms of its potential implications for stakeholder groups, including business in the packaging supply chain, smaller business in the packaging supply chain, the general public, local government and other governments.

1.3 Key Results

1.3.1 Assessment of policy options

The RIS determined that:

- When evaluated against a set of holistic criteria for public policy effectiveness, the revised Covenant/NEPM package performed better than other alternative policy approaches. While other approaches could potentially produce higher environmental benefits, they would also be more difficult to implement and would most likely involve a greater economic and social impact than the revised Covenant / NEPM package.

- The revised Covenant/NEPM package offers the best alternative at this point in time from the perspective of

    - supporting innovation in product and system design beyond compliance;

    - addressing the whole of lifecycle of packaging rather than specific components of it;

    - addressing the whole of the post consumer packaging stream; and

    - best reflecting Australia's demographic, economic and governmental structures.

It rated more highly than "more lenient" approaches (such as a return to a fully voluntary approach or continuation of the current Covenant) in terms of probable environmental performance. Because it more specifically provides guidance for organisations on compliance, performance targets and measures, and has a regime for (theoretically) penalising those that fail to act, it motivates a greater level of environmental performance than voluntary efforts.

It also rated more highly than more prescriptive approaches - such as Extended Producer Responsibility Schemes (EPR) schemes - on implementation and achievability type grounds. Because it still allows for a significant degree of flexibility in how individual and overall targets and measures are to be achieved, it is seen as imposing a lower burden (and cost) on the total system.

In sum, it was the best "allrounder" of the considered delivery mechanisms.

1.3.2 Assessment of Preferred Option

In assessing the revised Covenant model, consideration was given to broad costs and benefits resulting from the revised Covenant including data collection, monitoring, reporting and administration costs to government and business as well as impacts arising from operational and design changes, education and communication with employees, clients and consumers and expansion and uptake of recycling systems.

Particular focus was applied in the "triple bottom line" assessment to four areas nominated by EPHC Ministers for inclusion as overarching performance targets in the revised Covenant:

- Increase in packaging recovered for recycling and decrease in packaging disposed of to landfill
- Reduction in the use of non-recyclable packaging
- Increased use of recycled packaging materials in new products
- Continuous Performance Improvement demonstrated by individual signatories in action plans

At the time of authorship of the RIS, the final regime / level of the performance targets continues to be developed in consultation with stakeholders. Therefore, a range of performance achievement possibilities – as advised by EPHC officials - was considered and modelled where possible to determine potential impacts.

The recycling target was modelled against two baseline recycling rates, 40 per cent and 50 per cent, selected to represent the lower and upper limits of current recycling rates from domestic and commercial industrial sources combined as indicated by available data. Further work since the modelling contained in this RIS suggests that the current baseline is around 47% recovery, a figure accepted by all paries involved in the targets discussion.

From these baselines, increases in recovery have been modelled as follows:

- To 55 per cent, 65 per cent and 75 per cent respectively by 2008, and;
- To 60 per cent, 70 per cent and 80 per cent respectively by 2010.

Modelling has looked at the potential for increased recovery and contribution from the domestic sector though kerbside recycling and from the away-from-home sector (eg,, public places and venues, workplaces, shopping centres, hotels, and institutions).

The possible recycling targets were selected to cover a relatively wide range and reflect the range of proposals suggested by stakeholders. It is noted that the higher recycling targets (75% - 80%) may not be achievable or practicable for some materials, whereas it may be more realistic for others. The modelling focuses on the costs and benefits of each target, not the implementation steps, practicality or desirability of achieving it.

The landfill reduction target has been assumed to flow from an increase in recovery rates, factoring in changes in packaging consumption, economic growth, population growth and changes in household size.

A qualitative discussion has been included about issues which may need to be considered if a numeric target is assigned to set targets for the amount of packaging which is not recyclable or to drive market growth for recyclate in particular areas.

The analysis of the impact of a continuous improvement target focussed on a number of potential indicators of improvement:

- Increasing participation of the packaging supply chain from the current 80 per cent baseline to 90 per cent;

- Continued light weighting of major packaging material groups by an average decrease in weight per unit of 1 per cent to 5 per cent across all materials (on a net basis), and;

- Minimum improved environmental performance of industry signatories by between 2 per cent and 5 per cent.

One of the critical factors underpinning the ability of the revised Covenant to deliver against established targets and to demonstrate improvement against the proposed Key Performance Indicators (KPIs) will be the development of an Implementation Strategy by the National Packaging Covenant Council. This will be used to guide action by signatories and other parties and funding priorities under the Covenant.

This Implementation Strategy will be particularly important in determining which locations and actions will reap the greatest gains in better lifecycle management of packaging, including increasing recycling and market support. It is not envisaged that all of the areas modelled in the RIS would receive equal emphasis. Some will clearly offer greater opportunities for focus because they yield greater and more easily accessible quantities of materials. For example, it would appear to be initially more effective to establish recycling systems in large institutions such as universities and hospitals, major entertainment and sporting venues than to attempt to engage a large number of additional small businesses.

It is not envisaged that all actions which will contribute to the targets will need to be funded under the Covenant. For example, the costs of participation in recycling by some business and commercial premises such as shopping centres can often be offset by their disposal savings. The RIS does not attempt to differentiate between the relative merits of action in any of the areas modelled.

1.3.3 Key Impacts of the Preferred Option

In summary, the RIS determined the following aspects:

- When evaluated against a set of holistic criteria for public policy effectiveness, the revised Covenant / NEPM package performed better than other alternative policy approaches. While other approaches could potentially produce higher environmental benefits, they would also be more difficult to implement and would most likely involve a greater economic and social impact than the revised Covenant / NEPM package.

- While there will be different effects on different stakeholder groups, the financial costs of the revised package are likely to exceed its financial benefits. However, the total financial cost of the revised Covenant is estimated to be $31m - $46m. In large measure, these costs will be borne by business and ultimately passed on to consumers. These costs are largely attributable to increased participation in commercial and industrial resource recovery initiatives.

- Businesses undertaking increased packaging recycling are likely to have average increased financial costs of between $50 and $100 per business per year (or between $25m and $50m nationally). These businesses could be Covenant signatories or other businesses that take up increased opportunities to recycle.

- In terms of the distribution of financial costs, smaller business signatories – those with a turnover of less than $10m per year and comprising approximately one-third of current Covenant signatories - are likely to face disproportionately higher net costs than big business under the revised Covenant package. This situation arises largely because of the costs associated with preparing action plans and annual reports. It is estimated that these costs will be somewhat in excess of $2,000 per year.

- It is likely that local government will incur some savings from the revised Covenant. Costs associated with the provision of additional away-from-home recycling services by Councils ($3m - $6m) may be offset by cost reductions in the provision of kerbside recycling (resulting from improved efficiencies and materials yields) ($18m – $51m). These cost estimates are average predictions for the local government sector in general and may not apply to each individual local Council.

- Significant environmental benefits will arise from the revised Covenant. This is attributable to greater gains from increased resource recovery of packaging, as well as improved product stewardship by private sector companies in packaging's environmental life-cycle.

- To determine the effects of increased packaging recycling on quantities of packaging waste disposed of to landfill, the packaging waste to landfill was calculated by subtracting the amount recycled from the amount of packaging consumed (accounting for economic and population growth). For all modelled targets - and for both baselines the amount of packaging disposed to landfill will reduce from current levels. The extent of the reduction varies dependent on targets and baseline assumed.

- The social impact of the revised Covenant package is negligible to somewhat beneficial.

Table 1.1: Summary of Financial Costs and Benefits of Revised Covenant

Category	Enhancing the Covenant
	Cost per year ($)
Costs	
- Business	Medium Cost (39m to 82m)
- State and Federal Government	Negligible cost (0.35m)
- Local Government	Medium benefit (8.5m to 37m)
Total Costs	$30m to $45m

1.4 SUMMARY OF KEY AREAS FOR FEEDBACK

In undertaking this assessment, it needs to be recognised that there are significant limitations and complexities in attempting to quantify the economic, environmental and social costs and benefits of packaging materials. To some extent, this situation arises from limitations in the availability of data and the time available to undertake the RIS. There are a number of factors adding to the complexity of the cost/benefit analysis including the heterogeneous nature of waste materials, and the fact that the costs and benefits are frequently highly dependent on site-specific economic and environmental factors such as the proximity of the waste stream to recycling facilities, the cost of appropriate land for landfill disposal, and severity of associated environmental problems (eg. air quality). Given this situation, it is important that the figures which appear in the cost / benefit analysis are regarded as indicative rather than exact.

The authors of the report and the EPHC welcome feedback from business, local government, environment groups and the broader community on the RIS' overall contents and findings. The following table highlights particular areas where feedback is sought, including references to the relevant sections of the document.

Any feedback should be directed to the address below by Thursday 19 May 2005 (electronic submissions are preferred where possible).

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Table 1.2: Summary of Areas Where Feedback is Sought

Description of Where Feedback is Sought	Reference
*Feedback **from businesses** is sought in relation to the estimated administrative costs to Covenant signatories, including a breakdown of the cost of developing an action plan and monitoring and reporting of KPIs.* *These costs could include the average time spent by individual businesses implementing the administrative and record keeping requirements of the Covenant and the cost of that time to the business.*	• Section 8.2.1 Costs – Impacts across all Target Areas (Pg. 88) • Section 8.3 Monitoring, Reporting and Administration a) Businesses (Pg. 99)
*Feedback **from small to medium-sized businesses** is sought in relation to the estimated administrative costs to Covenant signatories, including a breakdown of the cost of developing an action plan and monitoring and reporting of KPIs. Existing signatories should draw upon their experience in the current Covenant.* *These costs could include the average time spent by individual businesses implementing the requirements of the Covenant and the cost of that time to the business.*	• Section 8.2.1 Small businesses (Pg. 88).
*Feedback **from businesses** is sought in relation to the expected economic benefits to businesses likely to result from participation in the Covenant. Existing signatories should draw upon their experience in the current Covenant.*	• Section 8.2.2 Benefits b) Business – Impacts across all Target areas (Pg. 95)
*Feedback **from local government** is sought regarding potential opportunities for local government to increase recovery of used packaging materials through measures such as adoption of best practice and use of improved collection systems, including expected associated costs and potential barriers.*	• Section 8.2.2 Benefits c) Local Government – Impact across all Target Areas (Pg. 95) • Section 8.4.3 Impacts a) Economic – Overarching Targets – Increased Packaging Recycling (Pg. 106)
*Feedback **from local government** is sought on the estimated cost per bin per week of introducing / expanding public place recycling to major public places (eg. high streets, parks, gardens and recreational areas such as beaches) within their municipality.*	• Section 8.4.3 Impacts of Overarching Target Area – Increased Packaging Recycling a) Economic (Pg. 106)
*Feedback from **shopping centres or public venue owners** on*	• Section 8.4.3 Impacts of Overarching Target

Description of Where Feedback is Sought	Reference
estimated costs/bin and potential barriers.	Area – Increased Packaging Recycling a) Economic (Pg. 106)
*Feedback **from businesses** is sought on any costs incurred through introduction of business recycling services (including costs of in-house source separation).*	• Section 8.4.3 Impacts of Overarching Target Area – Increased Packaging Recycling a) Economic (Pg. 106)
*Feedback **from existing and potential Covenant signatories** is sought on the extent to which your organisation could contribute to increased recovery of packaging, including expected associated costs and potential barriers.*	• Section 8.4 Overarching Target Area – Increased Packaging Recycling (Pg. 102).
*Feedback **from existing and potential Covenant signatories** is sought on the extent to which your organisation could reduce your use of non-recyclable packaging, including expected associated costs and potential barriers.*	• Section 8.5 Overarching Target Area – Reduced Non-Recyclable Packaging (Pg. 124)
*Feedback **from existing and potential Covenant signatories** is sought on the extent to which your organisation could increase your use of recycled packaging materials (ie. increased recycled content) in new products, including expected associated costs and potential barriers.*	• Section 8.6 Overarching Target Area – Increased Use of Recycled Packaging Materials in New Products (Pg. 134).

2 INTRODUCTION

In 2004, the effectiveness of Australia's current national policy framework for addressing the environmental impacts of packaging – the National Packaging Covenant and the related National Environment Protection Measure (NEPM) for Used Packaging Materials - was independently reviewed. Subsequently, proposals for a revised Covenant / NEPM package – prepared by the National Packaging Covenant Council – were publicly circulated for stakeholder feedback.

The Environment Protection & Heritage Council (EPHC) is currently considering the appropriate public policy approach to environmental impacts of the life-cycle of packaging in Australia. At its December 2004 meeting, the EPHC considered progress in policy development, including the potential introduction of a revised Covenant / NEPM package. At that meeting, the EPHC resolved to "incorporate real targets to measure the achievements of the future Covenant term" (EPHC; 2004) and tasked officials to work with stakeholders to develop overarching targets. At its April 2005 meeting, the EPHC is scheduled to further consider relevant matters.

2.1 Purpose of Impact Statement

This Regulatory Impact Statement (RIS) for the revised Covenant is intended to assist decision-makers and stakeholders in understanding the key impacts - expressed as economic, social and environmental costs and benefits - associated with the proposal to enhance the Covenant.

This RIS should be read in conjunction with:

- "A Commitment to the Sustainable Manufacture, Use and Recovery of Packaging" - the proposal for a revised National Packaging Covenant by the National Packaging Covenant Council;
- "Independent Evaluation of the National Packaging Covenant" by Nolan-ITU Pty Ltd, commissioned by the National Packaging Covenant Council;
- "Local Government Evaluation of the National Packaging Covenant" by Meinhardt Infrastructure & Environment Pty Ltd, commissioned by the Australian Local Government Association;
- "Review of the National Packaging Covenant" by the Institute for Sustainable Futures, commissioned by the NSW Nature Conservation Council and funded by the NSW Department of Environment & Conservation;
- "Action Plan Review" by Matthew Warren commissioned by the National Packaging Covenant Industry Associationand;
- Previous Regulatory Impact Statements on National Packaging Covenant and the National Environment Protection Measure.

This RIS is designed to meet the requirements and expectations of both the EPHC and the Council of Australian Governments (COAG). Both these policy bodies require analysis of policy options and a transparent process.

COAG's "Principles and Guidelines for National Standard Setting and Regulatory Action by Ministerial Councils and Standard-Setting Bodies" (last confirmed by COAG in June 2004), state that a RIS should address the following types of questions, particularly the fifth one below:

- Is regulation / policy needed?
- Is regulation / policy likely to improve upon market outcomes?
- Is regulation needed to address the problem?
- What are the alternative approaches to dealing with the problem?
- **What are the likely costs and benefits of the proposed regulation / policy?**
- What is the feedback from consultation on the proposed regulation / policy?

The COAG Principles also strongly advocate systematic and quantitative analysis, such as cost / benefit analysis, to establish the most efficient form of policy to be taken.

An integrated "triple bottom line" assessment method, which builds on conventional cost/benefit analysis, has therefore been used in this RIS. This method seeks not only to calculate economic costs and benefits, but also to monetise environmental costs and benefits in indicative Eco-dollar terms. Together with consideration of social impacts and their influence on overall results, this enables a general estimation of the net welfare impact of a given proposal.

For the purposes of this RIS, limited consideration of the NEPM is included, as it is designed as the key driver of Covenant participation and activity. This consideration includes Governments' cost of administering the NEPM. However, more detailed discussion of the impacts of the NEPM which applies to brand owners who elect not to participate in the Covenant, or who fail to meet its requirements, is the subject of a separate Impact Statement.

2.1.1 Limitations of the RIS

A number of limitations and qualifications should be noted.

First, the RIS needed to be completed in an extremely short timeframe, eg, less than four months. By comparison, an impact assessment of the European Packaging Directive was conducted over more than a year, had access to more established data sets, and only then provided indicative findings on an existing policy's effectiveness.

Secondly, while data sets in the area of packaging and its environmental performance in Australia have significantly improved in recent years and continue to do so, there is a relative paucity of quantitative information and evidence in key areas, such as current levels of usage of recyclate in product manufacturing. As a result, the RIS in part relies on a variety of assumptions and performance predictions.

Thirdly, the final regime / level of performance targets for a revised Covenant is still under policy development at the time of authorship of the RIS, therefore, a range of possibilities has been considered and modelled to examine potential impacts. Determined by the RIS team for the sole purposes of assisting the assessment, these target and achievement ranges should not be interpreted as endorsed public policy, as they are only analytical devices at this stage.

Lastly, the RIS has focussed on establishing the potential costs and benefits of assumed performance achievements of a preferred approach. This is worthwhile to determine whether the preferred approach merits pursuit, eg. what is it likely to do to address the identified problem? It has not, however, looked in detail at: a) the practicability of achieving those performance levels, or b) the costs and benefits of the very many "how tos" of achieving those performance levels.

3 STATEMENT OF THE PROBLEM

As outlined in the 1999 Impact Statement for the draft National Environment Protection Measure for Used Packaging Materials, packaging performs a range of important functions which deliver positive benefits to the community and environment. It:

- serves many useful purposes and plays an important role in preserving, protecting and marketing products during their storage, transport and use;
- reduces damage or wastes and plays an important public health function by protecting and preventing the contamination of food and beverages; and
- through it's labelling, informs consumers about a product's characteristics and qualities and can help them make informed purchasing decisions.

In situations where a heavily urbanised society requires food and beverages to be produced at a distance from its consumption, packaging ensures less spoilage and damage, more effective transport, and reduced energy and labour requirements.

Packaging can also protect people and the environment by safely containing hazardous materials during storage, handling and transport.

While packaging performs a critical role in any modern society, there is also a multi-faceted problem inherent in its environmental life-cycle. Many of the dimensions of the problem were stated in 1999 when the current National Packaging Covenant was introduced. In large measure, they remain true today, as consumer packaging is ubiquitous in any modern society and therefore a persistent issue.

As stated in the 1999 Impact Statement for the NEPM:

> *"There is a range of environmental costs associated with the production, use and disposal of packaging.*
>
> *The production of some types of packaging is energy intensive and can generate solid wastes which may contain impurities and hazardous substances. Some materials generated during production, such as off-cuts and scraps, can be reused within the production process. Solid wastes need to be appropriately managed or disposed of in order to avoid risks to people or damage to the environment. Production of some packaging types (eg aluminium) from secondary materials requires less energy than the production of the same package from virgin materials.*
>
> *The production of packaging may also result in liquid and gaseous waste emissions, which can be associated with potentially serious air and water pollution and other environmental problems. Effective control and treatment of emissions may be required, prior to their release into the environment.*

Most energy production and use results in the generation of carbon dioxide and other greenhouse gases which contribute to global warming.

If not effectively disposed of, packaging can cause environmental impacts such as litter. Litter detracts from the attractiveness of the natural environment and artificial landscapes, can interfere with and harm wildlife, can be a danger to people, and can be widely dispersed making it difficult and costly to collect.

Packaging accounts for a significant component of municipal waste and, as a consequence, is a contributor to landfill costs and impacts." (NEPM 1999)

The Regulatory Impact Statement for the current Covenant equally stated:

"Negative impacts of packaging and paper occur particularly in relation to the extraction of materials, manufacture of packaging and paper, transport and disposal. The material extraction and manufacturing stages of packaging and paper lifecycles involve energy-intensive processes that produce solid, liquid and noxious gaseous wastes, greenhouse gases and ozone-depleting substances. These wastes can adversely affect human health, the quality of air, water and soil, and the integrity of ecosystems."

The above environmental aspects in turn create structural issues in terms of their management, as well as community and stakeholder viewpoints. These environmental, structural and community dimensions of the "packaging problem" are described below.

3.1 Environmental Dimension

3.1.1 Consumption

The value of the total packaging market in the world is estimated to be around US$500 billon and the global packaging industry represents approximately 1-2 per cent of world GDP.

Per capita use of packaging is considerably higher in the industrialised parts of the world. (Packforsk, 2001). However, the total quantity of packaging used per capita varies greatly even within the industrialised world with, for example, 85 kilograms per person per year in Finland, 110 kilograms in Sweden, 144 kilograms in Austria and 212 kilograms in France in Year 2000 (ASSURRE, 2003).

Packaging consumption in 2003 in Australia is estimated at 171 kilograms per person. The total quantity of packaging in Australia is estimated at 3,312,065 tonnes in 2003, and of this 1,231,000 tonnes, or 36 per cent, originated from the domestic sector. (Nolan-ITU, 2002; 2004). The consumption figure excludes the mass of packaging which comes into Australia on filled/finished products. This data is not currently available.

The Institute for Sustainable Futures' analysis of available data sources (including Euromonitor, 2003a, 2003b, 2003c, 2003d) suggests that – at least on a global basis – the generation of packaging is increasing. As further outlined in Section 8.1 of the RIS, there is every reason to believe that this trend is true of Australia as well, given its consistent economic growth in recent times, as well as some population growth.

3.1.2 Life-cycle Impacts

Packaging plays an important role in preserving, protecting and marketing products during their storage, transport and use. Packaging reduces damage and waste and plays an important public health function by protecting and preventing the contamination of food and beverages. These functions of packaging provide environmental benefits through avoided food and other product waste. For example, the 2003 Australian Food and Grocery Council (AFGC) Environmental Report states that food wastage and spoilage is significantly reduced through packaging. The majority of food wastage occurs on fresh food and from food scraps. Australians throw out almost 2.2m tonnes of the 11.5m tonnes of food consumed at home. Similarly, losses of packages product in transportation and retailing is generally low compared with a loss rate of 10-20 per cent for fresh food.

There are, however, a range of environmental impacts of packaging which can be broadly allocated between four phases in the life-cycle of packaging:

- extraction of raw materials;
- production and manufacturing;
- distribution, consumption and use; and
- post-consumption, including disposal and waste management.

The life-cycle production of packaging uses energy and resources, generates solid waste, and releases emissions to air and water. The management of materials and waste during the production and other life-cycle phases will affect the overall environmental impact of the package. For example, some materials generated during production, such as off-cuts and scraps, can be reused within the production process. This has the affect of reducing raw material and resource consumption impacts. Production of some packaging types from secondary materials requires less energy than the production of the same package from virgin materials. This has the affect of reducing global warming emissions.

If not effectively disposed of, packaging can cause environmental impacts such as litter. Litter detracts from the attractiveness of the natural environment and artificial landscapes can interfere with and harm wildlife, can be a danger to people, affect civic pride and can be widely dispersed making it difficult and costly to collect. Packaging accounts for a significant component of municipal waste, as well as away-from-home waste which primarily ends up in the commercial and industrial waste stream. As a consequence, it is a contributor to landfill costs and impacts.

Any environmental comparison of packaged products needs to consider both the product and the package and impacts arising across the respective life-cycles. The impact of the product may be as great as or greater than the impact of the package. When looking at, for example, Tetra Brik milk packaging, the packaging itself is reported to be just 13 per cent of the total environmental impact compared to the milk, including its resource usage.

Environmental impacts vary markedly between packaging materials (Abildgaard, 2000) and as a consequence, between the credits that are derived from recycling materials. For example, studies illustrate that energy use, and associated greenhouse gas emissions, are relatively high for virgin aluminium use. The recycling credit is subsequently high. During fibre and board production there is a significant impact on water usage while for some plastics the production of air pollutants is relatively high.

To properly identify and assess the environmental impacts of recycling and materials management options, comprehensive life-cycle assessment data is required. In this way, impacts associated with all emissions and the resource and energy use of packaging can be incorporated into decision making.

The impact of different packaging materials can also vary according to whether the feedstock is virgin material or recycled content material as shown below.

Table 3.1: Embodied Energy of Packaging Materials

Material type	Embodied Energy – virgin material (MJ/kg)	Embodied Energy Savings per kilogram of recycled material compared to an equivalent virgin material (%)
Aluminium	215.0	93
Glass	28.3	57
Steel	54.6	79
PET	77.6	76
HDPE	76.1	79
PVC	58.2	80
Paper/Cardboard	40	>22

(Sustainable Packaging Alliance 2004)

To some degree, some of the environmental costs from the pre-consumer phases of the packaging life-cycle are internalised in product prices. Governments set minimum standards for the environmental performance of industrial facilities, such as permissible emission levels, through policy, regulations, licensing, and law. However, many of the environmental costs remain external to pricing systems and the market place, particularly in the consumer and post-consumer phases of the life-cycle. This includes costs such as greenhouse gas emissions, air and water pollution and possible resource depletion from the production and usage of packaging. It should be noted that the externalities associated with post consumer management are but one component. There is debate over the size of these externalities cost and, indeed, the best way for these to be addressed.

It has also been clearly demonstrated that consumers focus on the product contained within the packaging with little thought for the package itself. For example, in a project for the NSW Jurisdictional Recycling Group (2004b) on consumer motives and behaviour, it is concluded that concern about environmental impacts and packaging is comparatively limited. Price, taste, quality and convenience factors are the most significant aspects for the public when choosing between different products. Only three per cent of the people in the survey mentioned factors related to the environmental performances of packaging such as recyclability, biodegradability and re-useability.

3.1.3 Post-Consumption

Packaging is short lived in the community compared with its longevity when disposed to landfill. The decomposition of packaging in landfills results over time in the production and emission of landfill gases such as methane and carbon dioxide which both, especially methane, contribute to global warming. Another problem arising from landfills is the leakage of water contaminated with waste-derived chemicals with the potential to cause damages to the environment (Waste Service NSW, 2004).

Of the total of 3.3 M (Nolan-ITU, 2004, for NSW JRG) tonnes of packaging consumed in Australia in 2003 and 2004, it is estimated that:

- 1.05 million tonnes were recovered for recycling from the commercial and industrial sector;
- 665,000 tonnes were recovered for recycling from the municipal sector; and
- 1.6 million tonnes were disposed of to landfill of which 566,000 tonnes were from the municipal / domestic sector and 1.14 million tonnes were from the commercial and industrial sector.

This would suggest an estimated net national recovery rate of used packaging of approximately 47 per cent in 2003.

In 2003, it is estimated that the 566,000 tonnes of municipal packaging that were sent to landfills corresponds to nine per cent of the total quantity of municipal solid waste disposed of to landfill. Large quantities of packaging are also disposed of into the commercial and industrial (C&I) stream which is the main recipient of away-from-home materials. The actual quantities disposed of are likely to be significant, based on estimates of consumption between domestic and away-from-home. For example Beverage Industry Environment Council (BIEC) member companies estimate that up to 75 per cent of their product sales go into away-from-home venues. Accurate data on packaging disposed of in the away-from-home sector is not, however, available.

It should also be noted that some packaging that is inappropriately disposed of becomes litter in the built and natural environment. There is no consistent Australia wide methodology for measuring the amount of packaging in the litter stream. According to the Litter Characterisation Survey in the *New South Wales Litter Report 2004* (DEC, 2004c) the most commonly littered objects in New South Wales, by volume are: cigarette butts (34%), paper (27%), plastics (25%), metals (5%) and glass (3.5%). When looking at littered material by weight, cigarette butts made up 38.8 per cent; paper, glass, plastic and non ferrous material amount to a combined 46.4 per cent of the total

3.2 Management of Used Packaging in Australia

The environmental impacts of packaging are influenced or managed at several different levels:

- By the packaging supply chain as part of product stewardship.
- Through provision of resource recovery collection systems and reprocessing facilities

3.2.1 Product Stewardship

The dominant environmental impacts associated with the packaging life-cycle (excluding the product impacts) occur during the life-cycle phases of raw materials extraction and product manufacture. This is a consistent finding of life-cycle data and models from throughout the world including the models Eco Invent (Germany); DST (US EPA); and Simapro (Netherlands). This finding suggests that there is a high potential to influence the environmental performance of packaging through product stewardship initiatives.

Industry can influence the management and environmental impacts of packaging through its control over the supply, design, manufacturing, and distribution phases of the packaging life-cycle. In terms of post-consumer aspects, there have been numerous examples of product stewardship by individual companies, industry associations and sectors to positively influence and support recovery of more used packaging for recycling. Product stewardship initiatives by industry have included work with local Councils to improve kerbside recycling and drop off systems, to improve litter bin and recycling bin placement at events and in public places, work with key commercial sectors such as hotels and hospitality to increase recycling, a wide range of community education and awareness initiatives and market development initiatives.

Improvements to packaging design to reduce environmental impacts can be achieved through re-design to change the material or combination of materials used, improved production processes and better information for consumers. Recent initiatives have been described in Action Plans under the current Covenant. Examples from specific company actions include:

- 17 per cent reduction in outers;
- reductions in 40 tonnes of packaging material per annum from packaging trials;
- down gauging of paper cores by 25 per cent for kitchen tidy bags; and
- decreased overall virgin board consumption by 6 tonnes/year.

One industry response to product stewardship has been the development of Action Plans under the National Packaging Covenant.

3.2.2 Resource Recovery

There are several established methods to address the environmental impact of packaging in its post-consumer phase through resource recovery. These are: kerbside recycling of domestically consumed packaging; recycling of packaging consumed in commercial and industrial settings, and recycling of packaging consumed in public places and at events.

a) Kerbside Recycling

Between 85 and 90 per cent of Australia's population has access to a kerbside recycling service. Some communities also offer drop off collection points.

Volumes of material have increased dramatically since 1999. Revenue from the sale of collected recyclable material, and savings from avoided garbage disposal, does not always match the financial cost of conducting domestic kerbside recycling programs. However, the cost effectiveness of systems is improving. The proportion of Councils with some form of "best practice" kerbside recycling – in terms of collection systems, contractual arrangements, and educational programs - is at an unprecedented level and continues to grow.

Costs can also be dependent on fluctuations in commodity markets – both virgin material prices and recyclate prices – many of which are determined by global factors.

The current National Packaging Covenant, through its industry, State and Commonwealth government signatories, has sought to fund improvements to kerbside recycling. However, receipt of funds has been limited to local government signatories of the Covenant.

b) Away-from-home Systems

In addition to recovery from households through drop off and kerbside systems, post-consumer packaging can be recovered from many "away-from-home" locations. These are estimated to make up in excess of 50 per cent of packaging generated and include settings such as public places, special events, recreational areas, shopping centres, workplaces, industry, institutions (eg, universities, hospitals) and transportation hubs.

In terms of recovery of packaging from the away-from-home sectors, the majority of activity exists on a largely market basis. Recovery rates are shaped by market factors, such as reprocessors' demand for recyclate (particularly cardboard), concentration of volume by location, and waste generators' willingness to pay for environmental outcomes. Indeed, as an indication of the reasonably high level of development of commercial and industrial recovery, it can be noted that the majority of recyclate recovered in Australia emanates from a small number of firms who are major commercial clients of recovery and reprocessing companies.

By contrast, research by Government agencies has determined that recovery from small to medium size enterprises (such as "High Street" shopping centres) and office blocks is comparatively underdeveloped. In these sub-sectors, volumes are not concentrated; there are significant logistical issues with recovery, and; there is a lower willingness / capacity to pay for environmental outcomes. Additionally, there have been contractions in the recyclate collection industry, as commodity prices have shifted. Hence, there is market failure.

In terms of away-from-home recycling, including recycling in public places, recreational facilities, and at public events, the "system" is essentially in its infancy with very low recovery rates. (The notable exception is South Australia where the container deposit scheme provides a recovery system for beverage containers, but not all packaging). Brand owner sources report that, while there is no definitive data, it would appear that the amount of packaging going into away-from-home consumption is increasing compared to packaging consumed in domestic settings. This would appear largely due to changes in both demographics (eg, smaller family units, increased dining out) and industry practices (eg, access to expanding markets). The development of recovery practices does not appear to have mirrored this trend.

There have been a range of initiatives to trial and implement systems for recovery in away-from-home settings, and there is a growing body of knowledge about which systems work most effectively in particular settings. Again, while there is no definitive data, it would appear that the presence of recycling infrastructure in away-from-home settings could be characterised as follows:

- Not widely available to members of the public;
- Inconsistent in their infrastructure and signage design;
- Inconsistent in terms of materials targeted;
- Subject to higher levels of contamination, and;
- Not significantly promoted to potential users.

Equally, there has been only limited discussion and work to address the issue of responsibility in terms of away-from-home recycling infrastructure. Greater detail on the current operation of away-from-home recycling and its potential future is at Section 8 of the RIS.

In general, and while there is largely only anecdotal evidence, packaging recovery chain sources report that net recovery rates for packaging consumed in away-from-home settings would appear to be low.

3.3 Used packaging - Attitudes & Behaviours

3.3.1 Attitudes & Concerns

a) Attitudes about Environment, Waste & Packaging

Australians' attitudes toward the environment, waste and packaging are complex. However, research paints an overall picture of people "wanting something done about packaging and wanting the opportunity to do something about packaging".

The majority of Australians are concerned about the environment, and rank waste and/or garbage disposal in the top five or six issues of environmental concern (ABS, 1998, ABS, 2003, NSW EPA, 2000, DEC NSW 2003). While environmental concern in the community remains high, it has declined steadily over the last decade (ABS, 2003).

The main drivers of the level of environmental concern appear to be the immediacy of the environmental problem, combined with the perception of whether there is a solution at hand, and the level of concern about other issues, such as unemployment (BCA, 2004). This is seemingly reflected in the current state of environmental concern in Australia.

One theory for this shift is that the solution at hand (i.e., environmental management, including availability of programs such as domestic recycling) has significantly improved over the last decade. With the shift away from manufacturing and toward a services and knowledge economy in many major metropolitan areas, there is often less direct evidence of environmental neglect, and global issues are difficult to relate to for many people (Chalke, D, NEEC Conference Presentation, 2003). Therefore, the community is less inclined to be actively concerned about environmental problems.

Another theory is that environmental concern has become an ingrained value with most Australians and therefore an issue they feel they don't necessarily need to nominate because its importance to Governments and business is already assumed. This theory is supported by the latest round of NSW EPA community attitudes research (DEC, 2003), which found that the 'environment' is the third most important *personal priority* in 9 out of 10 people' lives, after family and friends (DEC, 2003).

While there is less direct social research on community attitudes to packaging per se, a body of research, including by the Beverage Industry Environment Council and the Institute for Sustainable Futures, indicates that many Australian citizens would prefer government involvement in regulating packaging waste (BIEC, 1997; ISF, 2004).

A survey for EcoRecycle Victoria found that 98 per cent of respondents agreed that "the way we collect and dispose of waste in Victoria is an important environmental issue". Ninety-six percent believed "Governments have an important role to play in regulating products and packaging that commonly become waste" (ERV, 1998).

At the same time, and perhaps ironically, there appears to be very little demand from consumers for recyclability of packaging, recycled content in packaging, or environmental performance by products generally. The RIS addresses the behavioural aspect of this phenomenon in greater detail elsewhere.

b) Corporate Attitudes

There has been extensive analysis and commentary about major corporations' attitudes and motivations with regard to environmental performance, particularly in relation to major corporations and small-to-medium size enterprises. While it is beyond the scope of the RIS to fully consider this issue, it is worthwhile to mention at least one of the most recent references. Namely, a recently released major research study for the National Food Industry Strategy (NFIS) found the following:

> *"The key driver of change in relation to environmental sustainability is the need to identify and manage business risk. A factor of central importance is the possibility of losing access to natural resources due to community concerns… There is also a need to identify cost savings from more efficient use of inputs that have environmental implications in order to maintain competitiveness…"* (Allen Consulting Group; 2004).

This finding is particularly relevant, given that the vast majority of Australia's food and beverage manufacturing companies, and their packaging suppliers, are within the scope of the Covenant. In sum, while a debate can be had about its significance, it would seem that environmental sustainability is at least "on the radar" for larger business in Australia. Research suggests that larger businesses are also better able to cope with its demands due to their size, access to information, management structures, and other factors. A key indicator of the increase take-up of environmental sustainability thinking is the growth in the number of public corporate environmental reports, which have gone from a handful in the early 90s to more than 100 today. Several packaging supply chain members are now producing reports.

c) Smaller Business Attitudes

Some 33 per cent of the current Covenant's industry participants (or around 200 companies) are businesses with turnovers under $10m per year. Hence, they are most likely to be small businesses with less than 20 employees or SMEs with fewer than 100 employees.

The environmental impact of a smaller business may be less than that of a large corporation. However, the reality is that hundreds of thousands of combined smaller business in Australia can have a significant cumulative impact, including those in the packaging supply chain.

Compared to big business, less research has been conducted on the attitudes and approaches of smaller businesses in Australia to environmental management aspects. One national survey (Bubna-Litic & de Leeuw, 1999) of nearly 900 small businesses made the following findings:

- Two-thirds of respondents saw environmental management in their business as important or vital to their business;
- 59 per cent of respondents nominated waste management in their business as important or vital to their business, and;
- In terms of waste management, time and cost were nominated by the most respondents as the largest barriers to action.

3.3.2 Community behaviours

a) Recycling

Kerbside recycling is the most commonly cited behaviour performed by Australians to help the environment, with 95 per cent of Australians recycling waste (ABS, 2003).

Recycling would appear to tap into the community's desire to be involved in improving the environment. Recycling is a tangible and accessible way of "making a difference" (Nolan-ITU, 2000, ERV, 2003, BIEC, 1997).

Participation and presentation rates in kerbside recycling programs tend to average more than 70 per cent on a regular basis in Australian communities, making it one of the most, if not the most, pervasive civic participation program in Australia.

The high level of participation achieved in most kerbside recycling programs is behavioural evidence of support for the schemes. A 1997 BIEC study, found that over 92 per cent of respondents in each subject city claimed to be users of a kerbside recycling system.

In this same survey, when asked why they recycle, over 60 per cent of respondents indicated that they saw this as a "contribution to the environment and/or a good idea". This was easily the most frequent response. Next most frequent responses were "something we should do/our duty" (about 25% response), "convenient/easy/service is provided" (about 15%) and "not enough room in the garbage bin" (about 14%). Environmentally based motivation is thus the dominant factor.

Well over 80 per cent of respondents in each city were satisfied with their recycling service, a high level of satisfaction. Reinforcing this satisfaction, some 75 per cent of respondents expressed "no concerns" about their service. It is unlikely that this finding would have changed since the late 1990s as service levels have in many situations improved.

The high level of involvement in recycling suggests that any action to significantly reduce service levels would be met with concern.

b) Reuse

While the proportion of Australian households that reuse waste may have increased steadily over the last decade - from 40 per cent in 1994, to 83 per cent in 2000, to 85 per cent in 2003 (ABS, 2003) - many Australians apparently do not appreciate the significant contribution of reducing and reusing to waste minimisation (ERV, 2003). Reducing packaging waste is considered a sacrifice by many in the community, as it was associated with a change in shopping habits (ERV, 2003).

However, recent developments in terms of retail shopping bags are noteworthy as they appear contrary to previous research and expectations about reuse. Namely, there has been a rapid transition from plastic shopping bags to various forms of re-useable bags, and progress toward the targets of reducing bag usage by 25 percent by the end of 2004, and by 50 percent by end-2005.

Increased re-use of shopping bags has been characterised by:

- Active collaboration between industry, Government, and stakeholders;
- A concerted information and communication effort to explain the environmental implications;
- A simple, affordable, and accessible way to re-use, and;
- A known benefit or a minimum sacrifice from the re-use behaviour.

c) Purchasing

There is significant variation in research findings related to consumer's consideration of environmental aspects when purchasing products / packaging.

On the one hand, choosing environmentally friendly products would appear to be a commonly self-reported behaviour (ERV, 2001). The Australian Environmental Labelling Association (2003) recently investigated the status of consumer behaviour with regard to environmental considerations. They found that 64 per cent of consumers in the ACT consider the environmental impact of a product a relevant factor when purchasing (AELA, 2003). Assuming strong parallels to Australian consumers, the UK Social Market Foundation (SMF) think tank shows that 82 per cent of consumers prefer to purchase goods and services from companies that are socially and environmentally responsible. However, the vast majority is unable to put that principle into practice for a variety of reasons. Only 2 per cent of shoppers say they mostly have enough information to judge the ethical position of companies whilst 73 per cent say they lack such information most of the time (Warmer Bulletin E-News, September 2003).

On the other hand, EcoRecycle (2003) have found that cost and convenience outweigh environmental concerns in terms of purchasing decisions. In the BIEC study (1997), 62 per cent disagreed with the statement "I always look for products that are recyclable".

In a project for the NSW Jurisdictional Recycling Group (2004b) on consumer motives and behaviour, it was concluded that concern about environmental impacts and packaging is comparatively limited. When asking about product aspects disliked by the respondents, six per cent mentioned packaging, recycling or environmental issues. When asked purely about packaging, 16 per cent considered recyclability a positive attribute, while seven percent nominated a combination of refillability, reusability, small environmental damage and packaging made from recyclable material.

d) Littering

Packaging makes a significant contribution to litter. Ninety four percent of people identify that litter is a major environmental issue (BIEC, 2004). While Australians use bins twice as much as they litter (BIEC, 2004), the fact remains that people's littering is still a problem in some areas. Behaviour surrounding the incidence of 'casual' littering has been heavily researched over recent years, through the Littering Behaviour Studies conducted through BIEC. The research recorded the disposal method characteristics of people in public places, identifying eight littering behaviour types. They found that 'typical' littering behaviour does not exist and that many people may display more than one of the behavioural attributes described, depending on the situation, environment and/or the type of item they are handling.

3.3.3 Views on current management of used packaging

a) Local Government

Many in local government hold the view that companies in the packaging supply chain should take a greater degree of responsibility for the environmental impacts arising in the post-consumer phase of packaging, including more significantly contributing to meeting their financial cost.

Often local government's concerns are expressed as calls for Extended Producer Responsibility (EPR), which many local government stakeholders articulate as a method by which industry will take responsibility / pay for all or some of the financial costs of conducting kerbside recycling programs. Support for EPR – as expressed in surveys of Councils - was particularly noted in the "Local Government Evaluation of the National Packaging Covenant" prepared by Meinhardt Infrastructure and Environment Pty Ltd.

A significant number of local governments withheld participation in the current Covenant on the basis that, in their view, it does not sufficiently deal with perceived inequity in the delivery of the kerbside recycling system. A review of the current Covenant from the perspective of local government conducted by Meinhardt determined (Figure 3.1) the degree of local government participation. (It should be noted that the number of signatories in local government has increased since the review.)

Table ES1 Local Government Signatories

State / Territory	Is the State / Territory LGA a Covenant Signatory?	No. of Local Governments in the State / Territory	No. of Local Government Covenant Signatories	% Local Governments that are Covenant Signatories
New South Wales	No	172	0	0 %
Northern Territory	No	36	0	0 %
Queensland	Yes	125	125	100 %
South Australia	No	68	8	12 %
Tasmania	No	29	12	41 %
Victoria	Yes	79	79	100 %
Western Australia	No	142	4	3 %
TOTAL		651	228	35 %

There are 582 individual companies and industry organisations who are also signatories to the Covenant (as at 22nd December 2003).

Figure 3.1: Local Government Signatories (Meinhardt)

The Meinhardt review equally found in local government views that:

- "there is seen to be much less commitment to the down-stream effects of used packaging material", and;
- "there are seen to be significant deficiencies in industry Action Plans [which] are often perceived to be broad statements of industry intent with little commitment to real objectives."

b) Industry

Many in industry believe that industry is better placed to reduce the net costs of packaging by focussing on improving the environmental performance of its own production processes. Some in industry further argue that it is more efficient for post-consumer costs to be externally borne through the taxation / rates system. Within the packaging supply chain, there remain some concerns about the effectiveness of current kerbside recovery arrangements. This is particularly so in some industry groups who believe that kerbside recycling delivery methods can be further improved, including in terms of consistency of materials collected, systems used, types of community education, and contractual arrangements.

c) NGOs

In addition to general community viewpoints, the viewpoints of environmental NGOs with regard to packaging waste policy should be noted. In the Nolan-ITU evaluation of the current Covenant, stakeholder interviews determined the following:

> "*Environmental NGOs consider that, while there is a high level of industry participation, the quality of action plans is generally inadequate. They consider that Covenant signatories have not been effective in improving the lifecycle performance of packaging and paper in their own operations. For this reason they generally favour the replacement of the Covenant with a regulatory framework."*

In late 2004, environmental NGOs expressed further views about packaging waste policy, including through the recently formed, nationally-based Boomerang Alliance, which has the NSW Nature Conservation Council, the Total Environment Centre, Clean Up Australia, Environment Victoria and others as participants. A Boomerang Alliance statement noted:

> *"Environment groups are concerned that industry continues to produce packaging without due regard to the environment and without paying a fair share of the costs to the community."*

At that time, the Boomerang Alliance listed the following elements of packaging's environmental life-cycle performance as of concern:

- Excessive Use of Material in a Package;
- Large ratio of Packaging to Product;
- Poorly Designed for Recycling;
- Misleading labelling for waste management;
- Regressive development in packaging; and
- Likely to be littered.

In late 2004, members of environmental NGOs made representations to the EPHC with regard to the inclusion of performance targets in any revised Covenant.

3.4 Conclusion

In summary, the "packaging problem" can be defined as follows:

- Whilst packaging delivers positive benefits through increased product life and health and safety benefits, there are impacts on the natural environment and therefore sustainability throughout the life-cycle of consumer packaging / household paper used by Australians. Impacts flow from the consumption of resources to produce packaging, as well as from what occurs to packaging after its use and disposal.

- Many of the environmental costs of consumer packaging / household paper are externalised, particularly in its post-consumer phase.

- Resource recovery of packaging in the post-consumer phase is not optimised. Kerbside recovery is improving but fails to deal with more than 50 per cent of packaging generated away-from-home. Provision of systems for away-from-home recovery, such as in commercial premises, eg pubs, clubs, institutions eg universities, hospitals , offices and public places is relatively underdeveloped.

- While not wholly consistent, there is a societal expectation, expressed both in attitudes and behaviours, that the environmental impact of packaging be addressed, particularly in the post-consumer phase.

- Consumers tend not to focus on the non-environmental attributes of packaging.

At this point in time, there is no reason to believe that there will be an unprompted correction to the market failure. Indeed, without a public policy approach (eg,, without appropriate checks and balances in the packaging supply and recovery chains), it is probable that:

- There could be greater use of excessive or inappropriate resources in the manufacturing of packaging, increased packaging material to landfill disposal, and more potential for littering.

- The net environmental impact of the packaging life-cycle could increase at least in line with increasing overall consumption trends, and industry / demographic drives toward smaller packages.

- The environmental costs of packaging could be externalised on a largely unfettered basis, creating further burdens for the packaging recovery chain and the community at large.

- The structural arrangements for the environmental management of packaging – particularly in its post-consumer phase in away-from-home settings – could be inadequately addressed and resource recovery could become less prevalent.

- The general public's expectations about the need for environmental responsibility by business and government, appropriate conservation of finite resources, and waste minimisation opportunities could go unmet.

4 POLICY OBJECTIVES

In light of the problem outlined above, objectives for policy action can be summarised as:

- Foster the reduction, minimisation and/or management of the environmental impacts in the life-cycle of packaging, including:
    - Efficient use of resources in the manufacture and distribution of packaging, and;
    - Optimal recovery of resources following packaging's use.
- Have stakeholders in the packaging supply and recovery chains bear due responsibility and costs for the environmental impacts in the life-cycle of packaging;
- Facilitate appropriate structural arrangements to address the environmental impacts in the life-cycle of packaging;
- Create opportunities for the community and business to address the environmental impacts in the life-cycle of packaging through:
    - Purchasing and utilisation decisions and practices;
    - Product stewardship initiatives;
    - Resource recovery programs, and;
    - Litter management programs.

5 OPTIONS FOR ADDRESSING POLICY OBJECTIVES

There is a wide range of strategies available to pursue the policy objectives outlined above.

In considering potential strategies, a threshold question arises: should action take place on a national or jurisdictional basis? A set of criteria adopted in 1999 by the National Environment Protection Council to determine whether an environmental issue warrants the development of a National Environment Protection Measure can be used to answer the question. With minor modification, the key criteria are:

- There is a clear and agreed role for government;
- The problem crosses a number of State / Territory borders and /or impacts on major population centres,
- A single national response is likely to be the most efficient and effective response, and;
- It is identified in the NEPC Act as an environmental area that may be addressed by a NEPM.

In the above respects, it should be noted that, since the early 1990s, Commonwealth, State and Territory Governments have generally opted for a coordinated, national approach to address (initially) packaging waste issues and (now) the environmental impact of the packaging life-cycle. In part, this has been based on recognition that the packaging supply and recovery chains operate on a national basis. Much packaging in Australia is manufactured, supplied, used, distributed and recovered in a national market by industry players with national scope. As a result, the impacts of poor environmental management of packaging are very similar from jurisdiction to jurisdiction.

Additionally, Governments have recognised:

- the benefits for administrative efficiency from not establishing separate legal and operational regimes in each jurisdiction;
- the significant impacts that compliance with separate regimes is likely to have on members of the packaging supply chain, and;
- concerns about a lack of consistency between previous material-specific agreements, eg,, the previous policy approach.

Finally, packaging waste is specifically listed in the NEPC Act.

Having established that action on a national basis is valid, the next step is to consider the potential effectiveness and implications of different types of national approaches. Guidelines for the conduct of Regulatory Impact Statements require consideration of the potential range of strategies for achieving policy objectives. There are several broad strategic options for improving practices in the environmental management of the packaging supply and recovery life-cycle.

5.1 Strategic Options

The following table outlines the available strategic options, their policy characteristics, and some of the mechanisms by which they can be delivered.

Table 5.1: Strategic Policy Options

Strategic Option	Policy Characterisation	Delivery Mechanisms
Do Nothing	Voluntary	□ Activity by select companies and other players □ National industry-wide agreements according to packaging material type (eg,, pre-Covenant model)
Do Nothing Further	Co-regulatory; national; non-prescriptive performance	□ Current Covenant / NEPM
Enhanced Approach	Co-regulatory; national; specific policy goals and targets	□ Revised Covenant / NEPM
Alternative Approaches	Co-regulatory or regulatory; national; prescriptive performance / compliance requirements on participants	□ Advance Recycling Fees / NEPM □ Mandatory take-back □ Mandatory container deposit scheme □ Increased landfill disposal levies □ Other methods of prescribing specific practices and outcomes

5.1.1 Do Nothing Option

Under this option, there would effectively be a return to the situation that predated the current Covenant / NEPM package. In that era, efforts to address the environmental impact of packaging's life-cycle were either voluntary, limited to select players, or non-existent.

Some specific industry sectors forged voluntary agreements with the Australian New Zealand Environment & Conservation Council (ANZECC) to deliver packaging materials recovery – as opposed to environmental life-cycle – outcomes. There was no national regulatory underpinning to ensure comprehensive packaging supply chain participation. As a result, participation in voluntary arrangements was limited to the manufacturing segment of the packaging supply chain with some additional participation from select beverage companies, as represented by the Beverage Industry Environment Council. Some targets established for materials were achieved during this period, while others were not.

(During this period, jurisdictions, industry stakeholders, and local government consistently voiced a range of concerns. Therefore, ANZECC Ministers opted for a more holistic, national approach starting from 1996.)

The newsprint sector continues to meet its environmental responsibilities through a voluntary industry-wide agreement.

5.1.2 Do Nothing Further Option

Under this option, the current National Packaging Covenant (Covenant) and its supporting regulation, the National Environment Protection Measure for Used Packaging Materials (NEPM) would be extended in their original forms. The current Covenant promotes "a framework of shared responsibility for the effective life-cycle management of packaging and paper products…."; "a collaborative approach…", and; "a forum for regular consultation and discussion…".

The Covenant's current provisions for participating companies to produce Action Plans stating their continual improvement commitments and to financially contribute to the structural improvement of kerbside recycling, as a key means of managing the post-consumer impacts of packaging, would remain as they are. The NEPM – as a policy instrument to ensure brand owner participation and compliance – would equally remain.

The current Covenant's provisions are outlined in Table 5.2.

5.1.3 Enhanced Approach Option

Under the "Enhanced Approach" option, the current Covenant / NEPM package would be substantially strengthened in terms of implementation provisions (while retaining the co-regulatory structure). The revised Covenant would build on the current Covenant in several regards including the incorporation of:

- An overall objective "to reduce environmental degradation arising from the disposal of used packaging and conserve resources through better product design and encouragement for the recovery, re-use and recycling of used packaging materials".
- Explicit statement of environmental goals;
- Three related performance goals:

- Packaging optimised to integrate considerations about resource efficiency, maximum resource re-utilisation, product protection, and hygiene;
- Efficient resource recovery systems for consumer packaging and paper;
- Consumers able to make informed decisions about consumption, use and disposal of packaging of products.

- Use of Key Performance Indicators (KPIs) and quantified measures against them in Action Plans for Covenant signatories / participants to ensure a whole of lifecycle management approach including an emphasis on waste avoidance though improved product design and process improvement;
- Greater prescription, structure, and monitoring of participation and compliance;
- Requirement to independently review and report on performance at mid-term;
- A broader scope of funded projects to improve environmental life-cycle management practices for packaging (eg,, beyond kerbside recycling);
- Stronger guidance for industry in terms of product stewardship practices;
- Improved communication about the Covenant's objectives and compliance expectations;
- Inclusion of a community representative on the NPC Council, and;
- Stronger implementation of the NEPM, including enforcement against brand owners who are non-participants or poor participants of the Covenant.

Additionally, at their December 2004 meeting, in considering a draft proposal for the revised Covenant, the Environment Protection and Heritage Council requested that a set of overarching targets be developed to measure the achievements of a future Covenant term, particularly in the following areas:

- Packaging disposed of to landfill and packaging recovered for recycling
- Non-recyclable packaging
- Increased use of recycled packaging materials in new products.
- Continuous Performance Improvement for individual signatories

At the time of authorship of the RIS, the final regime / levels of the performance targets continue to be developed in consultation with stakeholders. Therefore, a range of possibilities has been considered and modelled to determine potential impacts.

The differences between the current policy approach, eg,, the current Covenant / NEPM model, and the proposed policy approach, eg,, a revised Covenant / NEPM model, are identified below. Additionally, it is necessary to make some predictions about what outcomes may occur as a result of the changes that are proposed.

Table 5.2 Comparison of Key Provisions of Covenant & Revised Covenant

	Current Covenant / NEPM	Revised Covenant / NEPM	Stakeholder Impacts of Revised Covenant
1.	Implied environmental goals	Explicit environmental goals and four performance target areas	□ Packaging supply chain – product stewardship efforts will need to become more robust and quantifiable (with implications greater for small businesses and SMEs) □ Packaging recovery chain – effort will be needed to expand non-kerbside recycling systems □ Consumers – may have increased opportunity for improved decision-making □ Governments – increased monitoring of performance required
2	No numeric performance targets	Numeric performance targets	□ Packaging supply chain – additional involvement in / support for the recovery of post-consumer materials, as well as their usage, will be needed (with implications greater for small businesses and SMEs) □ Packaging recovery chain - effort will be needed to expand non-kerbside recycling systems □ Consumers – increased opportunities for participation in recovery systems, particularly away-from-home □ Governments – increased monitoring of performance required, particularly in terms of relative contribution of different supply and recovery chain members to target achievement.
3.	Production of Action Plans according to broadly defined performance areas and non-specific reporting requirements	Production of Action Plans according to specifically defined performance areas and quantifiable measures in relation to KPIs, and specified reporting	□ Packaging supply chain – more comprehensive approach to Action Plans necessary (with implications greater for small businesses and SMEs) □ More comprehensive data gathering and reporting against specific KPIs □ Governments – increased monitoring of performance required
4.	An emphasis on kerbside recycling	An additional emphasis on away-	□ Local government and other land / asset

	Current Covenant / NEPM	Revised Covenant / NEPM	Stakeholder Impacts of Revised Covenant
	as a key means for management of post-consumer impact	from-home recycling of post-consumer packaging materials; inclusion of KPI for littering and away-from-home recycling	managers – additional effort required □ Packaging supply chain – additional support required □ Consumers – additional awareness and participation required
5.	Focus on consumer packaging	Broadened focus to include consumer packaging from all sources and distribution packaging	□ Packaging supply chain – greater consideration to distribution packaging (both in terms of use and disposal) in developing and enacting Action Plans □ Increased data gathering and reporting by jurisdictional governments □ Packaging recovery chain – additional volumes of material to manage
6.	Loose structural arrangements for Covenant / NEPM oversight	Detailed structural arrangements	□ Governments – Covenant operations will be streamlined
7.	Limited administrative resources for assessing quality of Action Plans and participation	Dedicated resources for administration of all aspects of Covenant	□ Governments – as above
8.	Some degree of "policing" of brand owners in terms of regulatory aspect	Higher degree of "policing" of brand owners in terms of regulatory aspect	□ Governments – increased resource for enforcement activity will be necessary
9.	Transitional arrangements fund aimed at improving kerbside recycling	Broader scope for use of raised funds across packaging supply chain to minimise environmental life-cycle impacts through State and national programs	□ Packaging supply and recovery chains, and Governments – increased opportunity to conduct initiatives not related to kerbside recycling

	Current Covenant / NEPM	Revised Covenant / NEPM	Stakeholder Impacts of Revised Covenant
10.	Limited and somewhat ad hoc communication to packaging supply chain and local government about participation opportunities	Dedicated and coordinated information and communication campaign to packaging supply chain, public and others about Covenant and related issues Increased participation by local government in data collection	□ All stakeholders – increased opportunity for improved decision-making about packaging and its environmental attributes
11.	Limited encouragement of industry to use Environmental Code of Packaging	Redrafted (by broad stakeholder group) and promoted Code featuring greater guidance to companies on design aspects	□ Packaging supply chain – more management activity to ensure compliance (with implications greater for small businesses and SMEs) □ Packaging recovery chain – less likelihood of emergence of packaging that is unacceptable or difficult to reprocess
12.	Very limited capacity to centrally and nationally monitor changes to packaging market, including limited data collection and reporting	Specific systems for centrally and nationally monitoring changes to packaging market, including increased and consistent data collection and reporting requirements against specific KPIs for industry, local government and State Governments	□ Governments – greater capacity to make policy decisions and "trouble shoot" □ Packaging supply and recovery chains – greater need to have data collection and reporting capacity (with implications greater for small businesses and SMEs)
13.	No requirement in terms of senior management accountability for commitments.	Requirement that CEO endorse company commitments	□ Packaging supply chain – CEO involvement will be required
14.	Generally lower levels in industry of awareness and experience in life-cycle based environmental management of packaging	Improved levels in industry of awareness and experience in life-cycle based environmental management of packaging	
15.	Decentralised system for conduct of funded projects	More centralised and coordinated system for conduct of funded projects	□ Packaging supply and recovery chains, and Governments – increased opportunity to identify and commence initiatives in a timely and efficient manner
16.	Requirement that fund beneficiaries be Covenant signatories	Opportunity for non-signatories to be fund beneficiaries on provision of matching funding	□ Local government – improved capacity to access funding for improvement programs
17.	NPC Council consisting of Commonwealth and State Government representatives, local government representatives, and industry representatives.	Inclusion of a community / NGO representative onto the NPC Council.	

The analysis of stakeholder implications shows that smaller business participants in the Covenant may be subject to a significant set of implications. These are more carefully examined elsewhere in the RIS.

5.1.4 Alternative Approaches Option

Under the "Alternative Approaches" option, arrangements other than voluntary or co-regulatory models would be introduced. These could include fully regulatory approaches whereby the environmental management practices of the packaging supply and recovery chains, particularly in terms of post-consumer material issues, are largely mandated. Backed with various regimes of regulatory penalties or disincentives, these mandates could include:

- Recycled content material quotas in products for packaging supply chain companies;
- Material-specific take-back and utilisation targets for packaging supply and recovery chain companies;
- Mandatory participation by packaging supply chain companies in a packaging levy system to fully fund the cost of post-consumer recovery;
- Mandatory participation by packaging supply and recovery chain companies in container deposit systems, including prescribed handling fees to address system operating costs;
- Regulatory requirements for local Councils to meet specific landfill diversion / resource recovery targets, and;
- Requirement for all waste generators to pay full environmental and social cost of landfill in waste disposal charges.

The alternate approaches examined and analysed in this document are:

- Advance Recycling Fees – This alternative requires the payment of advance recycling fees that reflect non-funded costs associated with collection, sorting and reprocessing of a product / package. The fees are distributed to parties involved in resource recovery to cover or subside the cost. This approach could also facilitate the development of trading scheme whereby organisations exceeding specific targets are eligible to sell credits (eg, fee discounts) to organisations not achieving specific targets.
- Mandatory take-back and utilisation scheme (EPR) – Based on international precedents, this alternative approach requires producers to take-back and reutilise their packaging and assumes material-specific resource recovery targets at average European levels. Modelling of this option is packaging material, but not supply chain, comprehensive, and is premised on comprehensive recovery/recycling targets for specific materials.

- Mandatory container deposit scheme – This approach requires a fee to be charged at point of sale which is recovered when the used container (as opposed to general packaging) is returned for recycling, as well as handling fees per container to fund recovery and reprocessing operations. For practical purposes, the current South Australian container deposit model has been examined, particularly in terms of recovery rates and materials coverage.

- Increased landfill disposal levies – This alternate assumes levies set at the NSW level for all Australian contingencies and a 50 per cent hypothecation back into waste minimisation programs.

The common denominating factor with these options is the selection by policy decision-makers of a specific prescribed outcome and the use of penalties and / or disincentives to enforce its achievement. These approaches tend to remove the advantages of flexibility in compliance in favour of the advantages of comprehensive coverage and reasonable uniformity in approach.

Effectively, the policy options under consideration "span the range" of the available responses – both in Australia and internationally – to the issue of packaging's environmental impact. For the purposes of the RIS, they are all presumed to be national in their scope.

Background material on policy approaches to packaging's environmental impact, particularly management of post-consumer impacts, can be found in sources on the reference list provided with the RIS. The original Impact Statement for the NEPM (Jan 1999) also included a substantial Appendix *Overseas Experiences in Management of Used Packaging* that outlined various policy approaches both nationally and internationally. This is provided for reference on the EPHC website (www.ephc.gov.au).

Appendix A.

5.1.5 Targets

Target setting as a tool merits specific comment, as it can apply to a wide range of different policy delivery mechanisms in the sphere of packaging's environmental impact.

Numeric targets that are established at the system-wide level can have both advantages and disadvantages for achieving policy outcomes. These are outlined in Table 5.3.

Table 5.3: Advantages and Disadvantages to Targets

Advantages	Disadvantages
□ Targets have a catalytic effect and clearly drive "beyond business-as-usual" actions throughout packaging supply chain therefore increasing net environmental benefits. □ Targets focus the minds and efforts of all players (provided there are clear consequences for non-achievement). □ If applied in a way that is either material-specific, sector-specific, or activity-specific, the 'focus effect' of targets is likely to be even stronger. □ Targets provide a more definitive measure of success / failure of scheme, and participant accountability. □ Targets allow for greater public scrutiny of policy action and progress. □ Depending on their level and achievement, recovery targets can decrease waste disposal and dependence on landfill. □ Targets could assist the development of increased markets for recovered materials and economic benefits. □ Targets will require new data methodologies and consistent national data collection approaches.	□ Targets are difficult to establish without baseline data. □ It is difficult to establish targets that: o cover total environmental life-cycle; o cover all players in packaging supply chain; o can foresee consumer and product changes, and; o encompass waste avoidance □ If applied at the system-wide level, non-achievement of targets is difficult to attribute / enforce with any given party. □ If applied primarily to recycling, targets could elevate recycling to an end in itself rather than a means to an end. □ By putting too strong a focus on single environmental outcomes, targets may compromise the functionality of the packaging. □ If applied primarily to environmental aspects such as recycled content usage, targets could limit market opportunity and have an unintended negative environmental impact (eg,, recyclate could be more appropriately used in products other than packaging, or recycled content packaging could be heavier).

5.2 Assessment of Strategic Options

A modified PEEST system – a commonly used planning tool that examines Policy, Economics, Environment, Society, and Technology vectors – has been used to assess the strategic advantages and disadvantages of the above options, and draw out insights about their relative viability. This assessment follows in Tables 5.4-5.7.

Table 5.4: Do Nothing Option Assessment

Advantages	Disadvantages
Policy: ❑ Lowest cost to governments for policy development, implementation, and effectiveness monitoring. ❑ No need for legislative reform.	**Policy:** ❑ Public expectations unmet. ❑ Greater chance of inter-jurisdictional policy conflicts as States potentially decide to "go it alone".
Economy: ❑ Lowest cost to majority of business. ❑ No compliance requirements for majority of business, including small businesses and SMEs.	**Economy:** ❑ No driver for more sustainable business sector. ❑ No driver for development of domestic reprocessing industry. ❑ Lack of industry confidence in policy context, eg,, uncertainty. ❑ Competitive disadvantage for voluntary environmental performers.
Environment: ❑ None.	**Environment**: ❑ Low packaging recovery rates, eg,, solely a function of market demand for material. ❑ More material to waste disposal, and greater reliance on landfill. ❑ Greater probability of harm to the natural environment in terms of air and water emissions, greenhouse gases, and other aspects. ❑ Environmental costs externalised from products / packaging.
Society: ❑ Lowest cost to ratepayers, eg,, limited costs of limited resource recovery programs.	**Society:** ❑ Greater community concern about lack of business environmental responsibility. ❑ Less opportunity for participation in resource recovery schemes and their educational benefits. ❑ Less information about environmental performance of packaging to enable consumer decision-making.
Technology: ❑ Limited to no need for capital investment in higher end technology for collection, sorting, or reprocessing of recyclate.	**Technology:** ❑ Limited incentives for capital infrastructure investment, eg, state-of-the art reprocessing equipment.

Table 5.5: Do Nothing Further Option Assessment

Advantages	Disadvantages
Policy: ❑ Contained, predictable cost to governments for policy development, implementation, and effectiveness monitoring. ❑ On-going improvement in the understanding of packaging's environmental impacts. ❑ No need for legislative reform.	**Policy:** ❑ Stakeholder criticism of lack of progress, eg, non-Government environmental organisations. ❑ Greater potential for individual jurisdictions to "go it alone" in time. ❑ Out of step with international trends, including in the Asia-Pacific region. ❑ Sends signal that problem is somehow "fixed".
Economy: ❑ Contained, predictable cost and compliance procedures for majority of business. ❑ Opportunity to continue with "business as usual" and focus on core profit and loss aspects. ❑ Industry certainty about policy.	**Economy:** ❑ Loss of opportunity for driver for more sustainable business sector. ❑ Lower order driver for development of domestic reprocessing industry.
Environment: ❑ Continuation of some incremental environmental gains by some policy participants.	**Environment**: ❑ Material to waste disposal likely to increase in line with net production and consumption rates. ❑ Lost opportunity to better address life-cycle environmental impacts of packaging, including in supply, production, and distribution. ❑ Non-quantifiable nature of most gains to be expected.
Society: ❑ Contained, predictable cost for resource recovery programs to householders.	**Society:** ❑ Greater community concern about lack of responsibility by business for environmental performance. ❑ Less opportunity for community to participate in resource recovery schemes and their educational benefits. ❑ Less information about the environmental performance of packaging to enable consumer decision-making.
Technology: ❑ Maintenance of status quo in terms of planned capital investment in higher end technology for collection, sorting, or reprocessing of recyclate.	**Technology:** ❑ Limited incentives for capital infrastructure investment, such as state-of-the art reprocessing equipment.

Table 5.6: Enhanced Approach Option Assessment

Advantages	Disadvantages
Policy: ❑ Predictable cost to governments for policy development, implementation, and effectiveness monitoring. ❑ No need for new legislation ❑ Greater probability of broader stakeholder acceptability. ❑ Flexibility to include other complementary approaches/instruments. ❑ Will engender a cooperative approach across the supply chain ❑ More definitive measurement of progress against performance targets, and opportunity to review effectiveness. ❑ Reasonable flexibility and capacity to adapt to suit any changes to prevailing conditions.	**Policy:** ❑ Some stakeholder criticism of governments for "not going far enough and / or fast enough".
Economy: ❑ Somewhat predictable cost and compliance procedures for majority of business, particularly with clearer requirements. ❑ Driver for more sustainable business sector. ❑ Driver for development of domestic reprocessing industry. ❑ Industry certainty about policy following introductory phase. ❑ Fostering innovation and cooperation across products and sectors. ❑ Higher levels of resource recovery, particularly away-from-home	**Economy:** ❑ Greater participation and compliance costs for some businesses, particularly small businesses and SMEs that do not currently have resource recovery or product stewardship actions in place. ❑ Initial costs of infrastructure investment, eg,, additional reprocessing capacity. ❑ Increased cost to governments for compliance. ❑ Increased costs to all stakeholders for data collection and monitoring requirements.
Environment: ❑ Net material to waste disposal likely to decrease. ❑ Recovery rates likely to increase and deliver associated environmental benefits. ❑ Product stewardship efforts, such as improved product design, likely to increase uptake and deliver associated environmental benefits.	**Environment**: ❑ Pace of gains may not be as widespread or commensurate with a minimum regulated outcome imposed in the same specific area.

Advantages	Disadvantages
Society: ❑ Cost reduction for kerbside recycling programs. ❑ Greater opportunity to participate in non-domestic resource recovery programs and their educational benefits.	**Society:** ❑ Increased costs for development of non-domestic resource recovery programs, such as public place recycling.
Technology: ❑ Driver for increased investment in higher end technology for collection, sorting, or reprocessing of recyclate.	**Technology:** ❑ Risk associated with predicating infrastructure investment on "certainty of supply" as represented by prospect of greater materials recovery. ❑ Potential lack of capacity to cope with increased supply of materials – both in terms of reprocessing and take-up of recyclate in manufacturing.

Table 5.7: Alternative Approaches Option Assessment

Advantages	Disadvantages
Policy: ❑ Support from non-governmental environmental organisations and some sectors of local government. ❑ More definitive measurement of progress against performance targets, and opportunity to review effectiveness.	**Policy:** ❑ Largely "uncharted waters" and therefore cost to governments for policy development, implementation, and effectiveness monitoring difficult to predict. ❑ Criticism from industry of government for "prescriptiveness" and lack of flexibility. ❑ Strong need for new legislation/ legislative change in many jurisdictions. ❑ Administrative impacts and implementation delays associated with transition to any fundamentally new scheme. ❑ Less flexibility for incorporating other legislative approaches. ❑ Less flexibility and adaptability once introduced ❑ Will minimise cooperation on a supply chain level.
Economy: ❑ Driver for more sustainable business sector and greater innovation. ❑ Driver for development of domestic reprocessing	**Economy:** ❑ Greatest participation and compliance costs and burden for many businesses regardless of size.

Advantages	Disadvantages
industry, and increased benefits to its service providers.	❑ Administrative impacts of transition. ❑ Depending on nature of scheme, strongest probability of market distortion and creation of competitive disadvantages between companies in / sectors of packaging supply chain.
Environment: ❑ High levels of resource recovery particularly of products consumed away-from-home ❑ Net material to waste disposal likely to decrease. ❑ Greatest coverage of industry engagement.	**Environment**: ❑ Likely to result in long-term emphasis on post-consumer impacts – a minority proportion - rather than "in-the-pipe" design and resource reduction impacts – a majority proportion. ❑ Does not foster innovation and a cooperative approach across products and sectors.
Society: ❑ Greatest opportunity to participate in non-domestic resource recovery programs and their educational benefits. ❑ Greatest amount of information to consumers about environmental performance of products.	**Society:** ❑ Increased costs for development of non-domestic resource recovery programs; net resource recovery costs likely to be higher. ❑ Costs likely to be passed to end consumers in product prices. ❑ Recovery schemes where consumers need to transport / bring materials to specific locations have less convenience and amenity.
Technology: ❑ Strongest driver for increased investment in higher end technology for collection, sorting, or reprocessing of recyclate. ❑ Greater probability of technological innovation.	**Technology:** ❑ Risk associated with predicating infrastructure investment on "certainty of supply" as represented by prospect of greater materials recovery.

The combined assessment illustrates the following:

- As represented by the Do Nothing Option, a purely voluntary business-led approach is not desirable. Given the current lack of accounting for individual company's environmental costs and liabilities, and the on-going focus on largely financial performance, a *laissez faire* approach is likely to perpetuate the problem represented by the environmental impacts of packaging's life-cycle. This is because – simply put – for many companies environmental management can be a cost, and there is an imperative to either reduce or avoid costs within the current paradigm.

- As represented by the Do Nothing Further Option, continuation of the Covenant / NEPM package in its current form will lead to comparatively weaker comprehensive outcomes than other available options, which would not be acceptable to a wide range of stakeholders..

- Both the Do Nothing and Do Nothing Further options do not deliver consistent and equitable sector-wide outcomes, as they are reliant on individual company will and initiatives.

- Either an enhanced approach, such as a revised Covenant with targets, or alternative arrangements, such as greater prescription of business practices with regard to the environmental performance of packaging, appear best positioned.

  On the one hand, the revised Covenant route would appear to deliver greater advantages in policy and economic terms. For example, it is easier to implement and is less likely to have a significant financial cost impact; and it is likely to foster more innovation in product and system design, and cooperative efforts across the packaging supply chain. These are important considerations for the ultimate success of public policy.

  On the other hand, an alternative approach, such as one featuring stronger prescription about business' environmental performance, could provide higher recovery of resources, particularly away-from- home.. Based on the European experience, environmental gains are likely to be "bought" through higher business costs, which are likely to be passed onto consumers in product prices. Australian packaging supply chain's capacity to bear such a greater cost and/or the community's willingness to make the necessary investment - eg,, higher grocery basket prices for further environmental gains – is unclear in terms of packaging.

It is important to note that Australia does not have the same demographics or characteristics as Europe. This may have implications for the suitability of these models for Australia. However, there has been no substantial analysis and comparison to date and therefore it is difficult to draw any conclusions about the likely consequences of applying these models to Australia.

Given the somewhat ambiguous nature of these initial results, it is critical to further look at the delivery mechanisms of a given policy approach, and how they rate against objective public policy effectiveness criteria.

5.3 Policy Options Evaluation Criteria

A range of evaluation criteria have been developed and applied to the policy options. These criteria cover detailed critical success factors for environmental public policy, including a range of administrative and operational issues, cost issues, environmental outcomes, and stakeholder perspectives. The criteria also take into account Council of Australian Governments (COAG) precepts for policy making and their emphasis on a holistic basis, particularly *Principles and Guidelines for National Standard Setting and Regulatory Action by Ministerial Councils and Standard-Setting Bodies* (last confirmed by COAG in June 2004).

Table 5.8 sets out and further describes each evaluation criterion and provides further information on the rationale for its selection.

Table 5.8: Evaluation criterion

Criterion	Selection Rationale	Comment
1. Stakeholder acceptability	Consistent with previous analyses Conforms with COAG provisions	
2. Transition impacts and duration	Consistent with previous analyses	Impacts and timeframe associated with establishing administrative, legal, and operational framework for implementation of instrument
3. Labelling, education, program promotion	Consistent with previous analyses	Changes and requirements to product labelling, educational campaigns and methods, and associated costs of promotion arising from instrument
4. Administrative and governance burden	Consistent with previous analyses Conforms with COAG provisions	Both for administering and enforcing authorities
5. Flexibility and convenience	Consistent with previous analyses Conforms with COAG provisions	Ease of operating and participating in system for industry arising from instrument
6. Coverage scope	Consistent with previous analyses Threshold issue	Range of packaging materials, segments of packaging life-cycle, and segments of packaging supply chain dealt with
7. Non-compliance	Consistent with previous analyses Stakeholder expectations Conforms with COAG provisions	Capacity to "free-ride" and create disadvantage for participants
8. Competitiveness	Stakeholder expectations Conforms with COAG provisions Increased globalisation of packaging supply chain(s)	Capacity of instrument to cause supply chain cost shifting, inappropriate competitive advantage among participants, and implications for international competitiveness
9. Material recovery rates	Measurement of post-consumer impact in particular	
10. Net energy usage	Measurement of life-cycle impact / unit efficiency	
11. Resource conservation	Measurement of life-cycle impact / unit efficiency	
12. In-house environmental change	Measurement of cultural and operational response	An important consideration in the selection of an instrument is its potential in stimulating cultural and operational change in business. Namely, it is important to consider what will motivate thinking and activity beyond "business as usual" in terms of upstream aspects such as product design, materials selection, waste avoidance,

Criterion	Selection Rationale	Comment
		employee environmental education and training etc.
13. Measurement	Consistent with previous analyses Conforms with COAG provisions	Capacity to monitor and measure instrument's effectiveness

5.4 Policy Options Evaluation Method

Each policy option was assessed against the evaluation criteria at three linked levels.

First, the option was assessed at the general or overview level. This served the purpose of identifying any issues or aspects of specific relevance to that policy alternative.

Secondly, to introduce a strong level of objectivity into the analysis, each policy was assessed against a point scale based on performance indicators. This scale and its contents were developed on the basis of best practice guidelines for impact assessment, as well as the Australian standard for risk management (Standards Australia, AS/NZS Risk Management 4360: 1999).

Care was taken to ensure that the point scale was both "vertically and horizontally" consistent from evaluation criterion to evaluation criterion. An important advantage of using established evaluation criteria and a related point scoring system is to minimise subjectivity and increase transparency. The point scoring system is provided in Table 5.9.

Table 5.9: Evaluation Criterion Scoring

Evaluation Criterion	Point scoring (5 to 1)
1. Stakeholder acceptability	5. All key stakeholder groups accept alternative 4. Majority of key stakeholder groups accept alternative 3. Some key stakeholder groups accept alternative 2. Minority of key stakeholder groups accept alternative 1. No key stakeholder groups accept alternative
2. Transition impacts and duration	5. Easy and short-term to establish framework for both Governments and industry 4. Moderately easy and short-term to establish framework for both Governments and industry 3. Moderately easy and medium term to establish framework for both Governments and industry 2. Somewhat difficult and medium term to establish framework for both Governments and industry 1. Difficult and long-term to establish framework for both Governments and industry
3. Labelling, education, program promotion	5. No changes and no costs for both Governments and industry 4. Minimal changes and insignificant costs for both Governments and industry 3. Substantial changes and insignificant costs for both Governments and industry 2.. Substantial changes and significant costs for both Governments and industry

Evaluation Criterion	Point scoring (5 to 1)
	1. Whole-scale changes and very significant costs for both Governments and industry
4. Administrative and governance burden	5. No additional effort for Govt's to administer 4. Very simple for Govt's to administer 3. Simple for Govt's to administer 2. Somewhat complex for Govt's to administer 1. Highly complex for Govt to administer
5. Flexibility and convenience	5. No additional efforts by industry to operate within 4. Minor additional efforts by industry to operate within 3. Some additional efforts by industry to operate within 2. Much additional effort by industry to operate within 1. 100% additional effort by industry to operate within
6. Coverage scope	5. Covers all packaging materials, segments of life-cycle, and segments of supply / recovery chains 4. Covers majority of packaging materials, majority of segments of lifecycle, and majority of supply / recovery chains 3. Covers majority of two of three aspects: packaging materials, segments of lifecycle, or supply/recovery chains 2. Covers majority of one of three aspects: packaging materials, segments of lifecycle, or supply/recovery chains 1. Covers minority of packaging materials, minority of lifecycle segments, and minority of supply / recovery chains
7. Non-compliance	5. No capacity by industry to free-ride and create disadvantage 4. Highly restricted capacity by industry to free ride and create disadvantage 3. Somewhat restricted capacity by industry to free-ride and cause disadvantage 2. Significant capacity by industry to free-ride and create disadvantage 1. Full capacity by industry to free-ride and create disadvantage
8. Competitiveness	5. No capacity to decrease industry competitiveness (including supply chain cost shifting, and international trading disadvantage) 4. Very limited capacity to decrease industry competitiveness 3. Limited capacity to decrease industry competitiveness 2. Significant capacity to decrease industry competitiveness 1. Full capacity to decrease industry competitiveness
9. Material recovery rates	5. Substantial increases across all major packaging material groups

Evaluation Criterion	Point scoring (5 to 1)
	4. Substantial increases across most major packaging material groups 3. Incremental increases across most major packaging material groups 2. Status quo across most major packaging material groups 1. Decreases across most major packaging material groups
10. Net energy usage	5. Substantial decrease 4. Incremental decrease 3. Limited decrease 2. Status quo 1. Increase
11. Resource conservation	5. Substantial savings 4. Some savings 3. Limited savings 2. Status quo 1. Increased usage of resources
12. In-house environmental change	5. Very high capacity to stimulate greater environmental awareness and improved general practices by industry, including product design 4. High capacity to stimulate greater environmental awareness and improved general practices by industry, including product design 3. Some capacity to stimulate greater environmental awareness and improved general practices by industry, including product design 2. Limited capacity to stimulate greater environmental awareness and improved general practices by industry, including product design 1. No capacity to stimulate greater environmental awareness and improved general practices by industry, including product design
13. Measurement	5. Very high capacity to monitor and measure 4. High capacity to monitor and measure 3. Some capacity to monitor and measure 2. Limited capacity to monitor and measure 1. No capacity to monitor and measure

Thirdly, each option was considered in terms of its potential implications for specific stakeholder groups, including business in the packaging supply chain, smaller business in the packaging supply chain, the general public, local government, and other governments. Here, it was important to identify if a given alternative has a **clearly inequitable effect** on any one group in the overall packaging supply and recovery chains, as this would undermine its capacity to be successful.

Finally, the assessment was separately undertaken by two experts to ensure the validity of results. The scores attributed were based on the knowledge of these two experts, particularly of the performance of various packaging / environmental policy options both in Australia and overseas. The results between the two experts were highly comparable and did not alter the placing of the top ranked options. These results were further peer reviewed by a third expert, as well as EPHC officials.

5.5 Policy Options Evaluation Results

The evaluation of policy options demonstrated that the revised Covenant / NEPM package is the approach that **performed best in terms of the evaluation criteria that were used**. Table 5.10 shows the revised Covenant / NEPM package scored in first place because it was the most consistent performer in terms of the totality of the criteria.

Table 5.10: Evaluation Results

		Stakeholder acceptability	Transition impacts and duration	Labelling, education, program	Administrative burden	Flexibility and convenience	Coverage scope	Non-compliance	Competitiveness	Material recovery rates	Net energy usage	Resource conservation	In-house enviro change	Measurement	Total
Do Nothing Option	Voluntary Approach	2	1.5	3	2.5	3	1.5	1	2.5	2	2	2	1	1.5	25.5
Do Nothing Further Option	Current Covenant / NEPM model	2.5	5	5	3	4	3	3	4	2.5	2.5	3	2	2	41.5
Enhanced Approach Option	**Updated Covenant / NEPM model**	**3.5**	**3.5**	**4**	**4**	**3.5**	**4.5**	**4.5**	**4.5**	**3**	**3**	**3.5**	**3.5**	**5**	**50**
Alternative Approaches Options	Advance Recycling Fees	2.5	2	2	1.5	2.5	3.5	4	3.5	4	3.5	4	2	3.5	39
	Mandatory take-back and utilisation scheme (EPR)	2	2	1.5	1	1.5	3	4	2	5	3.5	4.5	3.5	4	37.5
	Mandatory container deposit scheme (EPR)	3	2	2	1	3	1.5	4	2	4	3.5	4	2	3	35
	Increased landfill disposal levies	2	3	3.5	4	2	2	2.5	3	3	3	2.5	1.5	1.5	33.5

5.5.1 Results Interpretation

a) Evaluation using Evaluation Criteria

As illustrated in the scores in Table 5.10 above, the revised Covenant / NEPM package best met the evaluation criteria on a net basis.

On the one hand, it rated more highly than "more lenient" approaches (such as a return to a fully voluntary approach or continuation of the current Covenant) in terms of probable environmental performance. Because it more specifically provides guidance for organisations on compliance, performance targets and measures, and has a regime for penalising those that fail to act, it motivates a greater level of environmental performance, particularly for post-consumer impacts of used packaging, than voluntary efforts.

On the other hand, it rated more highly than more prescriptive approaches (such EPR schemes) on implementation and achievability type grounds. Because it still allows for a significant degree of flexibility in how individual and overall targets and measures are to be achieved, it is seen as imposing less burden (and cost) on the total system.

In sum, it was the best "allrounder" of the considered policy options when each is taken as a 'stand alone' option. This is further illustrated by the below table which groups the evaluation criteria (and the objectives that they represent) into broader categories.

Table 5.11: Performance by Category Type

Delivery Mechanism	Environmental outcomes	Ease of management (on-going)	Ease of introduction
Voluntary Approach	Low	Medium	Medium
Current Covenant / NEPM model	Low to Medium	Low to Medium	High
Updated Covenant / NEPM model	Medium	Medium	Medium
Advance Recycling Fees	High	Low	Low
Mandatory take-back and utilisation scheme (EPR)	High	Low	Low
Mandatory container deposit scheme (EPR)	Medium	Low	Low
Increased landfill disposal levies	Medium	Medium	Low
"Low"….inferior result; "High"….superior result			

b) Overall lifecycle coverage

In addition to the evaluation provided above, it is also worth recognising that the various policy approaches have strengths and weaknesses in terms of their ability to cover and influence the entire lifecycle of packaging. Each policy approach was tested for its ability to drive action in various stages of the packaging lifecycle as well as its ability to reflect a policy goal and the distribution of costs across the various stages.

A qualitative analysis is contained in Appendix 1. This shows that the policy approaches often ascribed to "packaging" or "packaging waste" are in fact markedly different from each other in several respects.

In terms of the scope of a policy approach and delivery mechanism, the current and revised Covenants, for example, seek to cover the total life-cycle of packaging. Landfill levies have the broadest scope but their application is reasonably indirect for most packaging. On the other hand, approaches such as advance recycling fees and mandatory take-back and utilisation are more

significantly aimed at what happens to packaging after its use. In the case of container deposits, the scope is further targeted to beverage container packaging and its post-consumer fate.

Partially as a result of these differing scopes, and different points at which the policy signal is applied, costs of different schemes will fall to different phases and players within the overall life-cycle.

c) Container Deposit Legislation (CDL)

As an alternative policy approach, CDL has historically received the greatest evaluation in Australia of the alternatives policy approaches available. Reviews have been undertaken by the NSW, Victorian and the ACT Governments in recent years. The EPHC considered issues related to CDL in mid 2003.

CDL has also been considered in the RIS as a potential policy option under the Alternative Policy Approaches option (Mandatory Deposit Scheme, Extended Producer Responsibility (EPR) etc). As illustrated in Table 5.10, the evaluation of this approach demonstrated that it did not rate as highly as a number of the other alternative policy approaches or the revised Covenant option. Application of the evaluation criteria suggest the CDL option would:

- only cover a segment of consumer and distribution packaging;
- not enable free riding by affected industry groups;
- lead to a substantial increase in recovery rates for affected packaging;
- result in some resource conservation savings;
- have limited capacity to stimulate greater environmental awareness and improved general practices by industry including product design;
- only be acceptable to some stakeholder groups;
- present moderate difficulty in implementation including substantial administrative processes and costs;
- require substantial labeling, education and program promotion.

6 SUMMARY OF PREFERRED OPTION

The revised Covenant / NEPM package proposed as Australia's instrument of preference for addressing the environmental life-cycle impacts of consumer packaging and paper has several components.

6.1 Main Covenant document

The main document outlines policy context, rationale, objectives, materials scope, stakeholder roles and responsibilities, and some administrative / operational aspects. The document largely preserves the current approach, but significant modifications have been made in terms of seeking to practically improve the Covenant's efficacy:

- specifying environmentally-focussed performance goals (of a non-quantitative nature);
- outlining revised structural arrangements;
- formally extending the scope to include distribution packaging; and
- providing a glossary of key terms such as "product stewardship" and "shared responsibility".

These modifications suggested are in line with the recommendations of the evaluations of the current Covenant and stakeholder feedback.

6.1.1 Proposed Target Areas

When the Environment Protection & Heritage Council considered a draft of the revised Covenant at its December 2004 meeting, it was requested that a set of overarching targets be developed to drive the desired outcomes of the Covenant, particularly in the following areas:

- Packaging disposed of to landfill and packaging recovered for recycling
- Reduction in non-recyclable packaging
- Increased use of recycled packaging materials in new products.
- Continuous Performance Improvement

Definitive targets are still to be finalised. For the purposes of the RIS, several different possibilities and ranges have been considered and modelled.

6.1.2 Schedule 1: Environmental Goals and Key Performance Indicators

This schedule reiterates the revised Covenant's environmentally focussed performance goals and outlines the Key Performance Indicators (KPIs) that are designed to both drive their achievement and measure progress, as well as enhanced reporting requirements. The KPIs are:

- established for both the whole Covenant system and for company-specific target-setting and performance;
- both quantitative and qualitative in nature, and;
- meant to cover the total environmental life-cycle of packaging.

The development of KPIs and more stringent reporting against them as a method for driving improved performance reflect the recommendations of the evaluations of the current Covenant and stakeholder feedback.

6.1.3 Schedule 2: Governance & Compliance Enforcement Procedures

This schedule outlines in detail the governance structures for the Covenant, including the Covenant Council, National Projects Group, and Jurisdictional Projects Groups. It also outlines procedures, including referrals to jurisdictions for the purposes of action under the NEPM, which will apply in the case of under-performance by Covenant signatories.

The provision of greater clarity about the roles of different Covenant-related bodies and more stringent enforcement procedures are in line with the recommendations of the evaluations of the current Covenant and stakeholder feedback.

6.1.4 Schedule 3: Action Plans and Annual Reports

This schedule outlines what Action Plans and Annual Reports are, their duration and type, their content, and other requirements.

The development of a more structured model for Action Plan preparation, lodgement, review, and performance is in line with the recommendations of the evaluations of the current Covenant and stakeholder feedback.

6.1.5 Schedule 4: The Environmental Code for Practice for Packaging

The Environmental Code of Practice for Packaging (EcoPP) provides a statement of general principles for the design of environmentally responsible packaging. In addition, detailed Guidelines are being produced to assist companies to implement the Code and assist them to demonstrate that they have implemented it as part of their Action Plan under the Covenant.

The EcoPP and Guidelines needed updating and stronger integration with the revised Covenant. The focus has been on clarifying the previous requirements and guidelines, rather than developing additional new requirements. Key areas of change to the Code and Guidelines include:

- The objectives have been broadened to guide the packaging supply and recovery chain in reducing the overall lifecycle environmental impacts of packaging and to address the overarching targets as set out in the Covenant as well as providing a tool for the design and manufacture of innovative packaging.

- It is intended that the Code and Guidelines will provide a much more comprehensive and transparent guide for making packaging choices, rather than the previous simple checklist.

- Proposed areas of focus are: source reduction, potential for packaging re-use, recovery and recycling, ability to incorporate recycled content, minimising toxic impacts of packaging, propensity to become litter and consumer information.

- It is intended that the Code and Guidelines will link directly to specific KPIs outlined in the revised Covenant

6.1.6 Schedule 5: Funding Arrangements

This schedule outlines arrangements to fund and conduct projects under the revised Covenant. Funding is to continue to be drawn from Governments and industry participants (but not local government). The schedule puts forward procedures for developing projects, overall objectives, evaluation criteria and processes, and administrative arrangements. The schedule formally extends the scope of eligible projects beyond kerbside recycling to reflect the overall goals of the revised Covenant. The schedule also critically notes that "the Covenant will not exclude valuable project proposals from local government stakeholders who are not Covenant signatories" subject to several conditions. The schedule also outlines Covenant administrative arrangements and their estimated budget (to be drawn from funds collected from Commonwealth, State and Territory Governments and industry participants).

The extension of the scope of funded projects, and the specification of administrative arrangements, is in line with the recommendations of the evaluations of the current Covenant.

6.1.7 Schedule 6: Management of Plastic Bags

This schedule is currently under development, but it is intended that it will incorporate the Australian Retailers' Association Code for the Management of Plastic Bags as requested by Environment Ministers at the December 2004 Environment Protection and Heritage Council meeting. The Code, which was agreed in October 2003, commits retailers to meeting plastic bag reduction and recycling targets by the end of 2005.

Currently negotiations are underway with retailers on an agreement to phase out plastic bags by the end of 2008. It is proposed that the agreement, which will be subject to a separate RIS and Ministers' consideration, will be incorporated under this schedule if appropriate.

6.2 National Environment Protection Measure (NEPM) for Used Packaging Materials

The NEPM's main purpose is to provide support for the Covenant and to ensure that signatories are not competitively disadvantaged. The NEPM provides jurisdictions with a vehicle to impose an obligation on all brand owners operating outside the Covenant to be responsible for assuring the recovery and utilisation of the used packaging materials in which their products are sold to consumers.

To date, no prosecutions have taken place under the NEPM. Government authorities have flagged their intention to increase NEPM enforcement in future. Specific procedures have been outlined in the revised Covenant for referral of companies to jurisdictions for action under the NEPM.

6.3 Potential Effects of Proposed Option

The potential effects of the changes identified for the revised Covenant/NEPM package are in Table 6.1.

Table 6.1: Potential effects of revised Covenant

Provision in revised Covenant / NEPM	Potential effects / outcomes (NB: Effects and outcomes are labelled as both tangible and non-tangible in terms of scope to be quantified)
Explicit environmental goals	□ Improved understanding of purpose and rationale for policy approach (NT) □ Increased accountability on packaging supply chain (NT) □ Stronger drivers for collective industry performance (NT)
Numeric performance targets	□ Higher recycling yields and resultant environmental benefits (T) □ Higher recycled content usage and resultant environmental benefits (T) □ Less waste disposed to landfill (T) □ Stronger focus in companies on identifying, managing and mitigating packaging's life-cycle impacts (NT)
Production of Action Plans according to specifically defined performance areas and quantifiable measures in relation to KPIs, and	□ Continued transition from primarily cultural change practices to greater operational change practices (NT)

Provision in revised Covenant / NEPM	Potential effects / outcomes (NB: Effects and outcomes are labelled as both tangible and non-tangible in terms of scope to be quantified)
specified reporting against them	□ Shift in proportion of commitments from education and awareness to operational aspects (T) □ Increased material from reporting process to measure progress (NT)
An additional emphasis on non-kerbside recycling (eg,, away-from-home recycling) of post-consumer packaging materials	□ Increases in overall recovery rates across materials (T) □ Increased focus on away-from-home recycling (T) □ Increased focus on littering management (T)
Broadened focus to include consumer packaging and distribution packaging	□ Increased packaging supply chain activity to recover distribution / transport packaging, including support from funded projects (NT)
Detailed structural arrangements	□ Increased accountability on all participants (NT)
Dedicated resources for administration of all aspects of Covenant	□ Increased accountability on all participants (NT)
Higher degree of "policing" of brand owners in terms of regulatory aspect, including a new Compliance and Governance Schedule in the Covenant documentation	□ Increase in participation by packaging supply chain (T) □ Continued transition from primarily cultural change practices to greater operational change practices (NT)

Provision in revised Covenant / NEPM	Potential effects / outcomes (NB: Effects and outcomes are labelled as both tangible and non-tangible in terms of scope to be quantified)
Broader scope for use of raised funds across packaging supply chain to minimise environmental life-cycle impacts	□ More projects involving collaboration toward product stewardship (as opposed to kerbside recycling)
Dedicated and coordinated information and communication campaign to packaging supply chain, public and others about Covenant and related issues	□ Increase in participation of eligible packaging supply chain (T) □ Continued transition from primarily cultural change practices to greater operational change practices (NT) □ Improved consumer knowledge and decision-making about the environmental performance of packaging, and capacity to measure same through program evaluation (NT) □ Shift in proportion of commitments from education and awareness to operational aspects (T) □ Higher profile for Covenant in stakeholder groupings (NT)
Redrafted and promoted Environmental Code for Packaging featuring greater guidance to companies on design aspects	□ Continued transition from primarily cultural change practices to greater operational change practices (NT)
Specific systems for centrally and nationally monitoring changes to packaging market, including increased and consistent data collection and reporting requirements against overall performance targets, and specific KPIs for industry, local government and State Governments	□ Increased capacity for Covenant Council and Governments to identify and address issues arising, including introduction of materials / combinations problematic in current recovery systems (NT)
Requirement that CEO endorse company commitments	□ Increased compliance activity and improved resourcing (NT) □ Higher profile for Covenant in industry circles (NT)
More centralised and coordinated system for conduct of funded projects	□ Greater targeting of funding and projects to areas of need on a whole-of-system basis; less duplication of efforts (NT) □ More projects involving collaboration toward product stewardship - as opposed to kerbside recycling (NT)
Opportunity for non-signatories to be fund beneficiaries on provision of matching funding	□ Greater participation of local government in best practice projects; increased national recovery rates (T)

7 ASSESSMENT FRAMEWORK

A key function of this RIS is to identify and assess the impacts of the option that appears preferable at this point in time – a revised Covenant / NEPM model including performance targets.

The COAG Principles strongly advocate systematic and quantitative analysis, such as cost / benefit analysis, to establish the most efficient form of policy to be taken. However, conventional cost / benefit analysis is generally limited to consideration of largely financial and economic aspects. Given that a key driver of the Covenant is the generation of environmental outcomes, it is therefore appropriate to use an integrated "triple bottom line" assessment method. "Triple bottom line" assessment preserves the rigour of conventional cost/benefit analysis, while further enabling insights and conclusions in terms of broader sustainability, including the inter-generational equity of decision-making.

The "triple bottom line" assessment method used in the RIS has three components. First, using conventional techniques, the economic cost / benefit of the proposal is established, including direct and indirect costs / benefits and their distribution. Secondly, the environmental costs and benefits of the proposal are calculated in Eco-dollar terms. Then, the economic and environmental costs and benefits are combined to provide a net provisional result. Thirdly, the social impacts – which are generally difficult to quantify – are considered. If the social impacts are deemed significant, an adjustment is made to the combined economic / environmental valuation. In total, the method enables an estimation of the net welfare impact of a given proposal. Elements of the "triple bottom line" assessment method are further discussed below.

Additionally, it should be noted that the assessment method was primarily applied to the four key target areas proposed for the revised Covenant. This is because:

- Targets are the instrument that will be used as the primary measure of the Covenant's performance and will be closely aligned with the KPIs; and
- The scope of the target areas covers a reasonable proportion of the environmental life-cycle of packaging as a whole.

Notwithstanding the introduction of targets, it should be noted that many of the changes that are likely to ensue from the revised Covenant – and without in any way diminishing their significance – will be non-tangible. This is due to the fact that the revised Covenant remains flexible in its approach to accommodate the diversity and span of the packaging supply and recovery chains, and the fact that baseline data is yet to be gathered.

For the purposes of this analysis, the following boundaries / definitions have used:

- **Domestic** – material from the kerbside system and public places serviced by Councils, and;
- **Commercial & Industrial** (C&I) – material from institutions, shopping centres, bars, clubs, restaurants, offices and businesses.

It **is** noted that away-from-home material is a sub-set of both domestic and C&I, and includes material from special events, shopping centres, pubs/restaurants/hotels, workplaces and institutions.

It is acknowledged that there is some overlap between the above categories – which reflects the complexity of materials recovery practices. This has been borne in mind in the analysis.

In undertaking this assessment, it needs to be recognised that there are significant limitations and complexities in attempting to quantify the economic, environmental and social costs and benefits of packaging materials. To some extent, this situation arises from limitations in the availability of data and the time available to undertake the RIS. There are a number of factors adding to the complexity of the benefit/cost analysis including the heterogeneous nature of waste materials, and the fact that the costs and benefits are frequently highly dependent on site-specific economic and environmental factors such as the proximity of the waste stream to recycling facilities, the cost of appropriate land for landfill disposal, and severity of associated environmental problems (eg. air quality). Given this situation, it is important that the figures which appear in the cost / benefit analysis are regarded as indicative rather than exact.

7.1 Economic

7.1.1 Framework

The economic impact of the revised Covenant / NEPM package, particularly its targets, is assessed against the alternative of the maintenance of the current Covenant. The possible impacts of enhancing the Covenant are identified and then estimates of the costs and benefits of both the introduction and enhancement of the Covenant are made. The costs and benefits are not spread equally, so the assessment outlines the impacts on businesses, government (including local government) and consumers.

A full cost-benefit analysis of the proposed changes to the Covenant cannot be conducted without a large-scale survey of the more than 600 participants, and without an assessment of the flow-on effects, using a large scale economic model and substantial decomposition of the national account input-output tables. Therefore, the analysis below does not capture all the impacts that will flow through the economy, but provides some general indications.

The analysis is also constrained because the methods through which recycling targets will be achieved have yet to be determined. This is important because the way that a target is achieved will impact on both the costs associated with the target and the way that these costs are distributed. For instance, those who are accountable for achieving a target may not be the group who could achieve it at lowest cost.

The analysis serves to highlight the key areas in which there may be efficiency gains or losses.

A number of expected changes following the revised Covenant have been identified in Section 6. From these, the economic impacts from the revised Covenant are expected to be:

- Increase the supply of kerbside recycling, arising from improved Council collection services and increased awareness of consumer demand for recycling.
- Increase the recycling of away-from-home packaging materials.
- Increase in the demand for recycled materials, as businesses explore opportunities to use recycled products, and raise the ratio of recycled to raw material inputs.
- Improved consumer outcomes through increased information on the recyclable qualities of the product and assisting consume choice and disposal.
- Increase in the demand for kerbside collection services of recyclables, as more packaging is able to be recycled and awareness of the benefits of recycling improves.
- Decrease in the unit cost of recycled materials, as more recyclable material is collected.
- Decrease in the cost of collecting a tonne of kerbside recycling (decreasing the *unit cost* of kerbside recycling).

These effects provide the basis for an analysis of the impacts arising from the revised Covenant. In many cases the magnitude of the impact is very uncertain, in which case only directional implications are discussed. The analysis proceeds by examining the impacts these effects have on prices and quantities in these markets, and the implications of this for economic welfare.

7.1.2 The Distribution of Costs and Benefits

While the overall economic loss or benefit can be established with reference to information about administration costs, changes in business efficiency and environmental benefits, these costs and benefits are not evenly distributed across different parts of the economy. The economic assessment documents costs generated for different groups (at a broad level) and quantifies the overall benefit expected from strengthening the Covenant. This is done using an analysis of the magnitudes and distribution of the costs and benefits from the introduction of the Covenant and modelled results of expected outcomes under the proposed changes to the Covenant. It should be noted that there is still considerable uncertainty about the implementation measures that will be used to deliver the targets, but levels of performance need to be assumed for assessment purposes.

7.2 Environmental

7.2.1 Framework

The environmental assessment for this RIS is strategic in nature and based on existing data sets, assessments, and methodologies. The document relied upon for this assessment of the environmental impacts of the revised Covenant was the Independent Assessment of Kerbside Recycling – IAKR - (Nolan-ITU, 2001) which included a Life-cycle Assessment (LCA) of Australia's kerbside recycling system. This study, for the first time, expressed the overall environmental performance of the system as a single, monetised indicator – the 'Eco-dollar'. Economic environmental values from this study, which was undertaken at the commencement of the current Covenant, have now been applied as the basis for assessing the environmental benefits of the revised Covenant proposal, including its four target areas.

The original method developed a value for pollutant loads and resource depletion using equivalence relationships and a base valuation from published government sources. The impact category of global warming uses carbon dioxide as a base and applies equivalence factors developed by the Intergovernmental Panel on Climate Change (AGO, 2001). Water and air pollutants use equivalence factors based on established toxicity assessments from the Life-cycle Impact Assessment Method, Themes Approach developed by the Centre of Environmental Studies (CML), Leiden University, Netherlands (Heijungs, 2001). Resource depletion impacts are measured against the base resource of coal and include equivalence factors for land-use impacts (physical degradation associated with extraction or harvest) and the known resource scarcity based on resource stocks and regeneration. Appendix B provides more details about this methodology.

Economic valuation of environmental impacts aims to aggregate complex information in a meaningful way. This approach is particularly challenging as it requires a simple definitive assessment of systems that are dynamic and indeterminate. On balance, the approach is increasingly used for environmental decision making and is recommended by the European Commission as being rigorous and scientific, and "*providing the basis for improved policy decision making*" (Philippe Busquin, EC Member for Research, Ref. *External Costs* (2003) European Commission EUR20198 Project).

In this context, it is important to note that the final Eco-dollar valuation is indicative and not intended to represent actual environmental benefits for environmental impacts but rather to indicate the relative significance of the different environmental loads and impacts. The main aim is to ensure the LCA results are more meaningful and accessible to a broader cross-section of stakeholders.

7.2.2 Steps

The following steps have been undertaken in the environmental assessment:

1 Identify Covenant performance assumptions, including participation rates and levels, degree of regulatory enforcement

2 Identify Covenant performance scenarios and their characteristics, including status quo and different levels of effectiveness against targets

3 Determine general environmental cost / benefit of proposed Covenant using Life-Cycle Assessment based method and databases (details are provided in Appendix B). This included:

- Life Cycle Assessment – Inventory Data Application; and
- Environmental Economic Valuation using Eco-Dollars.

4 Identify cost / benefit distribution in terms of different sections of the packaging life-cycle, eg,, manufacturing, distribution, post-consumer.

In conducting an environmental assessment of the revised Covenant proposal, particularly its targets, the RIS has focussed on two separate but highly inter-related aspects:

- the potential performance of the key environmental management methods for consumer packaging and paper – domestic kerbside recycling and recycling in commercial / industrial premises;
- the potential in-house environmental performance of members of the packaging supply chain, including "upstream" aspects such as packaging redesign or cleaner production of packaging.

It should also be noted that existing and available data sets for the first aspect of performance (post-consumer environmental management) are stronger than for the second aspect.

7.2.3 The Environmental Cost / Benefit Step

The environmental cost / benefit step seeks to define and value the externalities associated with proposed Covenant performance scenarios using Life Cycle Assessment data and the established Eco-Dollar valuation methods. While this approach was relatively new when the original report (Nolan-ITU et al., 2001) was written, similar approaches involving the application of LCA data and subsequent economic valuation of loads, have been used by the European Commission to support policy making in waste management and other environmental fields (COWI 2000).

a) Background

Life Cycle Assessment is an internationally standardised method for the environmental assessment of products and services. A series of international standards describe the principles and framework for conducting and reporting LCA studies (AS/NZS ISO, 1998). Australian LCA data has lagged much of the developed world. The LCA data used for the modelling of covenant scenarios was used previously for the Independent Assessment of Kerbside Recycling (Nolan-ITU, 2001). The data was considered to be the best available within the study scope at the time of its application, and the same LCA data is used for this study.

Life Cycle Assessment data and support models for waste management have been developed independently throughout the developed world. Models now available include: the USEPA decision support tool, *DST*; the UK Environment Agency model, *Wizard* and the private sector developed model by Proctor and Gamble, *IWM2* as well as numerous European models developed by academic institutes.

Life Cycle Assessment provides a systems-based method of analysis that enables the quantification of all the input and output flows associated with the system into "Inventory Data" and then groups substances with the same type of environmental impact according to scientific procedures. For this study, these impacts are then valued by techniques involving environmental economics to express the final impacts in terms of notional monetary values.

b) The Environmental Cost / Benefit Methodology

- ***Life Cycle Assessment – Inventory Data Application***

  The LCA – inventory data application step involved the modelling of more than 50 substances (resource inputs and pollutant outputs) for each aspect of the waste collection, treatment, recycling and product system. The original study applied data from systems in operation throughout Australia and the world to achieve this.

- ***Environmental Economic Valuation using Eco-Dollars***

  The environmental economic valuation used published economic benefit valuation data to describe the significance of the environmental load for the impact categories of Air Pollution; Water Pollution; Global Warming; Solid Waste; and Traffic and Noise.

  For those loads for which no existing valuation data could be found, scientifically derived equivalency factors (rankings) were applied to allocate the relative economic value.

  As noted above, there are international standards which describe the framework for conducting and reporting LCA studies. However, there are currently no international or Australian standards relating to the Eco-dollar or other similar approaches.

c) Application to this RIS

Eco$ values used

In the IAKR study (Nolan-ITU et al., 2001), the average national environmental benefit of kerbside collection and recycling systems in metropolitan and regional centres was estimated to be Eco$68 per household per year (between Eco$41 and Eco$119 depending on the system and location). Based on the analysis, the total national environmental benefit of kerbside recycling was estimated to be in the order of Eco$424 million per year. The quantity of materials collected was 812,500 t/yr which equates to Eco$522 per tonne of recyclate. This value was for the mix of materials recycled from kerbside. However, no disaggregated (i.e. material specific) figures were published. Some work has been undertaken by RMIT and Nolan-ITU since the original study. Much more work would need to be done to allow publication of material-specific Eco-dollar values. For this reason, and in order to ensure consistency with the original study, the original Eco-dollar value has been applied to the 'mix' of recyclables.

A value of Eco$422 per tonne was adopted as the lower end of the range. More detail is provided in Appendix B.

The environmental impact categories which contributed to the overall environmental benefit of current collection and recycling systems are also detailed in Appendix B. The majority of the impact - 75 percent, comes from *air and water pollution* credits arising from the avoided product system associated with the avoided manufacture from virgin materials. The *natural resource* value of recycling is the next most influential factor at 21 percent of the benefit. This is followed by *global warming* credits, valued at 4 percent, and *landfill* savings at 1.6 percent. *Traffic (Noise and Traffic)* represents a net environmental cost to the system of 2 percent.

Qualifications

It is emphasised that these values do not reflect actual environmental benefits. Their purpose is to indicate the possible order of magnitude of environmental externalities – in this case the improvement of environmental performance and its (currently uncosted) value to the broader society at large.

As described above the quantification of environmental benefits was based on a value attributed to the mix of packaging materials recycled at kerbside at the time of the original study (Nolan-ITU et al., 2001). The economic and environmental impacts associated with recycling packaging materials varies significantly between different types of packaging material, and the results should not be applied to decisions made about individual packaging materials.

Whilst increasing the recycling rate of most packaging waste will deliver environmental benefits, there is evidence to suggest that the environmental impact of recycling mixed plastics could be worse than using the corresponding virgin material.

It is also noted that approximately 21% of the Eco-dollar value is attributed to the assumption that there is a natural resource depletion value associated with the reuse of resources. In particular it is assumed that resources are underpriced by the market, leaving aside any environment cost associated with the extraction of these resources. This concept is subject to debate, even amongst environmental economists.

While taking note of the potential benefit care should be taken the interpretation of Eco-dollar values for decision making purposes at this time, given the indicative nature of these values.

7.3 Social

7.3.1 Framework

The social impact of the revised Covenant was considered on a cumulative basis. This is because the impacts arising from each target area are substantially similar to each other.

In considering the social impacts of the revised Covenant / NEPM package compared to the current situation, several boundaries needed to be established.

First, a set of social impact categories is required to conduct the evaluation. The set used is suggested in the widely recognised Guidelines and Principles for Social Impact Assessment developed by US Government agencies (1994). Several of these and/or similar social impact categories have been previously used and subjected to public scrutiny in a variety of projects conducted for public sector agencies in the waste and other environmental public policy arena, including by the NSW Department of Environment and Conservation. The set of social impact categories was further modified to accommodate the specific circumstances of the revised Covenant / NEPM package and the Australian social context.

Secondly, the ways and places in which individuals in our society interact with the packaging life-cycle were considered. It is important to examine the different "intersection points" between our society at large and the packaging life-cycle. For some Australians, there is interaction with the packaging supply or recovery chains as employees. For the majority of Australians, there is interaction as users of the domestic kerbside recycling system. Finally, for virtually all Australians, there is interaction as consumers of packaged goods. While the Covenant / NEPM emphasises change in industry, the number of people affected in the packaging supply chain is much lower than the number of consumers affected. However, the impacts on this smaller group are likely to be more pronounced and immediate. The list of social impacts assessed is provided in Table 7.1.

Table 7.1: Social benefits

Social Impact Category	Description	Indicators (scored from 5 to 1 in descending order)
Occupational Health & Safety	Degree to which changes from the revised Covenant / NEPM package impact on the occupational health and safety of individuals	Positive benefits, or no or limited discernible impact with negligible consequences. Low number of total impacts; impacts can be mitigated and/or managed; low consequences. Medium number of total impacts; impacts can be mitigated and/or managed; moderate consequences. Medium number of total impacts; impacts difficult to mitigate and/or manage; high consequences. High number of total impacts; impacts difficult to mitigate and/or manage; extensive consequences
Labour Relations	Degree to which changes from the revised Covenant / NEPM package impact on management / employee workplace relationships	Positive benefits, or no or limited discernible impact with negligible consequences. Low number of total impacts; impacts can be mitigated and/or managed; low consequences. Medium number of total impacts; impacts can be mitigated and/or managed; moderate consequences. Medium number of total impacts; impacts difficult to mitigate and/or manage; high consequences. High number of total impacts; impacts difficult to mitigate and/or manage; extensive consequences

Social Impact Category	Description	Indicators (scored from 5 to 1 in descending order)
Consumer Empowerment	Degree to which changes from the revised Covenant / NEPM package impact on consumers' knowledge of and decision-making power about the environmental attributes of packaging	Positive benefits, or no or limited discernible impact with negligible consequences. Low number of total impacts; impacts can be mitigated and/or managed; low consequences. Medium number of total impacts; impacts can be mitigated and/or managed; moderate consequences. Medium number of total impacts; impacts difficult to mitigate and/or manage; high consequences. High number of total impacts; impacts difficult to mitigate and/or manage; extensive consequences
Residential Amenity	Degree to which changes from the revised Covenant / NEPM package impact on residents' quality of life, including social cohesion / civic pride, convenience in participation, noise, traffic, odour and dust.	Positive benefits, or no or limited discernible impact with negligible consequences. Low number of total impacts; impacts can be mitigated and/or managed; low consequences. Medium number of total impacts; impacts can be mitigated and/or managed; moderate consequences. Medium number of total impacts; impacts difficult to mitigate and/or manage; high consequences. High number of total impacts; impacts difficult to mitigate and/or manage; extensive consequences.

Table 7.2 illustrates the inter-relationship between the different impact categories and stages of the packaging life-cycle and affected stakeholders. In conducting the assessment, these stakeholder groups were primarily considered when evaluating the impact of a given category.

Table 7.2: Impact Categories and Stages of Packaging Life-cycle

Packaging Life-cycle Stage	Most Directly Involved Groups	Relevant Impact Categories
Material Supply & Product / Package Design	Packaging supply chain employees	Occupational Health & Safety Labour Relations
Manufacturing	Packaging supply chain employees	Occupational Health & Safety Labour Relations
Distribution	Packaging supply chain employees	Occupational Health & Safety Labour Relations
Consumption	Individual users of packaging, including retail consumers Institutional users of packaging	Consumer Empowerment
Post-Consumption including Disposal and Recovery	Packaging recovery chain employees Householders	Occupational Health & Safety Labour Relations Residential Amenity

7.3.2 Considerations

There is considerable amount of debate in academic and other circles about the valuation of social costs and benefits. For instance, how can a value be put on the preservation of a natural asset? Or, in the case of the revised Covenant / NEPM package, what value can be placed on a consumers' sense of satisfaction from having selected a recyclable product in the supermarket, or having successfully segregated their recyclables at kerbside? A variety of techniques have been suggested for such valuation, including "willingness to pay" (WTP) for different or improved social goods and outcomes.

However, given the number of variables involved, it would be less than robust to apply a comparative costing or WTP methodology such as revealed-preference or cognitive valuation to the social costs and benefits of the revised Covenant / NEPM package. For example, seeking to assign a dollar value to an individual ratepayer to feel he/she is making a contribution to environmental protection through source segregation would be highly subjective and open to wide interpretation.

O'Connor (UNEP; 2002) is worth bearing in mind in this context:

> *"People in different cultural settings articulate their sense of value about nature in multi-layered ways. The significance of nature, and of built environments, is embodied in a person's or a community's way of life, in their institutions and taboos, in their principles and precepts of right conduct, their habits and forms of cooperation. Very often, explicit value statements about the environment emerge only when these*

principles are compromised or ways of life threatened… So, valuation should be taken broadly to refer to people's notions of what matters for the future and why."

While there is strong merit in further work in the area of social costing of environmental public policy, the approach used for the RIS was to use indicator-based evaluation to broadly establish impact levels of changes stemming from the revised Covenant / NEPM package. The indicators are designed to capture both the likelihood and consequence of the impact (which is in accordance with the Australian Standard for risk management). If the evaluation were to reveal a significant level of social impact, consideration would then be given to an adjustment of the net welfare costing (eg,, economic and environmental costs / benefits) of the revised Covenant / NEPM package.

Also, it should be highlighted that the revised Covenant / NEPM package has the potential to affect a wide range of stakeholder groups. These include:

- State and Territory governments;
- local government authorities;
- companies who produce and/or supply raw materials for packaging;
- companies who produce and/or use packaging in which products are sold;
- companies that distribute and/or sell packaged products;
- contracted collectors, sorters and reprocessors of recovered materials;
- members of the community both as ratepayers and as consumers.

It should be noted that there are significant differences within each of the stakeholder groups themselves. Stakeholder groups are by no means internally homogeneous. For example, impacts may be different according to the size of different firms in the packaging supply chain or the demographic composition of a given community. Indeed, impacts are partially shaped by a wide range of factors, including company size, current recycling systems in a community, geographical location, and income levels. This aspect cannot easily be corrected for, but it is important when conducting the evaluation to – at a minimum - consider any exceptional circumstances for given sub-sets of stakeholders.

Finally, a weighting system for the social impacts has not been employed on the basis that a wider consultation program would be required to assign weights to the impacts with any degree of certainty. This, however, does not imply lack of clarity from the assessment of social impacts. If a clear distinction between the current situation and the revised Covenant / NEPM package can be made in regard to overall social impacts without weighting, then weighting is superfluous to the analysis. Indeed, a clear result under these circumstances is, *a priori*, more robust than a weighted result (due to subjectivity included in the weights). The analysis here attempts to determine if a clear result is achieved without weighting.

8 DETAILED IMPACT ASSESSMENT OF PREFERRED OPTION

As discussed in Section 7, the impact assessment is structured around the preferred option's overarching target areas, as most of the costs and benefits are expected to relate to these areas. The overall impacts associated with monitoring, reporting and administrative components are considered for the revised Covenant as a whole.

The assessment first establishes current consumption and recycling levels ("the baseline"). Because there is still some uncertainty as to current packaging consumption levels, particularly with regard to imported packaging, the assessment uses a range of baseline values. In addition, because targets are still being established, the assessment considers performance ranges in each area.

The assessment considers the economic and environmental impacts of the preferred option in terms of:

- Broad impacts that occur across all target areas
- Monitoring, reporting and administration.

The assessment then goes on to consider the impacts associated with the following target areas:

- Increased packaging recycled (and less packaging sent to landfill);
- Reduced non-recyclable packaging
- Increased use of recycled packaging materials in new products
- Continuous improvement (which includes a wide range of aspects including waste avoidance and design for the environment).

Social impacts are considered separately in Section 9, as these are spread across each of the areas described above. Section 10 then goes on to summarise the overall economic, environmental and social impacts of the preferred option.

8.1 Establishing the Baseline

a) Packaging Production and Consumption

To assess the impacts of the Covenant, and to assist in establishing targets, baseline data about current levels of packaging consumption and recycling are required. To assess any potential changes in the packaging supply chain – "upstream" from recycling/disposal activities – the amount of packaging produced locally also needs to be known.

Table 8.1 lists estimates for packaging consumed in Australia, and the proportion that is produced locally (as opposed to imported). Figures have been collated from the National Packaging Materials Database project that was initially undertaken in 2002 (Nolan-ITU, 2002) and has now been updated, as part of the Covenant process. The updated figures are generally for 2003, except in a few cases where 2004 data was available. The total amount of packaging material consumed in Australia is approximately 3.3m tonnes per year, with 2.8m tonnes produced locally. (Note: Without any other influencing factors, an average GDP growth of 3.5% over 7 years (one and a half of which have already passed) would increase the amount of packaging used in Australia to 4.3m tonnes per year in 2010.

It is noted that this figure is likely to underestimate the consumption level as Australia imports a range of 'filled products' (eg wine in glass bottles, but also washing machines in cardboard packaging etc.), and the quantity of packaging used for these products is not known (as opposed to packaging imported for product packaging in the country, the quantity of which is known and has been accounted for in this study). .

Table 8.1: Estimate of Packaging Materials Consumed and Produced Locally

Packaging material	Consumed t/yr	Produced locally	
		%	t/yr
Paper/cardboard	1,675,500	90%	1,507,950
Glass	850,000	90%	765,000
PET	117,900	39%	46,200
HDPE	160,800	56%	89,600
Other plastic	380,600	70%	266,439
Steel (tin plate)	82,100	100%	82,100
Aluminium	45,200	98%	44,296
Total	**3,312,100**	**85%**	**2,801,585**

Source: National Packaging Database Project, Nolan-ITU (2005)

Note: Excludes imports of finished products

b) Kerbside Recycling

As a basis to estimate the amount of packaging recycled, data was sourced on the most recent kerbside recycling figures (which include newsprint and magazines in addition to actual *packaging* materials). The following data sources were used to obtain the most recent kerbside recycling figures (Table 8.2).

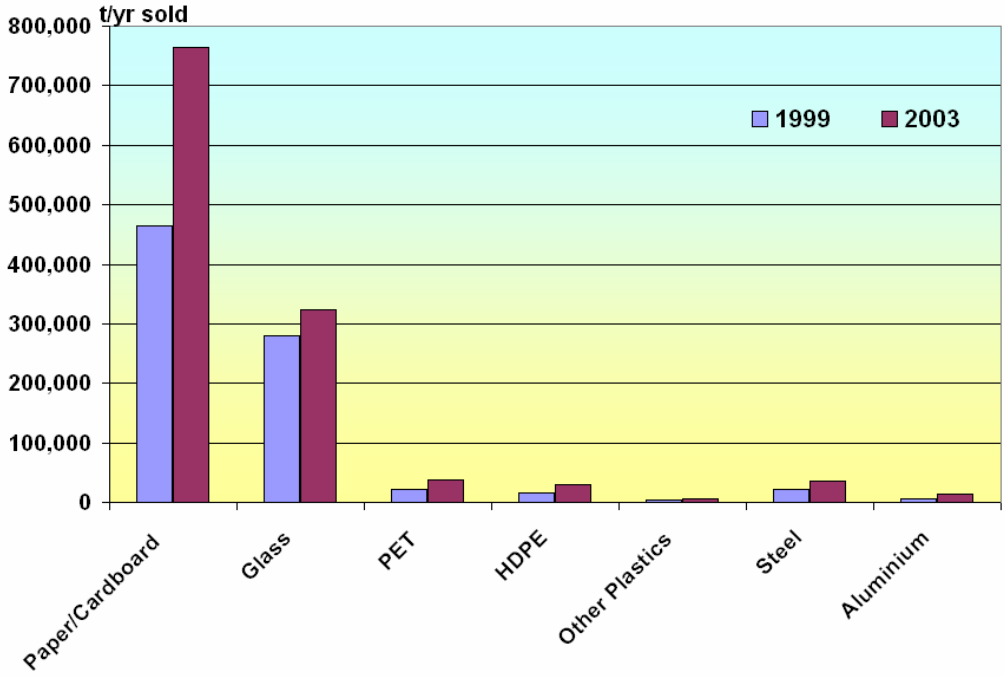
Table 8.2: Data Sources for Kerbside Recycling

Jurisdiction	Data Source
NSW, TAS, NT	NEPC (2004)
VIC	EcoRecycle Victoria (2004b)
QLD	QLD EPA (2004)
SA	SA EPA (2002, 2003)
WA	WALGA (2003)
ACT	ACT NoWaste (2004)

For 1999, the figures from Nolan-ITU (2001) were adopted. The results are listed in Table 8.3 and depicted in Figure 8.1. Overall, the quantity of kerbside recyclables (collected and) sold has increased from 812,000 t/yr in 1999 to 1,212,000 t/yr, a growth of 49 per cent in only four years. By weight, paper experienced by far the largest increase. However, the relative growth was greater for aluminium (144%), HDPE and PET (84% and 79%).

Table 8.3: Kerbside Recycling Quantities Sold (t/yr)

	1999	2003
NSW	315,000	485,000
Vic	232,000	372,000
Qld	133,000	158,000
SA	42,000	55,000
WA	65,000	87,000
TAS	11,000	19,000
NT	-	7,000
ACT	14,000	29,000
Total	**812,000**	**1,212,000**



Liquid Paperboard (LPB) quantities are comparatively small and have been included with paper/cardboard

Figure 8.1: Kerbside Recycling Quantities per Material, 1999 and 2003

Table 8.4 lists the quantities of *packaging* recovered from kerbside recycling systems throughout the country. These figures differ from those in Table 8.3 in that recycled newsprint and magazines have been deducted from the kerbside recycling stream as they are not packaging. Newsprint quantities recovered and reprocessed from the kerbside system have been taken from PNEB (2004). Some recovered magazine quantities had to be estimated using in-house data and industry sources.

It is interesting to note that, during the period from 1999 to 2003, the recovery of packaging materials (i.e. excluding newsprint and magazines) through kerbside recycling has increased by 79 per cent (from 381,000 t/yr to 667,000 t/yr), a significantly higher increase than the overall increase in kerbside recycling of 49 per cent (i.e. including newsprint and magazines). This is predominantly due to the already high recovery rate of newsprint in 1998/99.

The average quantity of packaging recycled from households is 1.9 kg per week (compared with 3.4 kg/hhld/week including newsprint and magazines). On this basis, ACT has the highest packaging recycling yield (2.77 kg), closely followed by Victoria and NSW.

Table 8.4: Packaging Materials Recovered (and sold) from Kerbside Recycling in 2003

	1999 (t/yr)	2003 (t/yr)	2003 (kg/hhld/week)
NSW	147,000	289,000	2.39
Vic	108,000	228,000	2.56
Qld	62,000	73,000	1.05
SA	20,000	22,000	0.80
WA	22,000	31,000	0.87
Tas	5,000	10,000	1.15
NT	-	5,000	1.46
ACT	7,000	16,000	2.77
Total	**370,000**	**674,000**	**1.85**

Some consumer packaging is also collected 'away-from-home' from public places (typically by local councils or other landowners), from shopping centres, and from pubs, clubs and restaurants.

Insufficient data is available to estimate how much away-from-home packaging is currently recovered from public places or from shopping centres. Although this is an emerging area (particularly at major events such as the Grand Prix, or the Olympics), overall quantities recycled are expected to be relatively low. Similarly, systems for recovering packaging recovered from pubs, clubs and restaurants could be improved. Packaging recovered from these sources would be expected to appear in the commercial and industrial figures below rather than in the domestic section.

c) Recycling from Commercial & Industrial Sources

Figures on commercial and industrial (C&I) recycling are more difficult to obtain for all States and Territories. Sources reviewed included:

- NSW Reprocessing Industry Surveys (NSW DEC 2004b);
- Victoria's Annual Survey of Recycling Industries (EcoRecycle 2004a);
- the latest figures for South Australia from Zero Waste SA;
- information from ACT No Waste published on their website;
- information from Queensland's State of Waste and Recycling (2004); and

For the remaining states, C&I figures were estimated by extrapolation. The resulting quantities recycled from non-domestic sources are shown in Figure 8.2. Based upon this information, the national total is estimated to be approximately 1.7m tonnes per year, up from around 1.5m tonnes per year in 1999. However, despite the fact that obvious non-packaging materials (such as recycled car bodies etc.) have been excluded from these figures it is estimated that the quantities quoted above include in the order of 20-25 per cent non-packaging materials. Therefore, adjustments have been made in the recovery projections to reflect this situation.

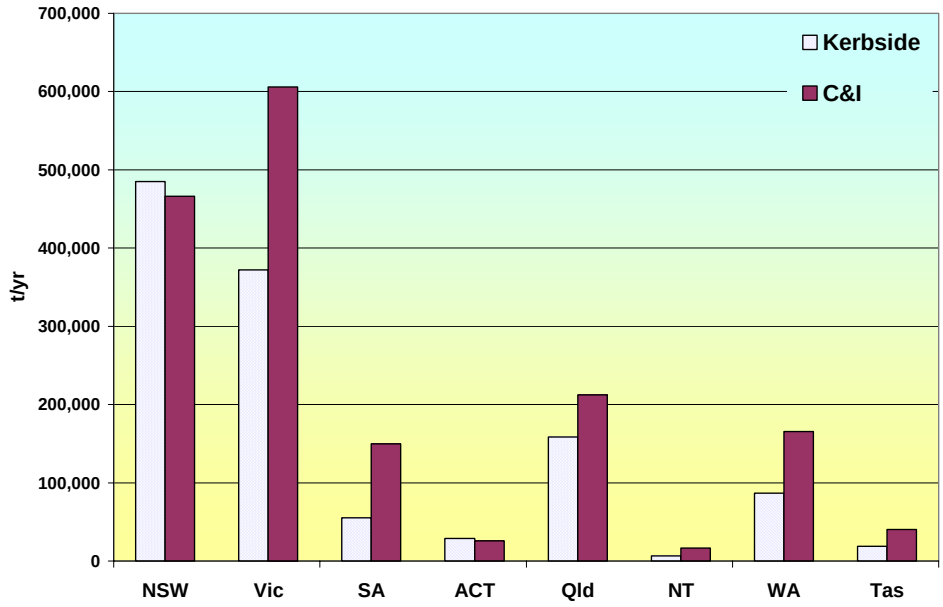


Figure 8.2: C&I Recycling by State compared to Kerbside Recycling (t/yr)

d) Adjustments for 'Filled Product'

The year 2003/04 is used as the baseline. In 2003/04, the total quantity of recycled packaging was about 1.75m tonnes. Packaging consumed in Australia was 3.3m tonnes (excluding imports of packaged products Nolan-ITU, 2005) of which 39 per cent was used by the domestic sector and 61 per cent in the commercial & industrial sector.

Based on these figures the overall recycling rate in Australia is approximately 53 per cent. However, as discussed earlier in this section, this figure overestimates the recycling rate as Australia imports a range of 'filled products' (eg wine in glass bottles, but also washing machines in cardboard packaging etc.), and the quantity of packaging used for these products is uncertain (refer to Section 8.1) For the above reason, and to reflect this uncertainty, two baseline recovery rates have been assumed. These are 40 per cent (Scenario A), and 50 per cent (Scenario B) recovery rates. These two baselines represent the uncertainty range, with the actual recovery rate likely to be somewhere in between. It is noted that further work since the modelling contained in this RIS suggests that the current baseline is around 47% recovery, a figure accepted by all parties involved in the targets discussion.

The resulting calculated totals for packaging consumption (including 'filled product') are provided in Table 8.5. Based on the known recycling figures and keeping the ratio between the sectors constant, the total quantity of packaging consumed (including 'filled product') is estimated to amount to between 3.4m tonnes per year (assuming a current 50 per cent recovery rate) and 4.3m tonnes per year (assuming a current 40 per cent recovery rate).

Table 8.5: Baseline Scenarios

Waste Stream	Scenario A, 40% Current Recovery			Scenario B, 50% Current Recovery		
	Packaging Consumption	Recovery	Disposal	Packaging Consumption	Recovery	Disposal
Domestic	1,662,000	665,000	997,000	1,330,000	665,000	665,000
C&I	2,621,000	1,048,000	1,572,000	2,097,000	1,048,000	1,048,000
Total	4,283,000	1,713,000	2,570,000	3,426,000	1,713,000	1,713,000
Note: As acknowledged previously, due to some potential overlaps there is a level of uncertainty in the split of materials between the domestic and Commercial & Industrial spheres.						

To enable comparison, the packaging recycling figures in EU countries are presented in Figure 8.3: The average packaging recycling rate in the European Union was 53 per cent in 2001 (European Environment Agency, 2004), compared with a rate of between 40 and 50 per cent (presumably closer to 50 per cent) in Australia.

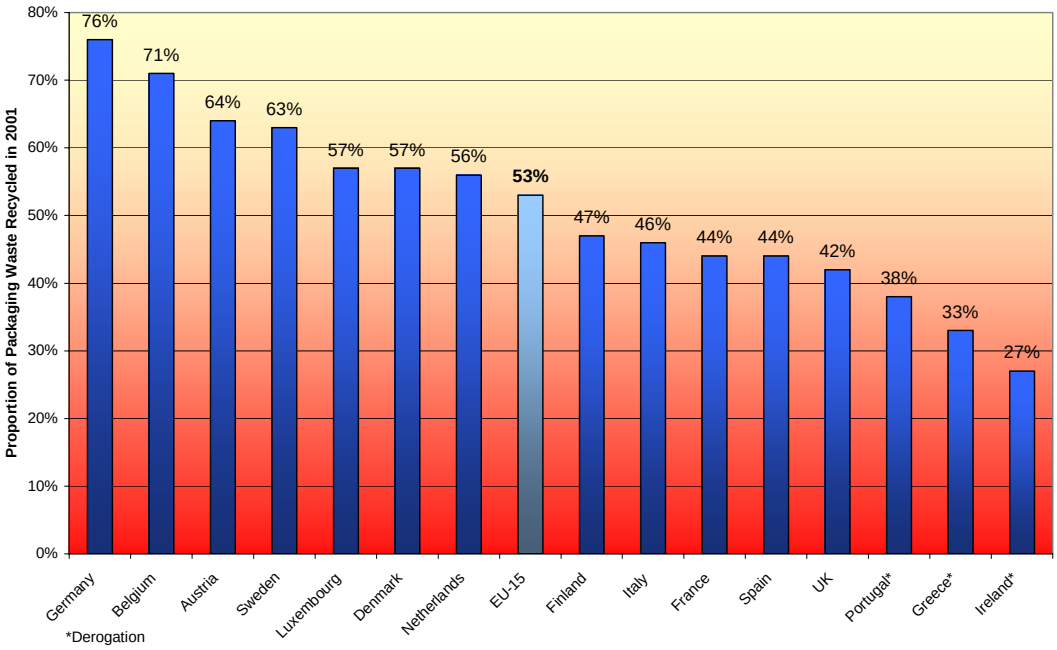


Figure 8.3: Recycling Rates for Packaging Waste in the European Union in 2001 (European Environment Agency, 2004)

Whilst it is appropriate to illustrate the differences between Australian and European recycling rates, it is also important to qualify any comparisons by considering the differing circumstances between Europe and Australia. For example, high cost of landfill has been a contributing factor to the establishment of high recycling targets in Europe, and towards the development of treatment systems for residual waste streams including packaging. As noted earlier there are implications for the suitability of European models for Australia. However, there has been no substantial analysis and comparison to date and therefore it is difficult to draw any conclusions about the likely consequences of applying these models to Australia. It is also noted that a number of different methods are used for data collection, collation and reporting in EU member countries which makes a direct comparison difficult. A recent decision by the European Decision (Warmer Bulletin, 25 March 2005) on a framework for providing statistical data aims at harmonising packaging and packaging recycling data in the future.

e) Projections

Two factors have been used to estimate the growth of packaging *consumption*. These are:

- Population growth of 1.13 per cent annually (ABS, 2004); and
- GDP growth (per capita) of 1.88 per cent (Reserve Bank of Australia, 2004)[1].

[1] Annual average GDP growth per capita from 1997/98 to 2003/04 was 1.88%. A similar growth has been assumed until 2010 where indicated.

Changing packaging consumption through a decrease in household size from 2.58 persons per household in 2003 to 2.53 and 2.51 in 2008 and 2010 respectively (ABS, 2004b) was initially considered as a influencing factor[2] however, the available information does not show a statistically representative correlation. In addition, the impact on packaging consumption would be very small (below 1 per cent over seven years) which is why a change in household size was not used as a factor in the projections.

Based on the above factors, the overall projected growth in packaging consumption between 2003 and 2010 is expected to be 23 per cent (from approximately 3.3m tonnes/annum to 4.2m tonnes). For comparison purposes, the projected growth rate as estimated by the European Environment Agency (EEA) in 2004 for the members of the European Union is expected to increase by 18 per cent between year 2000 and 2008 based on a continued production growth as before. It is noted that projected population growth in the EU is significantly lower than that in Australia.

8.2 Impacts across the whole of the revised Covenant

This section describes broad impacts that cannot be attributed to any specific target area, or to the monitoring, administration, or reporting requirements of the revised Covenant. In addition to environmental benefits, this section identifies some financial benefits of the Covenant.

8.2.1 Costs

The costs of strengthening the Covenant are initially borne by government and business. State and Territory governments will face costs from increased monitoring and policing, reflecting that these are areas in which the Covenant has been strengthened. Some Councils, particularly in regional Australia, will incur costs from increased collection of recyclable materials. Businesses will face increased administration costs and further costs due to operational changes, reflecting more explicit and accountable Action Plans.

Further consideration of these issues is set out below. Particular consideration has been given to costs to smaller business.

a) Businesses

Strengthening the Covenant should lead to both greater participation and more effective participation in the Covenant. Many of the costs associated with this will be of a similar nature to the costs arising from the introduction of the Covenant. However, the focus on away-from-home recycling will generate additional costs as calculated in the following sections.

[2] Industry perception is that households with more people have a lower per capita waste generation rate than households with fewer people.

For businesses, a small survey of Covenant signatories was conducted via interview. Businesses contacted were chosen to ensure information was obtained for different parts of the supply chain, different business sizes and different industries. However, several small businesses declined to be interviewed, due apparently to their negative views of the Covenant. As such, the survey contains some bias towards larger businesses, and businesses that cited larger benefits from the Covenant. Interviews were conducted with 10 businesses in total.

The main behavioural changes will occur in the business sector, and therefore this is where many of the costs will be incurred. Quantitative information in this area is sparse. However, a small survey of business signatories provides some indication of the drivers of business costs associated with the introduction of the Covenant, and what can be expected with a strengthening of the Covenant. Businesses were asked to rank the types of costs listed below. Results are presented so that a ranking of 5 indicates that every business ranked that cost highest, while 1 means every business ranked that cost lowest.

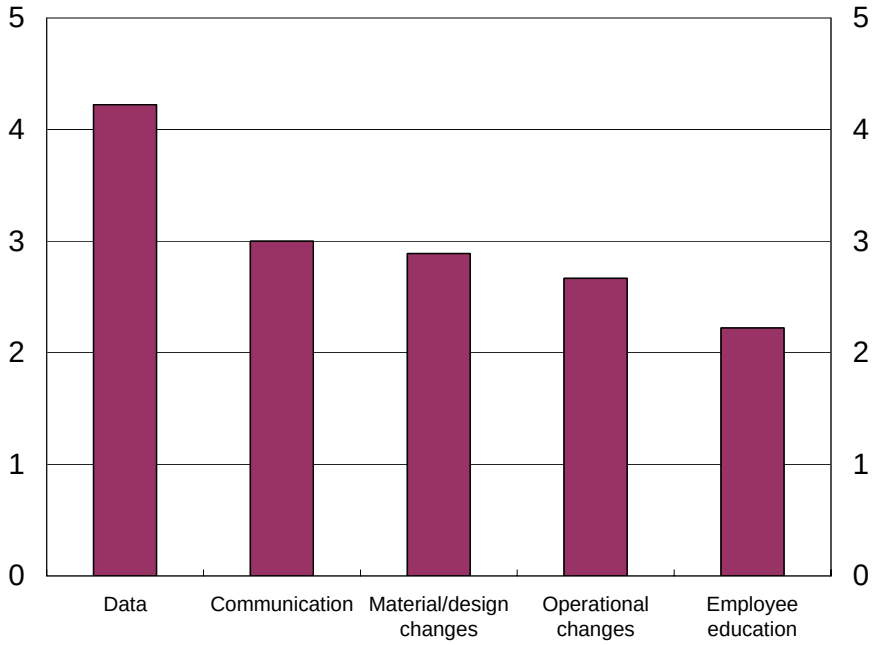
REQUEST FOR FEEDBACK FROM BUSINESSES:

Feedback from businesses is sought in relation to the estimated administrative costs to Covenant signatories, including a breakdown of the cost of developing an action plan, complying with the Environmental Code of Practice, contribution changes to the National Packaging Covenant Industry Association (NPCIA) and monitoring and reporting of KPIs. Existing signatories should draw upon their experience in the current Covenant.

These costs could include the average time spent by individual businesses implementing the administrative and record keeping requirements of the Covenant and the cost of that time to the business.

Data collection/monitoring/reporting

Businesses indicated that the costs of data collection, monitoring and reporting increased substantially following the introduction of the Covenant, ranking as the most important costs of those identified. Strengthening the Covenant will increase these costs somewhat, reflecting efforts to increase the accountability of Action Plans and create a useful data set for future analysis.



Source: Survey of businesses

Figure 8.4 : Which costs mattered most to business (ranking out of five)?

Communication with suppliers or customers

Communication with suppliers and customers ranked as the second largest cost to businesses of the introduction of the Covenant. A number of businesses gave examples of communication campaigns to raise the environmental profile of their business, or to provide consumers with more information on packaging. Some reputation-based campaigns were run purely for awareness whilst others involved sponsorship of environmental activities such as litter reduction programs.

Material/design changes

Material and design changes ranked as a moderate cost to business, reflecting that such decisions tended to be guided by financial concerns as well as environmental concerns. Many businesses had replaced non-recyclable materials with those that could be recycled, such as PET plastic and had increased the use of recycled materials in production. Beyond substitution of recycled for raw and recyclable for non-recyclable, businesses noted efforts to reduce usage of packaging materials, for example through bulk packaging.

Operational changes

Operational changes ranked reasonably low in the list of costs, indicating that many of the achievements of the Covenant have been intangible. Some of the operational changes included systems to light-weight packages (using less material for a given package) and developing systems to use recycled products.

Employee education

Costs of employee education ranked as the smallest of the costs to businesses. Some businesses spent money in educating their own employees on the waste management and recycling ethos, and some were required to educate suppliers or buyers as well. Education spending was an area that larger businesses attributed significant value to. They noted the opening up of communication channels within the firm, and expected that benefits, while hard to quantify, were arising from this.

Trans-Tasman Issues

The RIS envisages no significant issues of a trans-Tasman nature. The revised Covenant does not establish any barriers or obstacles to trade to or from New Zealand. Packaging in New Zealand is subject to the voluntary National Packaging Protocol, which encourages outcomes that are similar to those of the revised Covenant. Several companies operating in the region are known to participate in both agreements in a relatively seamless way.

Overall

The cost of operational and material changes of the Covenant is estimated to have been approximately $5m to $10m per year, using the business survey. Estimates from individual businesses were scaled up by allocating the operational costs of the businesses surveyed to the rest of the business signatories according to turnover. Strengthening the Covenant will lead to further operational changes by current signatories and changes by new signatories, under KPIs and targets relating to increased recyclability of packaging materials and the increased use of recyclable packaging in new products as well as continuous improvement against actions and baseline data established in Action Plans. Some of these costs have been quantified in previous sections. For the remainder, we assume that the extra costs to business of the proposed changes to the Covenant are relatively of the same order to somewhat higher than the extra cost of the Covenant relative to no Covenant, at $5m to $10m per year. Cost increases would largely be the result of increased Covenant KPI compliance, including data gathering and reporting.

The Small Business dimension

In terms of the distribution of financial costs, smaller business signatories are likely to face disproportionately net higher costs than big business under the revised Covenant package. This situation arises largely because the costs associated with preparing action plans and reporting are largely independent of the size of the company.

Smaller business (eg, businesses under 20 employees) and SMEs (eg, small-to-medium enterprises with under 100 employees) can be impacted by the Covenant initiative in a number of ways. Some businesses, even those who are not brand owners, may choose to become signatories to the Covenant and in this case, they will be obliged to draw up robust Action plans and meet the monitoring and reporting obligations associated with the KPIs. It is not anticipated that there will be specific additional requirements flowing from the overarching targets since these will be integrated into the KPIs and Action Plan development and reporting process.

It needs to be noted that, during the course of the initial Covenant package, State jurisdictions established an implementation threshold for NEPM enforcement action. This was to ensure that smaller business brand-owners who were not making a substantial contribution to the waste stream would not be captured. The threshold, or "trigger", was established at 1 per cent market share.

This "trigger" is currently being reviewed as experience has shown that it is difficult for businesses to demonstrate and difficult to enforce. An alternative "trigger" relating to the dollar value of packaging and/or amount of packaging used is being considered. The intended net result will be no change in the number of small businesses captured under the NEPM.

It is acknowledged, however, that some smaller businesses may voluntarily choose to join the revised Covenant (some 10 per cent of current signatories generate less than $2 million in revenue per year, and approximately one-third generate less than $10 million in revenue per year). It is equally acknowledged that there may be influence from other companies in the packaging supply chain (as a result of their own Covenant obligations) which cause smaller businesses to opt to participate in the Covenant.

Small business and SMEs may also be impacted more generally as a result of the momentum generated by the Covenant to increase the recovery of recyclables from the commercial sector. In focussing on recovering additional quantities of recyclables from away from home sources, small businesses will have increasing opportunities and be encouraged to utilise recycling services for their wastes since this is an area where there is substantial opportunity for increased yields. This may lead to additional costs for the business. There will, however, be no compulsion to participate in these systems although even non signatories to the Covenant may be strongly encouraged to participate by signatories with whom they deal as part of the supply chain.

Some of the potential impacts on smaller businesses (only some of which can be quantitatively estimated at this stage) and their causes are outlined below. Potential mitigation activity is also discussed below.

Table 8.6: Smaller Business Impacts

Impact	Probability / Consequence	Cause
Administrative costs	Likely to increase somewhat over the approximately $2,000 per year per small business or SME for current participants (It should be noted that the Independent Evaluation of the current Covenant found that Action Plan quality was not dictated by the size of an organisation. This suggests that small business and SME participants take their obligation seriously and do not attempt to avoid the costs of compliance.) Likely to be an increase for new participants, eg, $2,000 per year plus. Contribution charges to the NPCIA for SME signatories range from $500 to $1,875 per year under the existing Covenant.	Compliance with Covenant's administrative provisions, especially the development and lodgement of Action Plan(s) and Action Plan Report(s), and particularly data collection and reporting.
Operational costs	Likely to increase in shorter term by $50 to $100 per year per small business and SME for new participants (including non-signatories) who chose to participate in resource recovery schemes. This will be either direct for those who manage their own waste contracting, such as industrial park occupants or "High Street" businesses, or indirect for those who are tenants in shopping centres. Likely to increase in shorter term by unquantifiable amount as Covenant participating small businesses and SMEs identify and implement product stewardship initiatives.	Compliance with Covenant's performance provisions, particularly increased resource recovery from small business and SME participants. Compliance with Covenant's performance provisions in product stewardship areas, such as purchasing of recycled content products, product design, employee education etc. Voluntary participation in resource recovery schemes by non-signatory small businesses and SMEs. Lower capacity to find internal economies of scale in participation in resource recovery. Lower capacity to pass costs onto consumers as a result of seeking to maintain competitiveness with larger businesses.
Environmental awareness	Likely to increase for both Covenant participants and other smaller businesses who may become involved in increased resource recovery.	It has been demonstrated through a range of government-sponsored pilot and other programs that as small businesses and SMEs participate / increase participation in resource recovery and product stewardship, their management and workforce will gain greater awareness, knowledge, and skills in broader environmental performance. These

Impact	Probability / Consequence	Cause
		attributes can in turn lead to improved capacity to identify and claim operational cost saving opportunities, such as energy and water usage, as well as improved employee morale / productivity.

In summary, it would appear that there will be some negative impacts on small business and SME participants arising from the Covenant. Given their nature, it will be more difficult for small businesses and SMEs to pass these costs on than comparative costs incurred by larger businesses. However, actions can be taken to mitigate these impacts. This is made more possible by the changed scope of funding arrangements and eligibility envisaged under the revised Covenant.

Administrative costs to SME participants from Covenant compliance can be addressed through a range of governance initiatives, including:

- Provision by authorities of 'template' Action Plan solutions tailored to different small business and SME business-type categories;
- Streamlined reporting system, including once-a-year lodgement of Covenant information via an Internet form;
- Provision of specific advice / guidance by authorities either directly or through relevant industry associations, and;
- Provision of general communication and information about the Covenant, its purpose, compliance procedures etc.

In terms of resource recovery costs, it is important to look at their context. Many small businesses and SMEs currently have no or very limited resource recovery in place. Given the comparatively cheap cost of waste disposal due to low landfill pricing, it will cost small businesses and SMEs money to introduce or expand their in-house recycling efforts. Small businesses and SMEs will need to pay for resource recovery contractors, and there will be additional labour costs from increased segregation of recoverable materials in-house. Many of these costs are seen as transitional. Waste disposal charges will rise in due course, and economies of scale in recyclate collection will emerge.

Additionally, shorter-term costs associated with introducing greater product stewardship are likely to diminish or be off-set over time. It has been established that improved environmental performance – once achieved – can reduce businesses' fixed costs.

Resource recovery and product stewardship related costs can be further mitigated in the short-term by:

- Facilitation by authorities of development of resource recovery for “High Street” shopping centres by both the private sector and Councils;

- Development of “preferred practices” for the conduct of small business and SME resource recovery by local government;

- Support by authorities for other related initiatives which are targeting the small business and SME sector for more material, eg. beverage industry and paper industry;

- Specific programs of business support for reprocessing sectors with a high proportion of small business and SME participants, especially plastics reprocessing, including market development grants, and;

- Provision of advice / guidance by authorities on product stewardship opportunities either directly or through relevant industry associations.

REQUEST FOR FEEDBACK FROM SMALL TO MEDIUM-SIZED BUSINESSES:

*Feedback **from small to medium-sized businesses** is sought in relation to the estimated administrative costs to Covenant signatories, including a breakdown of the cost of developing an action plan, compliance with the Environmental Code of Practice, contribution changes to the National Packaging Covenant Industry Association (NPCIA) and monitoring and reporting of KPIs. Existing signatories should draw upon their experience in the current Covenant.*

***These costs could include the average time spent by individual businesses implementing the requirements of the Covenant and the cost of that time to the business**.*

b) *Government*

Costs to government (including local government) are discussed in Section 8.3 Monitoring, Reporting and Administration.

8.2.2 Benefits

The introduction of the Covenant is estimated to have had significant environmental and some business benefits. Somewhat surprisingly, most businesses surveyed said that participation in the Covenant had been a net benefit activity for them, although the survey tended to reflect the views of larger businesses.

The benefits to consumers are not strictly financial. They reflect consumer gains from the value of the increased services provided by Councils. This aspect and its quantification is discussed in more detail elsewhere.

a) Environmental

Including the environmental aspects of packaging into the decisions of consumers, businesses and governments is a main aim of the National Packaging Covenant. It is not surprising that this is where the bulk of benefits of the Covenant occurred and where the bulk of benefits from strengthening the Covenant are expected to occur.

b) Business

The Covenant/NEPM arrangements forced businesses to incur administrative and planning costs relating to their use of packaging. However, operational changes were largely at the discretion of businesses, and businesses surveyed indicated that operational changes were largely decided on financial gain. Most of the businesses that were surveyed identified net benefits arising from the introduction of the Covenant. There were mixed views about whether the strengthening of the Covenant would provide benefits of a magnitude larger or smaller than the introduction of the Covenant. Some felt the benefits of the approach had been exhausted. Others noted that strengthening the Covenant would stop 'free-riders', and thus benefit their business. Free-riding was a concern under the initial Covenant, and the proposed changes should allow businesses to fulfil environmental objectives in tandem, thus reducing the impacts from competitive disadvantage.

The business survey did not have the opportunity to consider the potential benefits of funding that may become available under the revised Covenant's new scope for funding allocations. For example, assistance may be more forthcoming to business to foster the further growth of away-from-home recycling.

Many businesses noted that the regulatory process appears to be a focus point for cooperation along the supply chain, with such cooperation leading to efficiency gains. Large business also suggested the Covenant had strengthened internal communication channels, and while hard to measure, this was of substantial benefit to the business.

Efficiency gains

Interviews with businesses identified efficiency gains resulting from analysis of their packaging. For example, some businesses lowered their packaging requirements by selling in bulk, or recycling the containers they transported materials in. Although businesses should have captured such efficiency gains regardless of whether the Covenant was in place, consultation indicates that this was only partly the case. The Covenant forced businesses to improve their packaging planning. Some of the key areas of improvement noted by businesses were in waste management and the use of reusable containers for distribution of their product. Both the National Packaging Covenant Annual Reports and the Action Plan Review commissioned by the National Packaging Covenant Industry Association provide examples of these benefits.

Communication

Interviews with businesses indicate that the Covenant provides a focal point for relationships with upstream and downstream businesses. It led to the strengthening of relationships and better communication between businesses. This was cited as a reason for efficiency gains. Large businesses also noted that the Covenant improved internal communication channels, as the entire business had to work towards the goals of the Covenant

A strengthening of the Covenant should increase the gains from networking by increasing the level of participation of current signatories and increasing the number of signatories.

Reputation/avoid sanctions

Businesses may avoid reputational losses arising from poor environmental practices, by being a part of the Covenant. To some extent, these reputational losses would drive businesses to undertake similar behaviour anyway. However, some businesses claimed the Covenant provided a means of communicating environmental credentials to consumers.

REQUEST FOR FEEDBACK FROM BUSINESSES:

Feedback *from businesses* ***is sought in relation to the expected economic benefits to businesses likely to result from participation in the Covenant****. Existing signatories should draw upon their experience in the current Covenant.*

c) Government

The proposed changes to the Covenant aim to improve local Council provision of kerbside recycling. Section 8.4.3(a) discusses the potential for a recycling target to drive cost reductions through increased kerbside recycling due to avoided landfill costs. Councils may also gain, through increased efficiency of collection services, through signatory funding. Meinhardt (2004) noted that around three-quarters of local governments surveyed had partially implemented best practice recycling, although 60 per cent of Councils noted that the Covenant had no impact on their recycling activities. Nolan-ITU (2004a) found that participating Victorian councils managed cost reductions in the collection of recyclables of around $20 per tonne, to $140. Assuming half of this $20 reduction in collections for the 40 per cent of Councils who said their recycling practices were influenced by the Covenant gives a cost-saving to local Councils of around $2.5m. This estimate is surrounded by considerable uncertainty – about both the proportion of councils who achieved cost savings and how much of this was due to the Covenant. The Covenant may have led to a reduction in the costs of collection of between $0 and $5m, depending on whether the cost saving was achieved by all councils, and how much of this was due to the Covenant.

The revised Covenant aims to make funding available to non-signatories, which could see efficiency gains achieved by more local Councils. Assigning a $20 per tonne reduction in collection cost to all kerbside recycling would see councils saving from $15 to $30m per year by 2010. Given that 75 per cent of Councils have begun to move towards best practice, there is less scope for the revised Covenant to impact on all councils. But if it has this impact of improving the efficiency through moving to best practice for those Councils currently not at that level (assume 10 per cent of Councils) then this will save councils as a whole around $1.5 to $3m per year. If it has less than this $20 impact then there will be a smaller cost-saving for local councils.

Councils may also gain from increased revenue from selling recycled materials, depending on whether the Covenant has a large impact on demand for recycled materials, and on the sensitivity of demand to price. Note that some gains in revenue from selling recyclables are already captured in the net cost of collecting recyclables over other waste.

REQUEST FOR FEEDBACK FROM LOCAL GOVERNMENT:

Feedback from local government is sought regarding potential opportunities for local government to increase recovery of used packaging materials through measures such as adoption of best practice and use of improved collection systems, including expected associated costs and potential barriers.

d) Consumers

Increased ability to recycle

The benefits to consumers are not strictly financial. They reflect consumer gains from the value of the increased services provided by councils. If this is not taken into account, then the analysis assumes that the provision of these costly services has no value to consumers.

In an ideal benefit-cost analysis, the price of council collection services would reflect the value consumers placed on these services. However, the 'price' of recyclable collection services is not directly perceived by consumers. Instead it is incorporated into the waste collection part of rates payments. And because the collection services market is essentially regulated, this price is not necessarily representative of consumer value. However, the benefits to the consumer of increased ability to recycle is likely to reflect consumer environmental awareness. In this case, we would be double counting to include both consumer benefits in this area and environmental benefits. Because the environmental benefits has been extensively quantitatively modelled, this report does not add in the consumer benefits of increased recycling.

Improved packaging information

Strengthening the Covenant aims to improve the dissemination of information about recycling to producers, consumers and government. Consumers will be able to identify whether a product is recyclable. Increasing consumer knowledge of the 'quality' of the product and its packaging allows consumers to better discriminate in their choice of consumption, and thus to gain welfare benefits from consumption.

Summary of non-environmental benefits

The non-environmental benefits identified in this section are summarised below.

Table 8.7 Non-environmental benefits of introduction and revision of Covenant

Category	The Revised Covenant Additional benefit ($m/year)	Source
Business	0 to 10	Current Covenant benefits
Government		
Local	1.5 to 3	Modelled
State	0	
Total	1.5 to 3	
Consumers		Part of environmental
Total	**≈ 1.5 to 13**	

8.3 Monitoring, Reporting and Administration

The revised Covenant has more detailed reporting and administration components, and in particular requires signatories to report against a list of quantitative Key Performance Indicators.

The welfare gains arising from the spread of information impact on businesses, government and consumers. Businesses gain through efficiency improvements from strengthened communication channels and better methods of waste management and other use of materials. Local Councils gain through cost reductions in the provision of recycling services. And consumers gain through increased knowledge of the recycling attributes of a product's packaging. The discovery and movement of this information is not costless however, with significant administration costs arising from the Covenant for both business and government. The impacts of these requirements are described further below.

a) Businesses

Administrative costs of the Covenant have been estimated at $1m by the Office of Small Business (OSB), or at $1600 per organisation. However, the information provided by the limited survey of businesses suggests a higher figure. Given that one very large business indicated that the cost of creating an Action Plan ran into the hundreds of thousands, the administrative cost to business of the Covenant is estimated at between $1 and $4m.

A strengthening of the Covenant will lead to further increases in business administration costs. Signatories will face increased information demands, and, if participation rises, new signatories will also incur the administration costs of the Covenant. With the participation possibly increasing from 80 per cent to 90 per cent, administration costs from these new signatories could amount to $0.5m at the highest. Given that new signatories are likely to be smaller, this figure could be substantially lower.

Increases in administration costs due to increased data demands have not been assessed in detail. These are unlikely to exceed current business administration costs, and are factored in at one million dollars per year. Feedback on the potential costs of reporting against the Covenant's KPI's is welcomed.

REQUEST FOR FEEDBACK FROM BUSINESSES:

Feedback from businesses is sought in relation to the estimated administrative costs to Covenant signatories, including a breakdown of the cost of developing an action plan, compliance with the Environmental Code of Practice, contribution changes to the NEPM and monitoring and reporting of KPIs. Existing signatories should draw upon their experience in the current Covenant.

These costs could include the average time spent by individual businesses implementing the administrative and record keeping requirements of the Covenant and the cost of that time to the business.

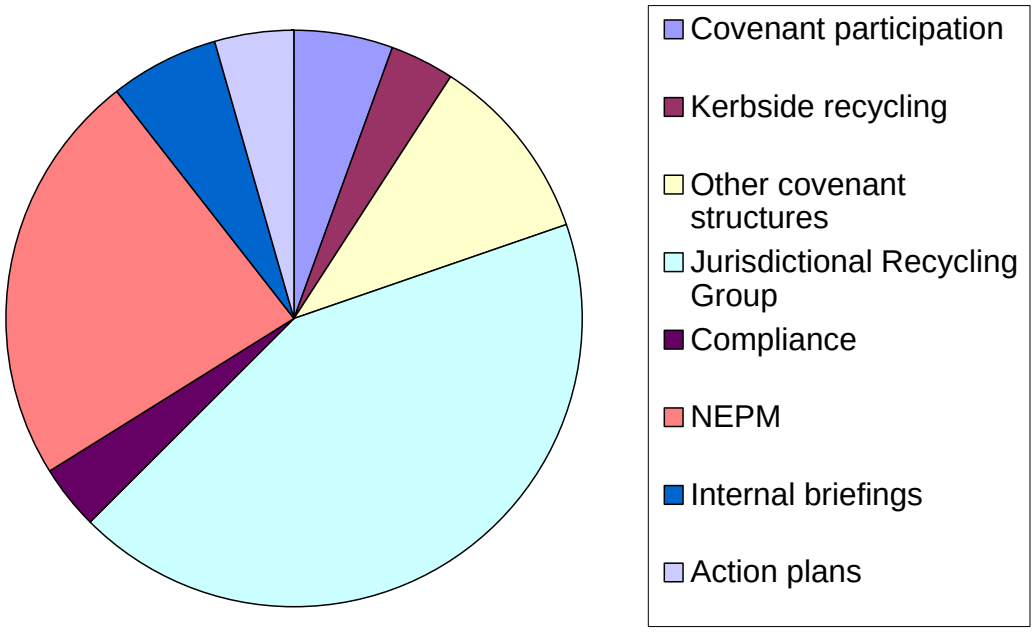
b) Government

Commonwealth, State and Territory governments have provided estimates of the amount of hours and other costs involved in overseeing the National Packaging Covenant and the NEPM. Government costs totalled over half a million dollars per year following the introduction of the current Covenant/NEPM co-regulatory framework.

Table 8.8: Costs to Governments of Current Framework

State	Hours (/yr)	Other costs ($/yr)	Total costs ($/yr)
New South Wales	2,435	9,150	109,100
Victoria	2,578	-	95,400
Queensland	3,575	13,032	128,100
South Australia	1,560	15,000	73,700
Western Australia	1,240	21,000	73,600
Tasmania	168	-	6,600
Northern Territory	84	-	4,000
Commonwealth	957	-	100,100
Total			**590,600**

(Note: Northern territory figures are for NEPM only)



Source: State governments

Figure 8.5 The proportion of current State government costs going to different activities

The State-based Jurisdictional Recycling Groups (JRG) were the area of largest cost to State governments. They are responsible for aiding Councils in moving to best practice recycling. Data gathering and enforcement of the NEPM was the second most costly part of the co-regulatory approach for State governments. Action Plan vetting and monitoring represented most of the Commonwealth's costs.

Monitoring and enforcement costs are likely to increase under a revised Covenant. A high-range estimate would put this increase at a quarter of a million dollars.

Similarly to State and Territory governments, the Commonwealth Government will face increased costs from the proposed changes to the Covenant. Currently, the Commonwealth Government costs are $100,100 per year. The cost from the proposed changes is likely to increase Commonwealth costs to $200,000 per year. Total costs to State and Territory are estimated to increase by $250,000.

The new monitoring and reporting requirements are not expected to have a significant impact on existing local government requirements under the NEPM.

8.4 Overarching Target Area - Increased Packaging Recycling

8.4.1 Background and Brief

a) Intent

An overarching target would seek to drive an increase in the amount of packaging recycled, and a reduction in total amount of packaging disposed of to landfill.

b) Predicted changes

Based on current data the packaging recovery rate is 53 per cent. This does not include imports of packaging of 'filled product' the quantity of which is currently unknown. The recycling target was modelled against two baseline recycling rates, 40 per cent and 50 per cent, selected to represent the upper and lower limits of current recycling rates from domestic and commercial industrial sources combined as indicated by available data. Further work since the modelling contained in this RIS suggests that the current baseline is around 47% recovery, a figure accepted by all parties involved in the targets discussion.

From these baselines, increases in recovery have been assessed as follows:

- To 55 per cent, 65 per cent and 75 per cent respectively by 2008; and
- To 60 per cent, 70 per cent and 80 per cent respectively by 2010.

The targets have been selected to cover a relatively wide range, and are based upon numbers that various stakeholders have suggested may be worthy of investigation in developing targets and in assessing the potential impacts of the Covenant. It is noted that the higher recycling rates may not be achievable or practicable for some materials whereas they may be more realistic for others. The impact statement does not seek to assess the practicability or the mechanisms for reaching such recycling rates, but the potential costs and benefits of doing so.

It should also be noted, as described further in the impact assessment, that neither the economic costs nor the environmental benefits of increased recycling change along a linear curve. Whilst some economic efficiencies may be gained with increased recycling, there may be points at which infrastructure or technical limits are reached and prices increase. Similarly, beyond certain recycling rates, the environmental benefits per unit recycled may start to decrease as logistical and technical issues arise.

An increase in recovery rates will reduce the amount of packaging disposed to landfill correspondingly. However, the effect on waste to landfill will be less distinct due to economic growth, population growth and change in household size. The combined impacts on waste to landfill have been modelled and are discussed in Section 8.4.3b) below.

8.4.2 Situation Analysis and Projections

The baseline scenarios (current recycling rate of 40 per cent and 50 per cent respectively) as well as the projected growth in packaging *consumption* (based on growth in population and GDP) are presented in Section 8.1 above.

In this Section, domestic and C&I *recycling* tonnages have been projected for the years 2008 and 2010. These are also based on population growth and GDP. In addition, three different increases in recovery rates for each of these two years have been assumed. The recovery rates used are 55 per cent, 65 per cent, and 75 per cent in 2008 and 60 per cent, 70 per cent, 80 per cent in 2010 (see Table 8.9 and Table 8.10 for details). A summary of increased tonnages recycled under each scenario is provided in Table 8.11. It has been assumed that there would be some increase in the amount of material recycled in 2008 and 2010 even without the Covenant, due to increases in population and GDP. The quantities presented in Table 8.10 are over and above these 'no Covenant' increases.

The projections for the domestic and Commercial & Industrial (C&I) recycling increase can also be seen in Figure 8.6, and Figure 8.7 below. To point out the historical increase in packaging recycling the graphs also include a figure for the year 1999. Domestic recycling in 1999 was 379,000 tonnes and C&I recycling approximately 900,000 tonnes. These recycling estimates are based on figures derived for the *Independent Assessment of Kerbside Recycling in Australia* (Nolan-ITU, 2001).

Increases in recovery rates have been assumed for modelling purposes, based on the tentative targets suggested. For modelling purposes, recovery rates have been assumed to increase at the same rate in both the domestic, and the commercial and industrial sector. Although this is considered a reasonable basis with which to assess impacts, it is noted that the away-from-home / commercial and industrial sector may be where the biggest gains can be made as kerbside systems around Australia are generally performing well, with limited opportunity for further significant improvements to be made.

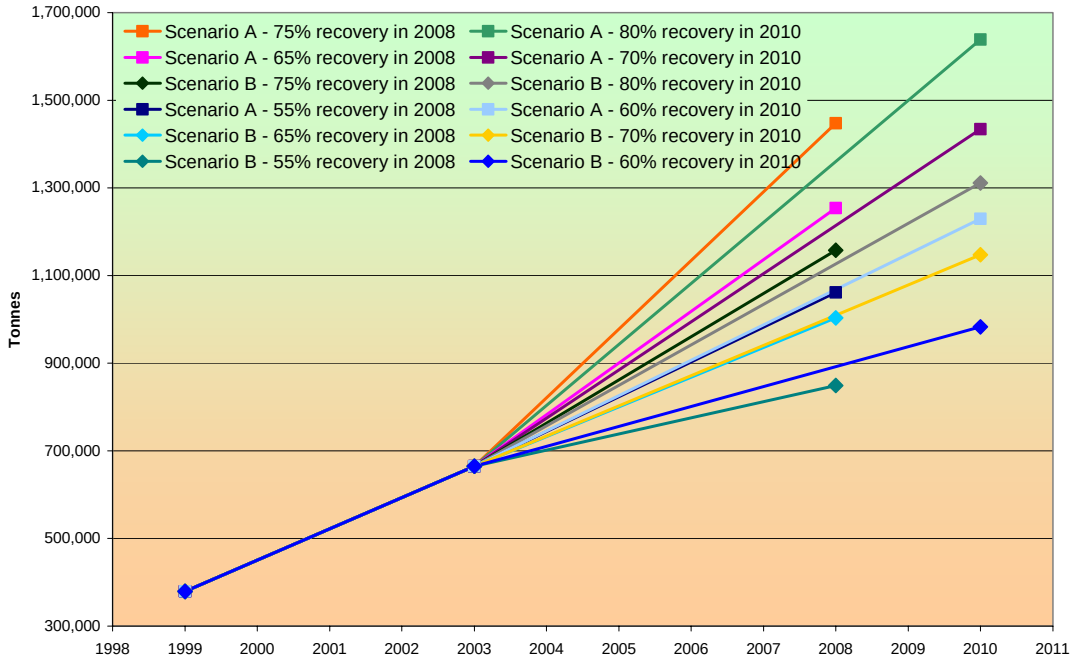


Figure 8.6: Domestic recovery projection with 40% and 50% baseline recovery in 2003 (t/yr)

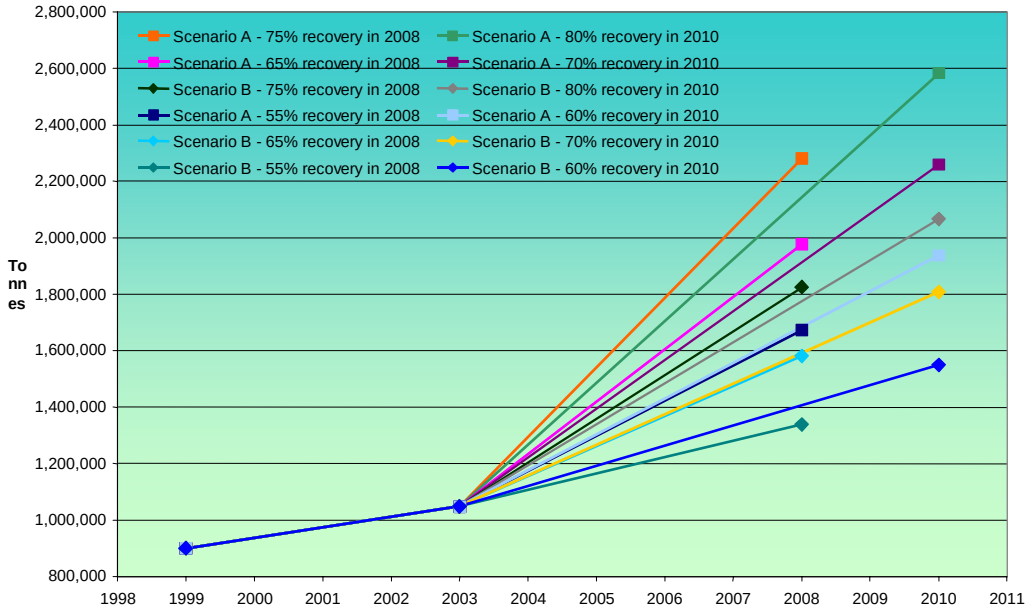


Figure 8.7: C&I recovery projection with 40% and 50% baseline recovery in 2003 (t/yr)

Table 8.9: Packaging quantities in 2008 with different improvements in recovery rate (t/yr)

Packaging	Scenario A Baseline with 40% Recovery in 2003 Recovery Rate			Scenario B Baseline with 50% Recovery in 2003 Recovery Rate		
	55%	65%	75%	55%	65%	75%
Domestic consumed	1,930,000	1,930,000	1,930,000	1,544,000	1,544,000	1,544,000
Domestic recycled	1,061,000	1,254,000	1,447,000	849,000	1,004,000	1,158,000
C&I consumed	3,043,000	3,043,000	3,043,000	2,434,000	2,434,000	2,434,000
C&I recycled	1,673,000	1,978,000	2,282,000	1,339,000	1,582,000	1,826,000
Total consumed	4,973,000	4,973,000	4,973,000	3,978,000	3,978,000	3,978,000
Total recycled	2,735,000	3,232,000	3,729,000	2,188,000	2,586,000	2,984,000
Note: 2003 amount recycled was 1,713,000, with 665,000 domestic and 1,048,000 C&I.						

Table 8.10: Packaging quantities in 2010 with different improvements in recovery rate (t/yr)

Packaging	Scenario A Baseline with 40% Recovery in 2003 Recovery Rate			Scenario B Baseline with 50% Recovery in 2003 Recovery Rate		
	60%	70%	80%	60%	70%	80%
Domestic consumed	2,049,000	2,049,000	2,049,000	1,639,000	1,639,000	1,639,000
Domestic recycled	1,229,000	1,434,000	1,639,000	983,000	1,147,000	1,311,000
C&I consumed	3,230,000	3,230,000	3,230,000	2,584,000	2,584,000	2,584,000
C&I recycled	1,938,000	2,261,000	2,584,000	1,550,000	1,809,000	2,067,000
Total consumed	5,279,000	5,279,000	5,279,000	4,223,000	4,223,000	4,223,000
Total recycled	3,167,000	3,695,000	4,223,000	2,534,000	2,956,000	3,378,000

Table 8.11: Summary of Increased Quantities of Packaging Recycled (t/yr)

	2008			2010		
	55%	65%	75%	60%	70%	80%
Domestic A	289,478	482,463	675,448	409,728	614,592	819,456
C&I A	456,408	760,681	1,064,953	646,002	969,003	1,292,004
Domestic B	77,194	231,582	385,970	163,891	327,782	491,673
C&I B	121,709	365,127	608,545	258,401	516,802	775,202

Note: Increases are expressed compared to projected "no Covenant" recoveries of 772,000 and 819,000 t/yr in 2008 and 2010 respectively for domestic and projected "no Covenant" recoveries 1,217,000 and 1,292,000 respectively for C&I.

8.4.3 Impacts

a) Economic

Impacts are assessed across the following key areas:

- **Domestic** – material from the kerbside system and public places serviced by Councils, and;
- **Commercial & Industrial** (C&I) – material from institutions, shopping centres, bars, clubs, restaurants, offices and businesses.

It **is noted that away**-from-home material includes material from public places (not serviced by Councils), shopping centres, pubs, clubs, restaurants etc.

It is acknowledged that there is some overlap between the above categories – which reflects the complexity of materials recovery practices. This has been borne in mind in the analysis.

For the purposes of this impact assessment, the recycling of away-from-home materials is grouped with C&I material (for details refer to Section 7).

Kerbside Recycling

Achievement of the tentative targets under consideration would generate an increase in packaging materials recovered (and recycled) of between 160,000 and 490,000 t/yr (for Scenario B) and between 410,000 and 820,000 t/yr (Scenario A) by 2010. This assumes the current range of materials collected (see Figure 8.6 and Table 8.11).

The marginal costs (i.e. the costs of additional quantities being collected, sorted and sold) of increased recovery rates from kerbside recycling are zero. In fact, as a national average, a small financial benefit can be expected through a change in the 'mix' recycled which will increase the value of these commodities as a 'basket price'.

In this section the cost impact of increased diversion of packaging materials on domestic waste management costs is estimated. Modelling of kerbside recycling and garbage collection & disposal was undertaken for all Australian metropolitan centres using the Waste and Recycling Cost Model (WRCM), developed by the Cooperative Research Centre for Waste Management and Pollution Control in association with EcoRecycle Victoria and Recycle 2000. The model allows organisations to evaluate existing and alternative collection systems to see the effect they have on yields and costs. Key operational parameters (labour costs, truck costs etc.) are updated continuously by Nolan-ITU.

The assessment was undertaken for the existing (2003) system and four future scenarios for the year 2010 as follows:

- Base (2003) domestic packaging recovery rates of 40 per cent and 50 per cent
- 2010 recovery targets of 60 per cent and 80 per cent

Recovery Rates

Recovery rates corresponding to each scenario were derived on a per household basis for cost modelling purposes. These were based on national recovery rates presented in Section 8. For the kerbside recycling stream an allowance of 10 per cent was made for contamination and sorting losses. Total packaging generation was assumed to increase by allowing for GDP and population growth. Derived garbage and recycling quantities per household and year are presented in Table 8.. To enable comparison with figures stated in previous sections, the total tonnages per year are also listed in the table.

These recovery rates have been calculated based on the tentative targets. It is noted that, particularly for the upper targets, it may be very difficult for some councils to achieve these rates. On the other hand, some Councils already report recycling yields per household similar to the highest one shown in Table 8.12.

Table 8.12: Derived Kerbside Recycling Quantities

Scenario	Garbage (kg/hhld/yr)	Recycling (kg/hhld/yr)	Domestic Waste (kg/hhld/yr)	All kerbside recycling (t/yr)	Packaging recycled (t/yr)
Existing Domestic Recovery (2003)	665	193	858	1,250,000	665,000
2010 - Base 50%, Recovery 60%	708	243	951	1,698,000	983,000
2010 - Base 50%, Recovery 80%	658	293	951	2,044,000	1,311,000
2010 - Base 40%, Recovery 60%	669	281	951	1,964,000	1,230,000
2010 - Base 40%, Recovery 80%	611	340	951	2,372,000	1,639,000

Markets

It is important to note that markets are required for packaging collected for recycling. The revised Covenant will need to continue to support the creation of new markets and the maintenance of existing markets. Market forces are discussed further in Section 8.6.

Capacity of Existing Recycling Bins to Accommodate Increased Kerbside Recycling

The assumed kerbside recycling system provided to households is 240 L fully commingled Municipal Garbage Bins (MGBs) collected fortnightly. This system, the most common in Australian metropolitan centres, provides an equivalent volumetric capacity of 120 L per week for the kerbside recycling stream.

Previous to kerbside recycling being introduced in the early to mid 1990s, the most common form of waste (garbage) collection in Australia was either using 55L cans twice weekly (an equivalent total volume for *all* wastes of 110 L per week) or 240L mobile garbage bins (an equivalent total volume for all wastes of 240 L per week).

The provision of an equivalent volume of 120 L per week for kerbside recyclables represents *half or more* of the available volume that was provided to householders for the total waste stream prior to kerbside recycling being introduced. It is therefore expected that, despite the projected increases in kerbside recycling quantities for the scenarios modelled in this study, there will be sufficient capacity in the existing kerbside recycling MGBs without changing the collection frequency.

For the purpose of this study, it has therefore been assumed that no increase in collection frequency is required. However, no detailed assessment has been undertaken on individual systems, and there may be instances where this assumption is not applicable.

Changes in Processing Fees

In undertaking the cost modelling it was necessary to consider the change in the mix of recyclables over time. Achievement of recovery targets will require significant increases in recovery for some materials (i.e., metals and some plastics) while for other materials that already have relatively high recovery, rates will increase less. As the market price per recyclate also varies considerably, changes in the mix will impact on the equivalent value per tonne of (mixed) domestic recyclables recovered, and hence MRF gate fees. In estimating potential changes to MRF gate fees, it was also necessary to consider non-packaging materials recovered through the system (i.e. newsprint and magazines). Derived estimates for the value of one tonne of mixed recyclate recovered from domestic kerbside systems for the scenarios modelled are shown in Table 8.13.

Table 8.13: Estimated Value of One Tonne of Mixed Recyclate Recovered from Domestic Kerbside Systems

Scenario	Value ($ /tonne mixed recyclables)	Difference to 2003 ($/tonne mixed recyclables)
Existing Domestic Recovery (2003)	$109	-
2010 - Base 50%, Recovery 60%	$121	+$12
2010 - Base 50%, Recovery 80%	$137	+$27
2010 - Base 40%, Recovery 60%	$125	+$15
2010 - Base 40%, Recovery 60%	$146	+$36

In the cost modelling, the assumed recyclables processing costs were adjusted by the cost differences shown in Table 8.13 to reflect the increased value of the material presented (in mixed form) at the processors gate. This has assumed constant commodity prices. It is noted however, that commodity prices in reality are subject to a variety of economic factors including global supply and demand patterns for both virgin and recycled commodities. For example, an increasing proportion of recyclate is being exported, mainly to Asia. A disproportionate increase in future exports and a subsequent fall due to different economic conditions in these countries may affect prices for recyclate as local infrastructure may not immediately be capable of processing these additional quantities.

Table 8.14 lists key parameters for the modelling in the WRCM. Additional parameters used in the modelling are listed below. These parameters enable reconstruction of the cost estimates through the WRCM. It is noted that this kind of modelling (applying the assumed parameters) has been carried out for a range of previous studies.

- Crew size (1.5 assumed as average);
- Truck capacities (18m3 for single stream and 22m3 for dual stream (split bin);
- Truck pick-up times (21 seconds per lift, 1,000 pick ups per day);

- Collection area characteristics (traffic 'moderate', density 'standard suburb', street width 'slight impediment');
- Set out rates (95 per cent for garbage, 80 per cent for recycling).

Table 8.14: Parameters for WRCM Modelling

Population Centre	Assumed Landfill gate fee ($/t)	Transfer Station Adjustment ($/t)	WRCM Disposal fee ($/t)	Assumed MRF Fee ($/t)	Assumed Labour Rates for Driver ($/hr)
Sydney	$77.43	$8.00	$85.43	$55.00	$26.00
Melbourne	$33.88	$8.00	$41.88	$30.00	$24.00
Brisbane	$56.47	$8.00	$64.47	$35.00	$23.00
Perth	$30.00	$8.00	$38.00	$40.00	$26.00
Adelaide	$50.92	$8.00	$58.92	$35.00	$23.00
Canberra	$50.00	$-	$50.00	$35.00	$26.00
Newcastle	$50.00	$-	$50.00	$35.00	$26.00
Gold Coast	$55.00	$-	$55.00	$35.00	$23.00

Net Cost of Recycling

The net cost of recycling reflects the actual cost to provide a recycling service, taking account of the direct cost of providing the service (recyclables collection and processing) less the associated savings in garbage collection and disposal. A summary of is provided in Table 8.15.

Table 8.15: Estimated Net Cost of Recycling

Scenario	Net Cost of Recycling ($/hhld/yr)	Net Cost of Recycling ($M/yr)
Existing Domestic Recovery (2003)	$22	$143
2010 - Base 50%, Recovery 60%	$20	$130
2010 - Base 50%, Recovery 80%	$15	$98
2010 - Base 40%, Recovery 60%	$19	$124
2010 - Base 40%, Recovery 60%	$12	$78

The results indicate that the increased diversion of packaging materials will result in a *net reduction* in costs of providing kerbside recycling services. This is based on the assumption that there will be no change in the frequency with which recyclate is collected. These costs reductions will be greater than those shown should the cost of garbage disposal increase between the base year (2003) and 2010 (eg due to the introduction of levies and improved environmental standards at landfills).

Note:

All figures presented are national (or state) averages. There will be councils where these figures may not be applicable due to special circumstances. For instance, the estimates are based on metropolitan councils and large regional centres. Higher collection and transport costs and other factors (no economies of scale) may offset any gains in parts of regional Australia. A more detailed analysis would be required to estimate these cost implications for individual regions or council categories. As stated above, the study has also assumed that the existing frequency of collection stays the same.

Another influencing factor is recyclate pricing. An increase in recyclate supply above the natural rate of market growth could lead to a fall in market price in some materials. However, a decrease in demand for virgin materials could have the effect of counter-acting any impacts from 'oversupply' of recyclate. The future market dynamics that result in recyclate pricing are complex, not easy to predict, and subject to factors broader than only supply and demand forces. For this reason, the analysis has assumed stability in recyclate pricing. Should a major shift in these prices occur, clearly the cost impact on councils would change, too.

REQUEST FOR FEEDBACK FROM LOCAL GOVERNMENT:

Feedback from local government is sought regarding potential opportunities for local government to increase recovery of used packaging materials through measures such as adoption of best practice and use of improved collection systems, including expected associated costs and potential barriers.

Public Place Recycling

For the purpose of this report, Public Place Recycling (PPR) only includes recycling in public places that are currently being serviced by Council litter bins. It does not include other forms of away-from-home recycling such as special events, shopping centres, pubs/restaurants, or workplaces. These are discussed in the following sections. As with most recycling activities other than kerbside collections from residential premises, information on Public Place Recycling is very limited and inconclusive. The main reason is that success and costs of these services are:

- highly dependent on local circumstances, and;
- usually included as part of much larger service contracts.

To highlight the inherent uncertainties, it is noted that there is a high interdependence with public litter (garbage) bin services. These services can also vary widely and they are more likely to be influenced by a Councils (or Councillors') preferences than the actual need to provide a certain level of service. In fact, in recent years some municipalities have opted to reduce the number of public litter bins provided.

Nevertheless, an first indicative cost estimate has been prepared for the provision of PPR services based on a case study from Victoria. The estimate is based on the following assumptions summarised in Table 8.16 and described below.

Fifteen Victorian Councils currently provide PPR services utilising 281 recycling bins. The average number of households per Victoria council is 23,937. This equates to 1,278 households per PPR bin in Victoria. Before extrapolating these services nationally (to the 6.5m households with kerbside recycling services), an adjustment is made to take into account councils that already provide PPR services. In Victoria, 18.8% of all households (15 x 23,937 of 1.9m) live in councils providing PPR services. If it is assumed that a similar proportion of Councils is providing PPR services across Australia, then 81.2% of 6.5m households (with recycling services) could potentially implement PPR. Using the same average number of households per PPR bin (based on these Victorian Councils) results in approximately 4,100 (additional) PPR bins provided across the country.

Assuming an average of twice weekly emptying assuming a (very conservative i.e. high) cost of $275 per tonne of material collected the total cost of extending PPR would cost $3m per year and result in 10,700 t/yr being collected (25kg x 2 x 52 x 4,116). Assuming an average four weekly emptying would cost $6m per year and result in twice the amount collected. The avoided costs of collecting and disposing to landfill of these materials (mixed with other litter) have not been considered here.

Table 8.16: Indicative Estimate of Costs of and Yields from Public Place Recycling (PPR)

Description	Assumption
Victorian councils with PPR	15
Number of Victorian PPR bins	281
Average size of Victorian councils (HH/council)	23,937
Average HHs per PPR bin (in Victoria)	1,278
Total HHs nationally with kerbside	6,472,151
Total HHs in Victoria	1,914,928
% HHs nationally with PPR councils (based on Vic)	18.8%
Number of HHs nationally in councils without PPR	5,258,623
Total number of extra PPR bins required	4,116 – 8,000
Estimated yield of PPR bins (kg/bin)	25
Total yield (tonnes/year)	10,700 – 20,000
Collection & sorting costs ($/t)	$275
Total costs per year ($/yr)	$3 - $6M
Sources: EcoRecycle (2003), Nolan-ITU (2004d)	

Note: This is a first and indicative estimate of the national costs to councils of providing a certain level of PPR services. Actual costs to councils will depend on specific circumstances such as the desired level of service provision and user convenience, the impact of tourism and socio-demographic characteristics.

REQUEST FOR FEEDBACK FROM LOCAL GOVERNMENT:

Feedback from local government is sought on the estimated cost per bin per week of introducing / expanding public place recycling to major public places (eg. high streets, parks, gardens and recreational areas such as beaches) within their municipality.

Away-from-home Recycling

Public Place Recycling at Shopping Centres

There are 1,338 shopping centres in Australia ranging from large regional centres of more than 100,000 square metres of retail space and generating sales of around $500m a year down to smaller, supermarket based centres of around 5,000 square metres generating sales around $30m. There are nearly 55,000 specialty stores in Australian shopping centres (Property Council of Australia, 2004).

Table 8.17 provides a derivation of likely costs and quantities of packaging recovered for recycling at shopping centres. The range of net costs has been assumed from $2 to $6 per lift. These costs are a rough estimate and include any 'in-house' costs through handling of more bins (eg cost of cleaners etc. to take bins and empty them into containers at loading ramp) as well as cost savings through reduced garbage collection and disposal. It is noted that, over the next few years, the materials recovered will mainly be beverage containers (and some flexible plastics) but may not yet include any food packaging.

The results suggest that up to 25,000 t/yr of packaging could be recovered from shopping centres at an annual cost of between $8M and $20M, or $6,000 to $20,000 per (average size) centre. It is noted that a number of shopping centres already provide some recycling to consumers. However, no information is available on how much packaging is currently recycled through these initiatives.

Table 8.17: Indicative Estimate of Costs and Recycling Yields of away-from-home Recycling from Shopping Centres

Description	Assumption
Number of shopping centers	1,338
Average # of recycling bins/center	20
Total # of bins	26,760
# of lifts per bin per year	150
Total # of lifts	4,014,000
kg per lift	6
Total tonnage collected per year	24,000
Net cost per lift including in-house costs [1)]	$2 - $6
Total cost per year	$8M - $20
Annual cost per center	$6,000 - $20,000
1) Includes avoided garbage costs and additional management costs (cleaners)	

REQUEST FOR FEEDBACK FROM SHOPPING CENTRES OR PUBLIC VENUE OWNERS:

Feedback from shopping centres or public venue owners on estimated costs/bin and potential barriers.

Other Commercial Premises

Background Information and Description of Assumptions Made

Based on the targets of 60,70 and 80% in 2010, as set out in Table 8.10, the impact assessment considered an additional 260,000 to 770,000 t/yr or 650,000-1,290,000 t/yr being recovered from the C&I waste stream.

Recycling in this sector is assumed to include pubs, clubs and restaurants, as well as other commercial premises like offices or manufacturing facilities. Significant increases in recovery of packaging materials could be achieved through recycling from these commercial premises.

Recycling of 'non consumer' packaging from commercial premises would primarily include distribution packaging such as shrink wrap or boxes around multiple units of consumer packaging. 'Business to business' packaging such as raw material packaging is not strictly included within the scope of the Covenant which is restricted to consumer packaging and distribution packaging. However, it is very difficult to collect separate data for distribution packaging. It is also recognised that Covenant activities around design for the environment, market development for recyclate, and support for collection activities are also likely to extend to influence how industrial packaging is managed.

Estimates on average costs of recycling services to commercial premises are also generally difficult to derive for the following reasons:

- The intrinsic diversity of industry and commerce with widely varying packaging and waste requirements (and, hence, costs).
- Much less information is available on the costs of collecting and sorting packaging from businesses (and institutions) than there is from the domestic/municipal sector.

However, the fact is that it is economics and not environmental sentiment that drive buying decisions in the workplace. Hence, it can be assumed that all easily recoverable materials ('low hanging fruit' i.e. those materials from those businesses where recycling does not add to the costs of running the business) are already recovered for recycling. This in turn implies that any increased quantities can only be recovered at an additional cost.

Despite the difficulties explained above, a rough estimate has been prepared as a national average of the cost of extending recycling services in the commercial/industrial sector.

It should also be stressed that a decision to introduce a recycling system by any business would not be as a result of a Covenant signatory obligation. Small business and SMEs will be impacted in this regard as a result of the momentum generated by the Covenant to increase the recovery of recyclables from the commercial sector. In focussing on recovering additional quantities of recyclables from away from home sources, small businesses will have increasing opportunities and be encouraged to utilise recycling services for their wastes since this is an area where there is substantial opportunity for increased yields. This may lead to additional costs for the business. There will, however, be no compulsion to participate in these systems although even non signatories to the Covenant may be strongly encouraged to participate by signatories with whom they deal as part of the supply chain.

In undertaking the costings below, it should also be noted that the extent of expansion of recycling services to a greater number of commercial premises will need to be considered against other potential sources of increased recyclate. One of the critical factors underpinning the ability of the revised Covenant to deliver against established targets and to demonstrate improvement against the KPIs will be the development of an Implementation Strategy by the National Packaging Covenant Council. This will be used to guide action by signatories and other parties and funding priorities under the Covenant.

This Implementation Strategy will determine which locations and actions will reap the greatest gains in recycled packaging and market support. It is not envisaged that all of the areas modelled in the RIS (eg. public place, shopping centres, commercial premises), would receive equal emphasis. Some will clearly offer greater opportunities for focus because they yield greater and more easily accessible quantities of materials. For example, it is likely to be initially more efficient to establish recycling systems in large institutions such as universities and hospitals, major entertainment and sporting venues than to attempt to engage 500,000 more small businesses.

Cost Estimates

Bearing this context in mind, Table 8.18 lists the assumptions and provides an indicative cost estimate based on increasing the take up of recycling services to an additional 500,000 businesses. This rough estimate has been prepared as a national average of the cost of extending recycling services in the commercial/industrial sector. The estimate of 500,000 businesses was used based on 40-45% of all businesses in Australia taking up recycling. This is obviously an estimation, and the total cost of recycling would be very sensitive to both the number of businesses that take up recycling and the size of those businesses.

Table 8.18 lists the assumptions and provides an indicative cost estimate: If 500,000 additional businesses (of the 1.1m businesses in total) took up recycling services, the average recycling quantity of one business weighed 10 – 20 kg/week thereby fitting into one 240L bin emptied once weekly, then between 0.25 and 0.5m t/yr of additional material could be recovered. A weekly collection service costs between $150 and $400 a year ($3 - $8 per lift), with savings from garbage disposal in the order of $2 - $6 per lift depending on landfill costs and local parameters. Net costs could therefore be expected to be in the order of $50 - $100 per business per year. It is noted that costs vary widely depending on a range of factors[3].

It is also noted that this assessment assumes (for the purpose of the modelling) an average business size. Actual costs would be spread across a range of business types and sizes, and would relate to the recycling of a range of different material types.

Another aspect requiring careful consideration is the cost of segregating the waste within the business to the point where it can be collected. This cost could range from negligible to significant. Due to the extreme diversity of businesses and a lack of information the cost of segregation has not been included.

Based on a figure of $50 and $100 per business per year, the overall costs of extending recycling services to businesses are estimated to be in the order of $25 to $50 M per year.

It is noted that another factor would need to be brought into the equation i.e. the economies of scale that could be achieved if a large number of businesses utilised a recycling service. The cost reduction through reduced collection and disposal of (mixed) waste to landfill will also be greater in the medium to long term as businesses can modify existing contracts.

It is noted that the figures given above are only a *first indicative estimate of the order of magnitude* for likely costs to businesses. Many of these costs are seen as transitional. Waste disposal charges will rise in due course, and economies of scale in recyclate collection will emerge. Given the above, the national total cost to businesses may not necessarily change through addition of more businesses, or increasing quantities of packaging recycling (beyond 500,000 tonnes) from the number of businesses used for this first estimate. Therefore, the total cost estimate of $25 to $50m per year has been used as a first indicative estimate of the recycling cost to businesses of recycling extra material in line with the scenarios of 60-80% recycling by 2010. These targets involve recycling an extra 455,000 to 1,035,000 tonnes of C&I packaging (using averages of the extra material recycled above the two baselines of 40% and 50% recycling) as per Table 8.11. These calculations are presented below to provide a first indicative estimate of likely costs. They should be seen as an estimate of the order of magnitude rather than precise figures.

[3] Apart from an increase in recycling of packaging materials, the introduction of enhanced recycling from businesses would result in significant recovery of office paper, a high value paper product 90% of which is currently landfilled.

Table 8.18: Indicative Cost Estimate of Enhanced Recycling from Business and Commerce – Initial Impact

Description	Assumption [5)]
Estimated number of businesses nationally to take up collection [1)]	500,000
Net cost per business ($/yr) [2)]	$50 - $100
Total cost of commingled service nationally ($M/yr)	$25M - $50M
Estimated yield (kg/week) [2)]	10-20
Total yield (tonnes/year) [3)]	260,000 – 520,000
Net cost/tonne [4)]	~$50 - $100

Sources:

1) 40-45% of all businesses (ABS, 2005)
2) Based on weekly 240L co-mingled collection. DEC (2003b); Nolan-ITU (2004d), industry data, in-house estimates

Notes:

3) 10 to 20 kg/week * 52 weeks * 500,000 businesses = 260,000 – 520,000 t/yr
4) Includes avoided garbage disposal costs. Costs are likely to reduce further in the long term due to economies of scale of recycling collections from commercial premises.
5) All figures provided should only be seen as ***indicative averages*** to stimulate discussion. Without a large scale study into costs per business within industry sectors, all figures discussed to date are of limited value.
6) This assessment assumes (for the purpose of the modelling) an average business size. Actual costs would be spread across a range of business types and sizes, and would relate to the recycling of a range of different material types.

REQUEST FOR FEEDBACK FROM BUSINESSES:

Feedback** from businesses **is sought on any costs incurred through introduction of business recycling services (including costs of in-house source separation).

Broad economic impacts of increased recycling

The costs estimated above provide an indication of the likely impact of a target that drives an increase in the amount of packaging recycled. This section presents a qualitative economic analysis of the broad economic benefits and their distribution, beyond the cost figures presented above.

In terms of kerbside recycling, the figures presented above show that there is no increase in costs to councils, on average, of increased kerbside collection of recyclables, after taking into account the avoided cost of collection and landfill. In fact, costs are likely to fall by about $13m to $65m per year across Australia. Councils that are in areas where landfill costs and travel to landfill areas are higher will typically find that increasing collections will reduce costs. On the other hand, regional councils are likely to find it more costly to increase their amount of recycling given the relatively cheap cost of landfill in regional areas.

However, many Councils may increase their kerbside recycling, reflecting potential financial gains, regardless of whether the Covenant is strengthened or not.

There are also some councils and residents not currently covered by kerbside recycling services. Because this is typically owing to distance, it is unlikely that these councils will begin to offer these services.

The economic impact of public place recycling on councils is estimated to be a small cost of around $3-6m per year across Australia.

The costs and cost reductions to councils of the proposed change to the Covenant are likely to be passed on to residents through changes in rates. If councils are unwilling (or unable) to change rates then changes in their expenditure may be offset through changes to other services.

The largest cost impacts for increased recycling are through commercial recycling, with costs estimated to rise by $25m to $50m across Australia. In addition, shopping centre recycling is expected to cost $8 to $20m across Australia. These figures will depend on the number of businesses who take up collection. Most of these costs will initially fall on businesses, except for some smaller businesses whose collections are included as part of kerbside recycling and collected by councils.

Many of these costs may be passed on to consumers or along the supply chain. (Note that consultation suggested that the costs incurred under the current Covenant arrangements are not typically passed along the supply chain.) Businesses that compete with importers or are exporters will not be able to pass these costs on without competitive disadvantage (although the businesses they compete with may be subject to similar requirements overseas).

Smaller businesses are also likely to be less able to pass costs on. The fixed costs of commercial recycling will impact more on smaller businesses. They will not be able to pass all costs on to consumers as this may reduce their competitiveness relative to larger businesses, who can find economies of scale in commercial recycling. However, it is noted that the NEPM includes a provision that businesses that do not make a substantial contribution to the waste stream are not subject to its requirements. This means that although smaller businesses may wish to sign the Covenant, if they decide the costs are too great and elect not to sign, they would not be subject to regulation.

The overall increase in the amount of packaging recycled, through kerbside, public place and commercial, should flow through into prices and quantities of recycled material processed and used. The impacts of increased use of recycled material in new products are discussed in Section 8.6.

b) Environmental

Impact on Waste to Landfill

To determine the effects of increased packaging recycling on quantities of packaging waste disposed to landfill, the packaging waste to landfill was calculated by subtracting the amount of packaging recycled from the amount of packaging consumed (accounting for economic and population growth). Table 8.19 and Table 8.20 show the estimates for 2008 and 2010 for the two different baselines. For all targets - and for both baselines - under consideration, the amount of packaging disposed to landfill will reduce from current levels. The extent of the reduction varies depending on the targets and baseline assumed.

Table 8.19: Packaging Landfilled with a 40% Baseline Recovery

	2003		2008		2010	
	(Tonnes/yr)	(Kg/Capita/yr)	(Tonnes/yr)	(Kg/Capita/yr)	(Tonnes/yr)	(Kg/Capita/yr)
No Improvement	2,570,000	128	2,984,000	141	3,167,000	146
Low Recovery	2,570,000	128	2,238,000	106	2,111,000	98
Medium Recovery	2,570,000	128	1,740,000	82	1,584,000	73
High Recovery	2,570,000	128	1,243,000	59	1,056,000	49

Table 8.20: Packaging Landfilled with a 50% Baseline Recovery

	2003		2008		2010	
	(Tonnes/yr)	(Kg/Capita/yr)	(Tonnes/yr)	(Kg/Capita/yr)	(Tonnes/yr)	(Kg/Capita/yr)
No Improvement	1,713,000	86	1,989,000	94	2,111,000	98
Low Recovery	1,713,000	86	1,790,000	85	1,689,000	78
Medium Recovery	1,713,000	86	1,392,000	66	1,267,000	59
High Recovery	1,713,000	86	995,000	47	845,000	39

Overall Environmental Benefits

Methodology

The environmental benefits of increased recycling of packaging include reduced impacts from mining of raw materials, manufacture of virgin packaging materials, transport and avoided landfill and litter related issues. As discussed in section 7.2, this Impact Statement uses the "Eco$" indicator as a way of quantifying and describing these environmental impacts in a single indicator.

As also described in section 7.2, the quantum of environmental benefit gained from kerbside, expressed in "Eco$", is based upon the *Independent Assessment of Kerbside Recycling* report (Nolan-ITU et al, 2001). This study completed a life cycle assessment of kerbside recycling in Australia, and then used an environmental economic valuation methodology to express the results in "Eco$". The values applied were Eco$422 to Eco$522 for each tonne of recyclate collected, transported, reprocessed and sold.

It is stressed that the Eco-dollar figures above do not reflect actual environmental benefits but should be seen as **environmental indicators** used to simplify, quantify and compare the environmental changes through different options and assumptions. This assessment is subject to a number of qualifications and assumptions that are also discussed in further detail in Section 7.2. It is important to note that an average Eco-dollar figure is used and that the environmental costs and benefits of recycling will vary between different packaging materials, and that the environmental benefits may start to reduce at higher recycling rates.

Results

To calculate the environmental benefit in Eco-dollars, the increased quantities recovered under each of the two different baseline scenarios and the different recovery rates from Table 8.11 were used. As indicated in Section 8.1a), without any other influencing factors, an average GDP growth of 3.5% over 7 years (one and a half of which have already passed) would increase the amount of packaging used in Australia to 4.3m tonnes per year in 2010. On this basis, it is assumed that packaging recycling (even without a revised Covenant) will increase based on increase in GDP and population growth. An estimate of the environmental benefits of increases in both kerbside and C&I recycling was then derived through multiplying the recovered tonnages with the Eco-dollars per tonne (ie. Eco$422 /tonne to Eco$522/tonne). As these results provide an indicative measure of environmental benefit, they are conservatively expressed in terms of 'greater than' the low end benefit.

The benefit from the domestic sector varies between Eco$30m and Eco$250m in 2008 (Table 8.21) and between Eco$60m and Eco$300m in 2010 (Table 8.22). The 2008 benefit for the commercial and industrial sector is between Eco$50m and Eco$400m (Table 8.23), and the values for 2010 vary between Eco$100m and Eco$500m (Table 8.24).

It can be interpreted from this analysis that, as recycling rates increase so will net environmental benefits. Whilst this is true, the magnitude of the environmental benefits incrementally decreases as the recycling rates rise. At the same time, the financial cost for achieving those environmental benefits may incrementally increase above a certain threshold. This point of diminishing returns – or 'optimal' recycling ratio - requires further analysis to be identified in the Australian context.

Table 8.21: Domestic packaging recovery in 2008 under a revised covenant

Scenario	Recovery Rate	Without Covenant (t/yr)	With Covenant (t/yr)	Recovery increase (t/yr)	Eco$ Estimate (million)
Scenario A Baseline with 40% recovery in 2003	55%	772,000	1,061,000	289,000	>$100
	65%	772,000	1,254,000	482,000	>$200
	75%	772,000	1,447,000	675,000	>$250
Scenario B Baseline with 50% recovery in 2003	55%	772,000	849,000	77,000	>$30
	65%	772,000	1,004,000	232,000	>$95
	75%	772,000	1,158,000	386,000	>$150

Table 8.22: Domestic packaging recovery in 2010 under a revised covenant

Scenario	Recovery Rate	Without Covenant (t/yr)	With Covenant (t/yr)	Recovery increase (t/yr)	Eco$ Estimate (million)
Scenario A Baseline with 40% recovery in 2003	60%	819,000	1,229,000	410,000	>$150
	70%	819,000	1,434,000	615,000	>$200
	80%	819,000	1,639,000	819,000	>$300
Scenario B Baseline with 50% recovery in 2003	60%	819,000	983,000	164,000	>$60
	70%	819,000	1,147,000	328,000	>$100
	80%	819,000	1,311,000	492,000	>$200

Table 8.23: C&I packaging recovery in 2008 under a revised covenant

Scenario	Recovery Rate	Without Covenant (t/yr)	With Covenant (t/yr)	Recovery increase (t/yr)	Eco$ Estimate (million)
Scenario A Baseline with 40% recovery in 2003	55%	1,217,000	1,673,000	456,000	>$150
	65%	1,217,000	1,978,000	760,000	>$300
	75%	1,217,000	2,282,000	1,065,000	>$400
Scenario B Baseline with 50% recovery in 2003	55%	1,217,000	1,339,000	122,000	>$50
	65%	1,217,000	1,582,000	365,000	>$100
	75%	1,217,000	1,826,000	609,000	>$200

Table 8.24: C&I packaging recovery in 2010 under a revised covenant

Scenario	Recovery Rate	Without Covenant (t/yr)	With Covenant (t/yr)	Recovery increase (t/yr)	Eco$ Estimate (million)
Scenario A Baseline with 40% recovery in 2003	60%	1,292,000	1,938,000	646,000	>$250
	70%	1,292,000	2,261,000	969,000	>$400
	80%	1,292,000	2,584,000	1,292,000	>$500
Scenario B Baseline with 50% recovery in 2003	60%	1,292,000	1,550,000	258,000	>$100
	70%	1,292,000	1,809,000	517,000	>$200
	80%	1,292,000	2,067,000	775,000	>$300

REQUEST FOR FEEDBACK FROM EXISTING AND POTENTIAL COVENANT SIGNATORIES:

Feedback from existing and potential Covenant signatories is sought on the extent to which your organisation could contribute to increased recovery of packaging, including expected associated costs and potential barriers.

8.5 Overarching Target Area - Reduced Non - Recyclable Packaging

8.5.1 Background and Brief

a) Intent

An overarching target would seek to drive reductions in the use of non-recyclable packaging. "Recyclable" packaging for a product, means packaging that is reasonably able to be recovered in Australia through an approved or accredited collection or drop-off system, and able to be reprocessed and used as a raw material for the manufacture of a new product.

b) Predicted changes

This target is aimed at addressing packaging types such as some types of plastics such as PP, EPS or composites which cannot be economically recycled using current systems - particularly through kerbside recycling. This target area could be addressed through the redesign of packaging using different materials, or through facilitating the creation of markets for new recycled materials.

As with other packaging decisions, decisions made to address this target also need to consider broader environmental issues. In particular, it is noted that some lightweight plastics (that are not currently recyclable) are very effective packaging materials that can reduce food wastage. Whilst it is important to investigate options for creating markets for recyclates from these materials, other considerations do need to be taken into account if considering using different packaging materials.

8.5.2 Situation Analysis

There is no published information on the current amount or proportion of non-recyclable packaging. Appendix C is the first attempt to derive estimates of packaging that is recyclable and non-recyclable. Based on these estimates, approximately 90 per cent of packaging consumed is 'technically' recyclable, and around 85 per cent 'actually' recyclable in Australia (taking account of 'practicability' of recycling as well as technical recyclability). It should be noted that these estimates do not take into consideration the associated costs. As the rate of recycling increases, the benefit to cost ratio of recycling decreases due to the technical challenges associated with reprocessing waste from more remote and diffuse locations.

There is insufficient information available to undertake an impact assessment on increasing the recyclability of packaging. However, the following sections investigate increasing the range of packaging currently recycled i.e. to narrow the gap between *current recycling* rate of around 45 - 50 per cent of packaging and the potential recycling rate, i.e., the *recyclability* (85-90 per cent).

8.5.3 Impacts

a) Financial

Financial costs related to this target can occur in three key areas.

- Increased processing costs paid by local government or businesses.
- R&D and market development work. It is noted that although costs may occur here initially, such costs have the potential to be paid off over time and result in financial benefits.
- Costs associated with business using different packaging materials.

The costs associated with increased processing are further examined below whilst further assessment relevant to the second and third areas listed above is included in Section 8.6, no quantitative estimate has been made of the associated costs.

REQUEST FOR FEEDBACK FROM EXISTING AND POTENTIAL SIGNATORIES:

Feedback from existing and potential Covenant signatories is sought on the extent to which your organisation could reduce your use of non-recyclable packaging, including expected associated costs and potential barriers.

The following tables estimate the costs and the recoverable quantities for extending the range of materials collected from kerbside recycling. Table 8.25 provides a first indicative estimate of extending the range of plastics collected to all rigid plastics (Option A); Table 8.26 is an attempt to estimate changes for a scenario where the range of materials is collected to include flexible plastics as well (Option B).

In calculating the cost of collection and sorting for an extended range of rigid plastics, the estimate used is based on the current cost that applies to existing rigid plastics in the recycling system. The estimate for PET plastic is $137.40/tonne and this was applied to the extension of kerbside collection to other rigid plastics.

The predominant cost relating to rigid plastics recovery is the collection cost. These materials are lightweight and bulky and the cost of pick up, transport and subsequent sorting is not significantly different from one polymer to another. The only significant difference is in the value per tonne of sorted and baled material. As this is a very small component of the overall cost of collection and sorting it was not felt necessary to vary the per tonne calculation rate.

It is noted that costs for other plastics will differ depending on the revenue from the sale of that plastic. However, some of these markets are premature and underdeveloped. It is therefore difficult to predict a medium to long term price equilibrium. For this reason, the per tonne cost estimate was maintained across all rigid plastic types, and –again - it is acknowledged that this only provides a preliminary estimate of the order of magnitude of the financial impact. A much more detailed study including a market analysis would be required to provide reliable estimates on an individual material type basis.

There may be start up costs at a MRF level for each new polymer collected and a smaller volume handled for some polymers, but these are also not likely to be significant in overall handling costs.

Table 8.25: Option A – Extending the Range of Materials Collected to Include All Rigid Plastics

Option A	PET	HDPE	PVC	PP	PS	Total	Data Source
Number of councils	242	242	155	85	38	762	Nolan-ITU database
Households serviced with collections for this material (national)	6,479,328	6,324,328	4,147,932	2,487,327	1,233,331		Nolan-ITU database
Total households with kerbside collection (national)	6,472,151	6,472,151	6,472,151	6,472,151	6,472,151		Nolan-ITU database
Available households for increased collection of this material	0	147,823	2,324,219	3,984,824	5,238,820		-
Plastic recovered in VIC (tonnes)	15,875	13020	753	602	595	30,846	EcoRecycle 2004
Households in VIC with collection	1,702,002	1,702,002	1,475,172	200,769	104,337		Nolan-ITU database
Average yield in VIC (kg/hhld/yr)	9.3	7.6	0.5	3.0	5.7		Estimate
Potential plastic available nationally (t/yr) [(1)]	0	1,131	1,186	11,954	29,861	**44,133**	-
Collection & sorting costs ($/t)	$137	$137	$137	$137	$137		EcoRecycle 2004
Cost of recovery ($)	-	$155,378	$163,006	$1,642,544	$4,102,939	**6,063,867**	-

[(1)] This has been estimated based on number of available households x average yield in Victoria

Table 8.26: Option B - Extending the Range of Materials Collected to Include All Flexible Plastics

Option B Background Calculations	HDPE	LDPE	PP	Totals
Number of councils with LDPE collection	42	42	42	126
HHlds with HDPE & LDPE kerbside collection	1,465,865	1,465,865	1,465,865	
Total HHlds with kerbside collection (national)	6,472,151	6,472,151	6,472,151	
Available HHlds for increased range	5,006,286	5,006,286	5,006,286	
Average yield (kg/hhld/yr)	2.0	3.0	2.0	
Potential plastic available (t/yr)	10,013	15,019	10,013	35,044
Collection & sorting costs ($/t)	$206.10	$206.10	$206.10	
Cost of recovery ($)	$2,063,591	$3,095,387	$2,063,591	$7,222,569

Table 8.27 summarises the estimates. As can be seen extending the services to all rigid plastics would yield an additional 44,000 t/yr at a cost of $137/t; extending the services to include flexible plastics would yield another 35,000 t/yr.

Table 8.27: Indicative Estimate of Extending the Range of Materials Collected through Kerbside Recycling

Option	Current Coverage	Effective HHs	Total Cost	Est. Increased Yield (tonnes)	Cost ($/t)
Option A - Extend comprehensive kerbside recycling to all rigid plastics nationally	52.5%	3,396,542	$6,063,867	44,133	$137
Option B - Extend comprehensive kerbside recycling to all flexible plastics nationally	17.4%	1,123,266	$7,222,569	35,044	$206

Note: The above is a first and indicative estimate of the national costs to councils of extending the range of materials. It can only provide the order of magnitude of likely costs however, it is not intended to obviate the need for a substantial assessment of these costs to councils. Costs will also vary from council to council depending on specific circumstances.

b) Environmental

Gains through Increasing Tonnages and Extending the Range of Material

Specific environmental benefits through extending the range of materials collected have not been modelled. Section 8.4.3b) can be used to provide an indication of the impacts on waste to landfill. An additional benefit of extending the range of materials collected would be to reduce potential confusion by householders when determining which types of packaging are recyclable and which ones are not. This could help to improve overall recovery levels at kerbside.

It is important to note that packaging (including some lightweight plastics which are not currently recyclable) plays an important role in preserving and protecting products through their storage, handling and use, and in turn can reduce food wastage. This can have a significant environmental benefit due to avoided wastage of energy and raw materials. These overall environmental benefits mean that, whilst opportunities to choose recyclable packaging should always be investigated, they should not necessarily be pursued at the expense of much broader environmental benefits.

Impact of Packaging vs. Impact of Product Packaged

In this section, some further discussion is provided on the issue of recyclability in the context of overall environmental performance of the packaging supply chain. A number of case studies indicate that packaging recyclability and recycling is an important - but not the only – factor throughout the life-cycle of packaging.

The report *Environmental Impact of Packaging in the UK Food Supply System* (Incpen, 1996) shows that all packaging, including primary packaging and packaging & transport of packaging, only contributes between 10 and 11 per cent of the total energy use in the food supply chain, see Figure 8.8.

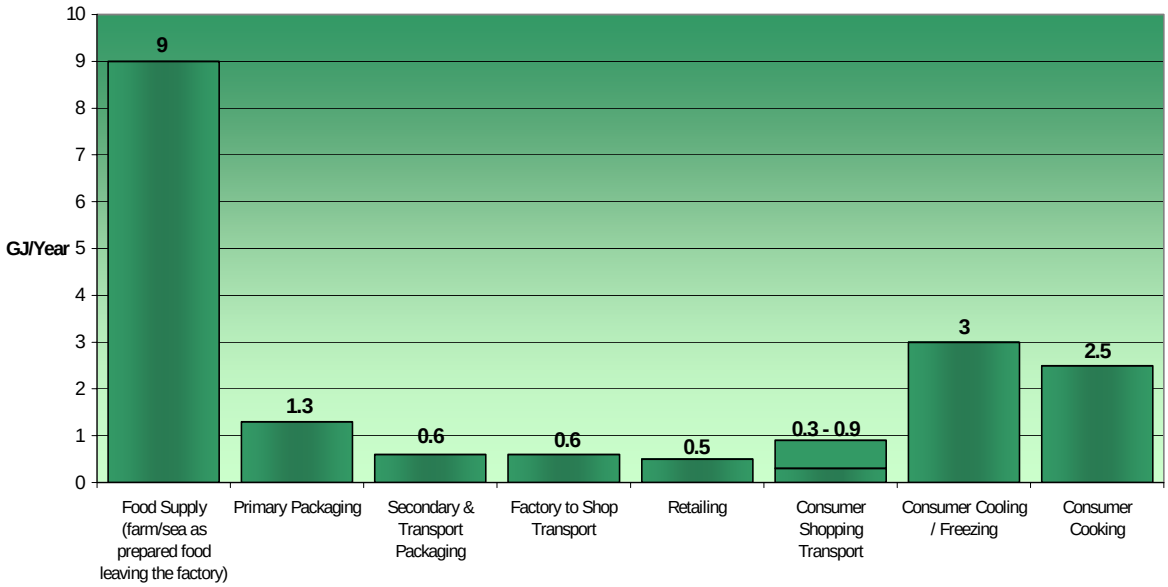


Figure 8.8: Energy use in the food chain in UK
(Figure by Nolan-ITU based on Incpen, 1996)

Impact of Packaging Recycling vs. Impact of Packaging Life-cycle

A Norwegian study (Hanssen, 1998) of life-cycle impacts of milk packaging, aluminium food packaging, tin can food packaging, glass jam pot, polypropylene jam pot, aluminium can and LDPE plastic bag for food containment purposes has emphasised different environmental impacts during the life-cycle of packaging. (In this study, the lifecycle is divided into six categories: raw material production; production; distribution; packaging; use; waste treatment.)

As is illustrated in Figure 8.9, the predominant contribution use of fossil fuels (frequently used as an indicator for environmental performance) in the packaging life-cycle arises from raw material production while the packaging is considered to have no impact.

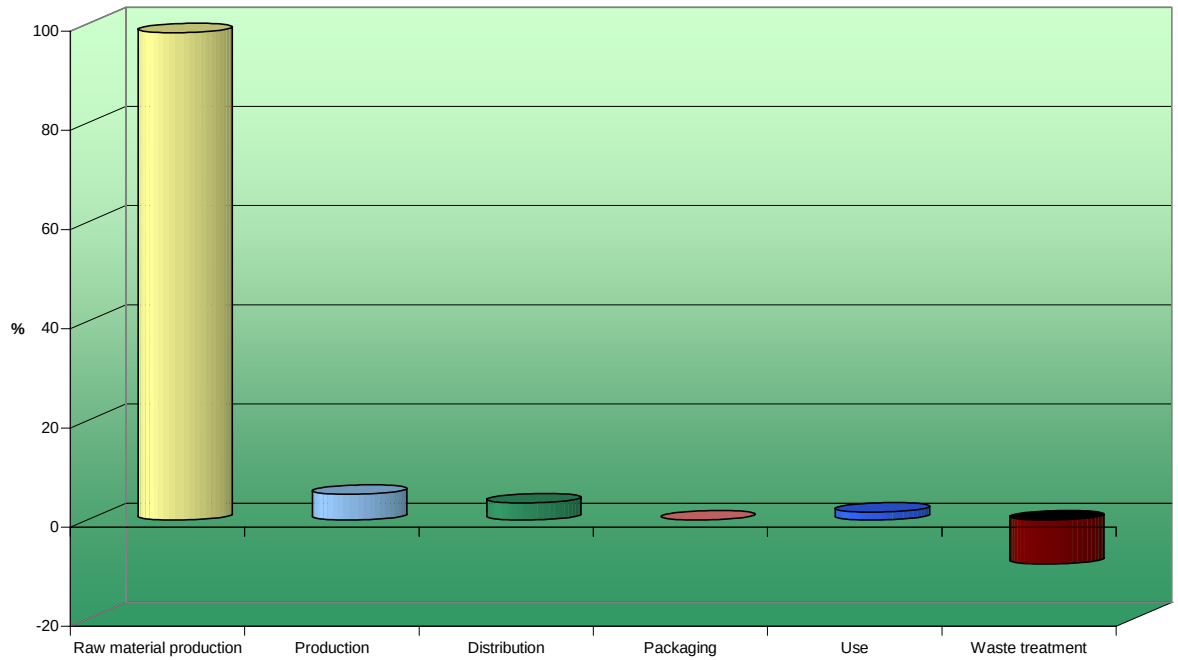


Figure 8.9 Average contribution to the use of fossil fuels during different phases in the lifecycle of packaging (%) (Figure by Nolan-ITU based on Hanssen, 1998)

Another study, the *Environment Report 2003* from the Australian Food and Grocery Council (2003), points out that packaging contributes 4 per cent of the total greenhouse gas emissions from pasteurised milk manufacturing and distribution, see Figure 8.10. When looking at the energy use per household and year throughout the supply chain, packaging stands for less than 11 per cent of the total usage for food and drinks, see Figure 8.11. Figure 8.12, shows the range of greenhouse gas emissions in carbon dioxide equivalents per kilogram of product. Again, it is an example highlighting the relatively small contribution packaging makes to the overall environmental impacts from a life-cycle perspective.

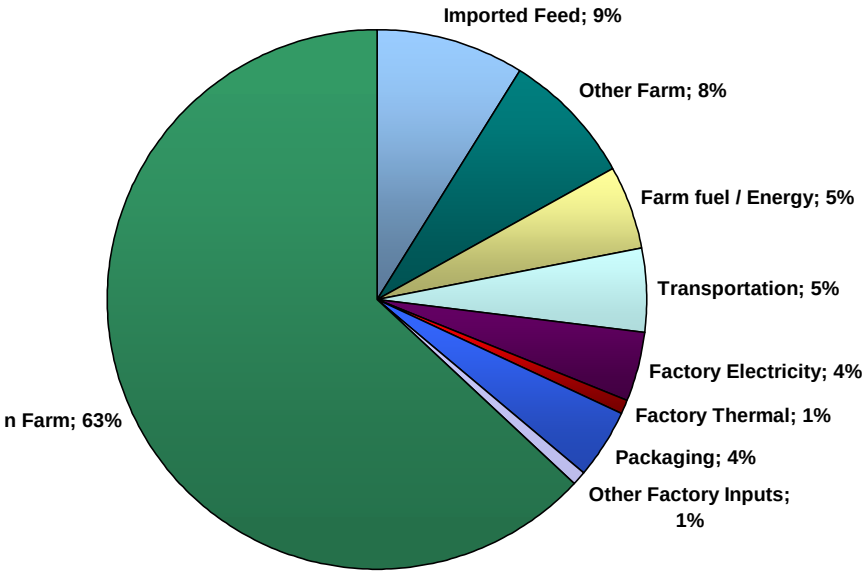


Figure 8.10 Pasteurised milk life-cycle contributors to greenhouse emissions (Figure by Nolan-ITU based on Australian Food and Grocery Council, 2003).

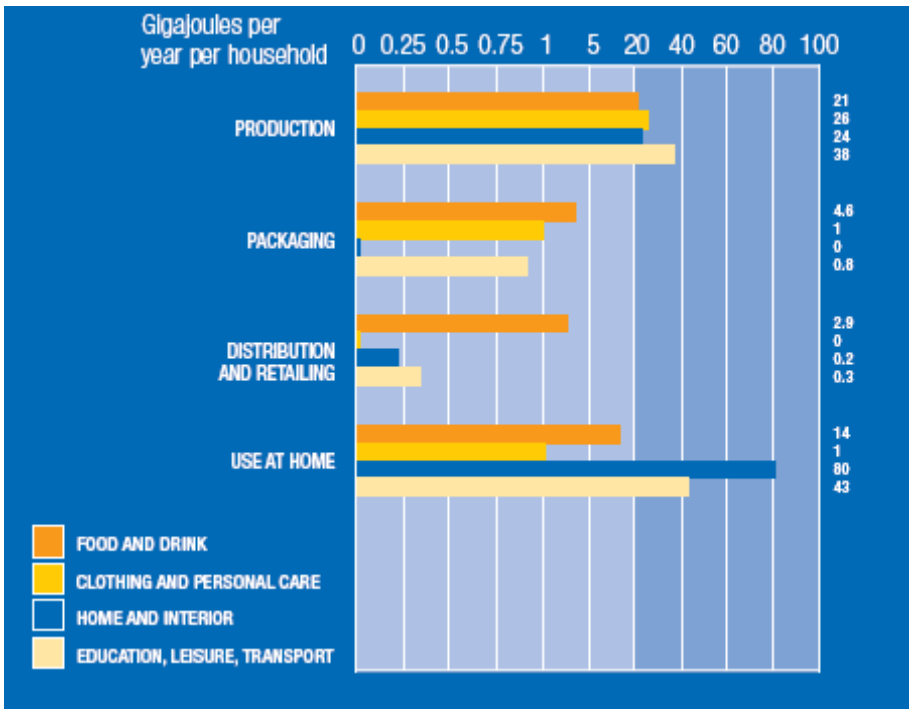


Figure 8.11 Energy use throughout the supply chain in giga joule per household and year. (Australian Food and Grocery Council, 2003)

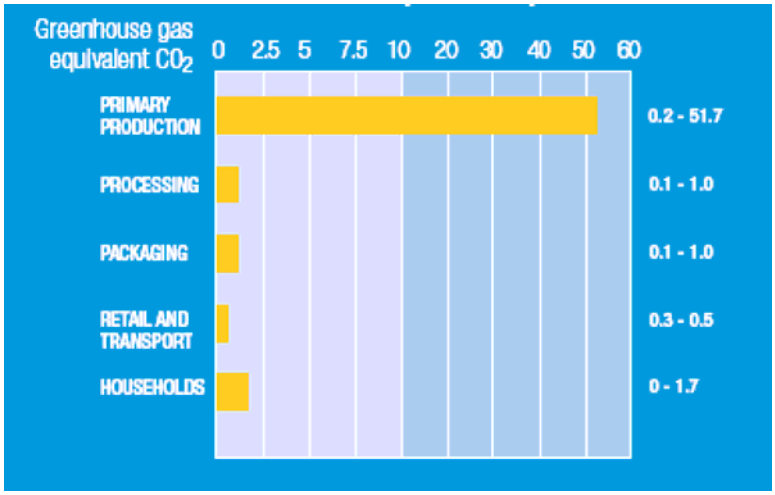


Figure 8.12 Range of greenhouse gas emission per kilo product in CO_2 equivalents. (Australian Food and Grocery Council, 2003)

In the report *Food Matters - On reducing energy use and greenhouse gas emissions from household food consumption* by K.J. Kramer at the Groningen University in Holland in 2000, cited in Miljøstyrelsen (2004), the environmental impacts from food products have been expressed in terms of energy use and global warming potential (CO_2-equivalents). The report shows that packaging only contributes 4.5 and 5 per cent respectively of the total impact for these parameters, see Figure 8.13.

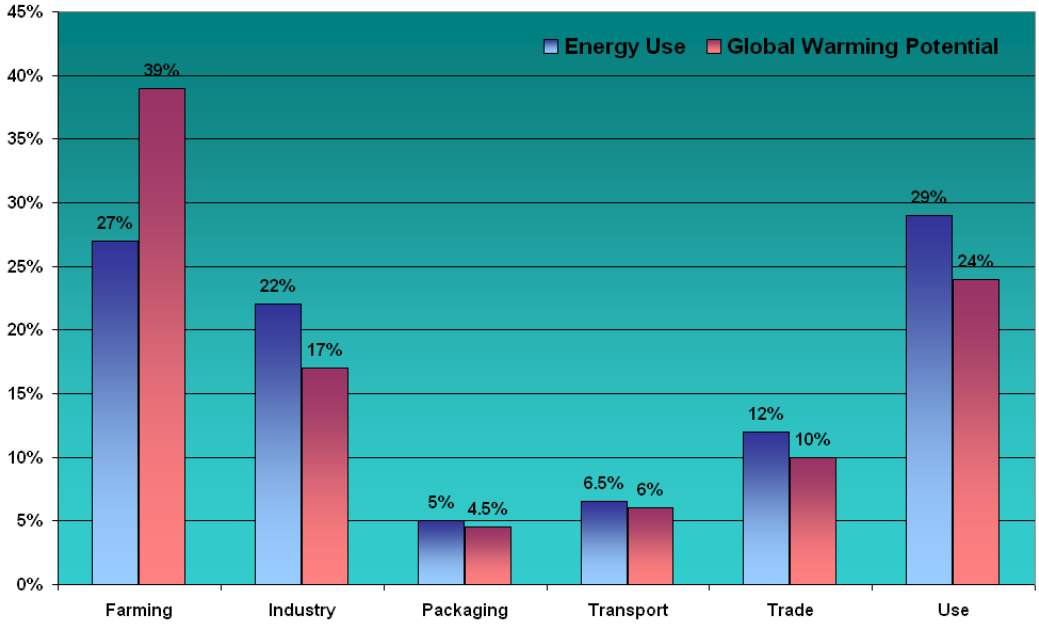


Figure 8.13 Energy use and global warming potential during different phases for different food products. (Figure by Nolan-ITU based on Miljøstyrelsen, 2004)

Integrated Packaging Design

As is highlighted in the above examples it is important that packaging design should be integrated at an early stage within the product development process and that any subsequent changes in product or packaging take account of the integrated system. Not considering the system as a whole can lead to unintended and unwanted results.

We note that it is for this very reason that the EU *Packaging and Packaging Waste Directive* is not specific about a minimum 'recyclability' of packaging materials. There are minimum recycling targets however, in terms of 'recyclability the Directive merely states that packaging must be suitable for 'recovery' which includes eg energy recovery.

Finally, the complexities in optimising packaging systems (and integrating their recovery for Highest Net Resource / Environmental Value) have been recognised in leading industrialised countries with the EU currently testing the feasibility of establishing a Packaging Environment Indicator (PIE) where the various categories determining the environmental performance of packaging systems and materials can be expressed as one single indicator – not dissimilar from the Eco-dollar indicator developed for the National Packaging Council in 2000 and also applied in this RIS.

c) Broad economic impacts

As discussed above, the costs of collection of a new material will typically be borne by local councils through sorting. Broad estimates of the potential costs of collecting more rigid and flexible plastics are made above. Councils may gain some revenue back through selling the recycled materials and the rest will be passed through to rate payers. It is, however, noted that as stronger markets are developed, it is possible that the costs of recycling these materials will drop due to economies of scale and, perhaps, as prices for recyclate increase.

There are numerous issues associated with markets and prices for recyclate. These issues are discussed further in section 8.6 below.

It may also be feasible to change the types of packaging that are being used so that councils do not have to collect a new type of material. In this case, the costs of changing packaging materials would fall on business. These costs have not been assessed in any detail.

REQUEST FOR FEEDBACK FROM EXISTING AND POTENTIAL COVENANT SIGNATORIES:

Feedback from existing and potential Covenant signatories is sought on the extent to which your organisation could reduce your use of non-recyclable packaging, including expected associated costs and potential barriers.

8.6 Overarching Target Area - Increased Use of Recycled Packaging Materials in New Products

8.6.1 Background and Brief

a) Intent

Ministers seek a target which will provide an indicator about market development for recyclate from used packaging. Targets for recycled content would drive the demand side of the local secondary commodity market thereby likely increasing the price paid for recyclate.

b) Predicted changes

It was only possible to complete an assessment of increased recyclate usage in Australia on a qualitative and indicative level, and focus on potential changes and their impacts at the strategic and systemic levels.

The economic and environmental costs and benefits of recyclate usage are, however, accounted for elsewhere in the RIS, eg, in the assessment of increased recycling rates - the flipside of which is increased recycled content unless the majority of increased recyclate recovered is exported.

While the limitations of the assessment are acknowledged, it does serve the purpose of pointing out strategic advantages and disadvantages of setting a target for increased packaging recyclate usage.

8.6.2 Situation Analysis

Current uses for packaging recyclate in products

Packaging recyclate is currently used in Australian manufacturing for both packaging and other recycled content products (RCPs) (Nolan-ITU; 2002; 2004).

The use of packaging recyclate for packaging products in Australia is a long-standing practice that largely precedes environmental drivers.[4] In other words, some types of packaging recyclate have long been regular feedstock materials for the manufacture of packaging because they meet the right technical requirements and, while subject to commodity price fluctuations, have generally been cost competitive to other available alternatives. Significant capital infrastructure investment has been directed at their use.

Notable long-term examples include:

[4] Pers.comms. ACOR representative.

- recovered cardboard and paper to corrugated boxes, boxboard, and other related fibre packaging products;
- recovered aluminium beverage cans into beverage cans;
- recovered steel into tinplate food cans;
- recovered glass cullet into glass beverage and food containers, and;
- since 1991, recovered PET into beverage bottles, including world-first inclusion of 25 per cent recycled content in food contact quality PET soft drink bottles by Coca-Cola Amatil in 2001 (at the Prestons facility now owned and operated by Visy).

It should also be noted that the recovery of each of these materials, and its use in packaging products, largely predates the establishment of regularized kerbside recycling services by local Councils. Collection previously took place on a "spot market" basis and was conducted by commercial operators who sought the materials when prices paid for them justified their efforts.

More recently, other forms of packaging recyclate, particularly plastics, have been introduced as feedstock materials for packaging and other products. This includes recovered PET plastic for PET bottles and transport packaging, and recovered HDPE for HDPE milk and other containers, and transport packaging. As an illustrative example, it is believed that the single largest order ever placed for recyclate HDPE was by Brickwood Holdings in 2003 from Visy Recycling to manufacture shipping pallets for Amcor.[5]

The large volume end-markets associated with the manufacture of packaging generate greater demand for feedstock, including packaging recyclate, than do other non-packaging RCP applications. Nevertheless, there is demand, albeit of a significantly smaller scale, for packaging recyclate in non-packaging RCPs. In some cases, the packaging recyclate used in these non-packaging applications is "excess" to the needs of the packaging sector, or is outside its quality requirements. In other cases, demand for packaging recyclate for non-packaging applications competes with demand for packaging applications. Some examples include:

- Recovered glass cullet into sand blasting abrasive, water filter medium, and road base / concrete aggregate;
- Recovered PET into geo-textiles;
- Recovered HDPE into garbage bags, agricultural pipes, bins, and crates;
- Recovered aluminium into window frames and other structural components, and;
- Recovered plastics into a variety of mixed plastics and PVC, LDPE, PP, and PS applications, including outdoor furniture, decking/flooring, lumber, document binders, plant pots, coat hangers, transport packaging and strapping, industrial moulding, traffic management devices, drainage systems and pipes, lighting components, waste management products, water storage products, and many others.

[5] Pers.comms. Brickwood Holdings, October 2004

It is important to note that the materials into which packaging consumption has most rapidly diversified – various plastics – are less likely to find their way back into recycled content packaging applications. It is estimated that the market share of rigid plastic packaging for consumer goods compared to other forms of packaging is increasing each year with plastic packaging now dominating beverage, health and beauty, cleaning and dairy categories (Nolan-ITU; 2004c).

In 2003, some 650,000 tonnes of plastic was used for packaging (with LDPE the largest material), while some 131,000 tonnes of plastics packaging was recovered for recycling and/or export (with PET and HDPE the largest materials). Of the 131,000 tonnes recovered, 59,000 tonnes (or 45 per cent) was exported for overseas recycling. When domestic recycling and exported material is considered together, a rate of around 20 per cent for rigid plastic packaging was achieved in 2003. The total recycling rate of all plastics in Australia has increased from around 7 per cent to around 13 per cent from 1997 to 2003. By weight, plastics packaging waste is 2 per cent of material going to landfill in Australia (PACIA; 2004).

Technical aspects of use of additional packaging recyclate in packaging products

The aim of using further packaging recyclate in packaging products (or in a "closed loop") is affected by a variety of technical aspects. These include the following:

- The key technical challenge for the use of recyclate in packaging and / or other products is ensuring clean, quality material that can be used smoothly and efficiently in manufacturing processes. The following statement from the plastics industry is equally true of other industries seeking to use recyclate:

  "The ability to produce clean, compatible recyclate PET has been the challenge for the plastics industry since recycling first came to the fore." (PACIA; 2005)

- There are technical limits to utilizing recyclate in some packaging that relate to the specifications of the packaging and/or product that it contains (ACOR; 2004). These include food contact grade and health provisions, and strength, clarity, durability, and shape / moulding requirements.

  Another example is the use of only virgin PET resin in PET water bottles, as there are concerns about tainting the taste of water with recyclate PET (PACIA; 2005).

- A key barrier (related to the above factor) is that much packaging is of a thin gauge of material, which sets a physical limitation on the incorporation of recyclate, particularly post-consumer material. Indeed, an unintended consequence of greater recyclate usage could be heavier packaging which in turn has environmental impacts.

- Packaging products differ in their capacity to absorb more recyclate. In this respect, some packaging has effectively reached its technical limit for recyclate usage. One example is moulded fibre where there is often 100 per cent recyclate usage (unless a small virgin fibre input is used to increase strength as fibres weaken over successive rounds through the fibre recycling "loop"). Indeed, the use of cardboard recyclate in fibre products is

probably over 95 per cent, while net recovery of materials is at an all time high. In 2002/2003, Victoria reached the highest recorded quantity yet of cardboard / paper at 818,000 tonnes (EcoRecycle; 2004a), while NSW recorded 754,000 tonnes (NSW DEC; 2004b), with the overwhelming majority of this material being put back into packaging products.

- Strict quality specifications in the manufacture of packaging and other products can dictate the source of packaging recyclate. For example, pre-consumer recyclate – such as scraps and off-cuts from manufacturing processes – is usually more consistent and 'pure' quality than post-consumer material, and is therefore favoured by some users.

- A significant issue in determining the current levels of recyclate usage by manufacturers, as well as tracking future levels, is that many packaging and other manufacturers do not specifically monitor the ratio of recyclate in their products or whether it came from a packaging source. Additionally, the use of recyclate as a source feedstock is not necessarily static in the manufacture of a product. It is the nature of a market economy that manufacturers can change suppliers, get better commercial deals on different feedstocks, and change technical / quality specifications to secure improved commercial benefits.

Market forces regarding packaging recyclate

In addition to the difficulty that some packaging recyclate has been economically competing with virgin feedstock, several other market-related aspects should be commented.

Attitudes & Behaviours

- While it has been reported that some 70 per cent of Australian business would appear to purchase recycled content products (RCPs), including an unknown quantity containing packaging recyclate, the purchasing pattern is quite distinct. RCP purchasing is done predominantly by larger organizations with a lower take-up rate among SMEs. It would appear concentrated in "incidental" purchasing, eg, office products. Additionally, the take-up of RCPs – as self-reported by surveyed companies – would appear to be static.

  The suboptimal take-up of RCPs may be related to perceptions – valid or otherwise – among end users of products that recycled content products are either of inferior quality or too expensive. Related to a lack of information, this is a significant barrier to the further take-up of RCPs and the creation of demand for packaging recyclate. (Conversely, the most commonly purchased items – paper office products – also have the greatest level of awareness among business purchasers (Colmar Brunton Research; 2002).)

- There is limited emphasis from Australian governments in their purchasing practices on recycled content products, including those that may have packaging recyclate. Government accounts for some 50 per cent of net purchasing in Australia. The Commonwealth, NSW, Victoria, and South Australia have frameworks in place for increasing Government purchasing of recycled content and other environmentally-appropriate products. However, these efforts are largely in their infancy, and rely almost

entirely on voluntary compliance by agencies, as stimulated by awareness raising, rather than any form of price allowance incentives or mandatory requirements.

At the local government level, there is a very active voluntary alliance in Victoria, EcoBuy, which has consistently reported increased levels of recycled content take-up by Councils, including $24.5m worth of RCP purchasing in 2002/03[6]. The NSW Government has initiated a similar program in NSW, but efforts are effectively under-developed or non-existent in other constituencies.

- In terms of consumers, there is limited demand for: a) products and packaging which is environmentally preferable, and/or; b) packaging with recycled content. Or, as noted by the Allen Consulting Group for the National Food Industry Strategy:

  "Environmentally sensitive and responsive consumers appear to represent a relatively small niche market in Australia. While it is likely that consumers would welcome the chance to be better informed on the environmental attributes of the food they buy… there is a question mark over the price premium or improvement in brand loyalty such food would enjoy… The environmental 'footprint' of the food and its container is a lower order concern for the majority of consumes than perception about the safety, flavour and nutritional properties of the food."[7]

  Specifically with regard to recycled content aspects, a research project conducted through the National Packaging Covenant's "transitional arrangements" fund by the NSW Jurisdictional Recycling Group (Taverner Research Company, 2003) and featuring a sample of more than 1000 shoppers found:

  - When discussing their purchasing considerations, only 4 per cent of shoppers identified packaging as a consideration;
  - When discussing packaging, 16 per cent identified recyclability as a positive and 3 per cent identified made from recycled materials as a positive.
  - *"Overall consumers think more about what they are going to do with the packaging rather than its antecedents, eg,, if it's made from recycled materials, energy usage, environmental impact of the product or package etc."*

Macro-economic Factors

- At the same time, it needs to be noted that the Australian recyclate market is affected by international trends. For example, due to industrial and manufacturing capacity growth in Asia, there is strong demand for packaging recyclate in China and its burgeoning apparel industry. For instance, it is estimated that almost 100 per cent of baled PET bottles exported from Australia to China ends up in fibre spinning applications (PACIA, 2005).

[6] www.mav.asn.au/ecobuy/whatsnew

[7] Allen Consulting Group for National Food Industry Strategy

For different materials at different times, particularly plastics, the export prices paid for packaging recyclate are higher than what is offered for domestic reprocessing in Australia. (Chinese buyers can sustain higher prices due to lower labour cost rates in their reprocessing operations.) Additionally, because the export trade is conducted in US dollar equivalents, as the Australian dollar strengthens against the US dollar, the local floor price increases.

Unsurprisingly, these factors have most recently resulted in the increasing export of material overseas rather than it staying in Australia for manufacturing. Local industry reports that the overall export market across most plastics packaging is growing at the expense of the local manufacturing market (Nolan-ITU, 2004c).

- Another global dimension that affects the Australian recyclate (and other) markets is the constant fluctuation of commodity prices. Historically, the price of plastics resins have moved in unison with the price of oil. Hence, during times of oil shortage and/or high oil prices, the price for recyclate resins – including PET and HDPE – becomes more competitive and attractive to buyers. In general historical terms, though, in the PET sector, evidence suggests that the differential for using recyclate PET is approximately 20 per cent above the price of "virgin" PET resin. (Assuming a 25 per cent recycled content per every bottle manufactured in Australia, this could have the effect of increasing the bottle's unit price by nearly 3 cents which would need to be passed on to the bottle purchaser / filler and then presumably retailers and consumers (Plastics & Chemicals Industries Association, 2005)).

- Nor is recyclate pricing immune from other supply and demand factors. For example, an increase in recyclate supply above the natural rate of market growth could lead to a fall in market price in some materials. This would in turn have effects on a number of other players, including those involved in recycling collection. However, the market price would also be affected by a decrease in demand for virgin materials. This could have the effect of in part counter-acting any impacts from oversupply of recyclate. Indeed, the current or future market dynamics that result in recyclate pricing are complex, not easy to predict, and subject to factors broader than only supply and demand forces. (For this and other reasons, much of the analysis in the RIS has needed to assume relative stability in recyclate pricing.)

- Many of the virgin materials against which recyclate materials compete benefit from economic support to the natural resources sector from Australian governments. It was been estimated by the Commonwealth Government in the mid 1990s that there are some $6 billion worth of both direct subsidies to the natural resources sector in Australia – one of the highest levels of subsidization of any developed economy in the world. This of course creates a structural advantage for non-recyclate materials (Department of Environment, Sport, & Territories, 1996).

- Another factor that influences the recyclate market is the comparatively low cost of landfill disposal of waste in Australia. Even in those markets where landfill prices are highest, Melbourne and Sydney, recovery of materials for processing can often be a marginal economic proposition for all involved. Its differential costs can often be passed

along the supply chain to reflect themselves in higher prices for RCPs. Indeed, in terms of the purchase of RCPs, corporate reputation is a much stronger driver for many organizations than any savings and this of course puts in doubt the longer term viability of many RCPs (Waste Audit & Consultancy Services, 2004).

Structural Factors

- The structure of the domestic recyclate reprocessing industry tends to be on an "established material / emerging material" divide. In terms of the established materials (eg, those that have long been collected and used as feedstock), there is strong concentration of players due to market maturity, and vertical integration on the part of several players. For example, cardboard and other related fibre is subject to an effective duopoly by two Australian-based, multi-national companies. Aluminium and steel are also highly concentrated in a handful of major players. There is only one glass reprocessor – ACI – in Australia. In terms of PET, there are currently two major reprocessors / packaging manufacturers handling two-thirds of all material while a third is exported (PACIA, 2005). Many of the above companies are represented through the Australian Council of Recyclers (ACOR) whose combined members report handling 8m tonnes of material per year (www.acor.org.au).

- Where there is greater fragmentation is in the emerging materials – particularly the non-PET plastics reprocessing sector. Here, while there are several major corporations involved, there is a tendency toward smaller businesses. At present, there are more than 100 sites for non-PET plastics reprocessing across Australia with the largest number (34) reprocessing HDPE. The structure of the plastics reprocessing sector is due to relatively low barriers to market entry (eg, the relative affordability of plastics extrusion equipment), as well as the fact that the end-markets' size is not particularly attractive to larger organizations. As the sector becomes mature, and there is some evidence of this beginning to appear as recovery volumes go up, it is very likely that there will be a consolidation of players and some smaller businesses and/or SMEs will leave the sector or be amalgamated into other businesses. (Only one organization, Visy Recycling, can make a legitimate claim to participating in reprocessing in a multi-material fashion.)

- There are numerous market related issues with regard to the collection and sorting of recyclate that influence material price, quality, and availability. One interesting example is LDPE – the most consumed plastic in Australia - which features in products such as squeeze bottles, lids/closures for numerous liquids, and, in film form, in retail carry bags. Only 16 per cent of Councils recently surveyed offer collection of LDPE. As a partial result, the limited volumes of recovered LDPE material (as well as PP and PS) are too small to sustain the development of a local reprocessing industry of any significant scale. At the same time, Councils' uncertainty about the scale of the potential cost impact of the inclusion of LDPE (and potentially other non-PET/HDPE plastics) in kerbside recycling systems is understandable, and explains their reluctance (Nolan-ITU, 2004c).

In sum, the following picture emerges with regard to the market situation for packaging recyclate in Australia:

- The recovery and use of packaging recyclate in Australia is affected by global market forces, including Asian industrial growth and the international price of oil, supply and demand market forces, as well as the direct and indirect subsidization of natural resources and pricing of waste disposal in Australia;

- The recovery and use of packaging recyclate in Australia is influenced by end-user market perceptions about RCPs' price and quality, as well as concerted action by all governments as significant purchasers, and;

- The domestic recyclate reprocessing industry is, in part, highly concentrated and, in part, highly fragmented according to material(s) handled.

8.6.3 Impacts of increased recycled content

The RIS examined the systemic and strategic effects of increased packaging recyclate usage at the qualitative level. (The specific economic and environmental costs and/or benefits of increased packaging recyclate usage are considered elsewhere in the RIS, as they are inextricably linked to increased recovery rates.) Fundamentally, the assessment aimed to address the following questions:

- Transitional impacts: Will increased packaging recyclate usage necessitate capital infrastructure investment in Australia beyond what is currently likely? If yes, to what extent?

- Competition-related impacts: Will increased packaging recyclate usage affect the competitive balances in the current Australian packaging supply and recovery chains? If yes, to what extent?

- Employment: Will increased packaging recyclate usage generate sustainable employment opportunities in Australia beyond what is currently likely? If yes, to what extent?

- Research & development: Will increased packaging recyclate usage stimulate additional research and development, and the creation of new intellectual capital in Australia beyond what is currently likely? If yes, to what extent?

a) Structure

Scope

The scope of the assessment was limited to two types of packaging recyclate, cardboard fibre and LDPE. These materials were selected to represent an established and robust market for packaging recyclate, and an emerging market for packaging recyclate.

Phase One

The first phase of the assessment was therefore structured on probability indicators, eg,, how likely is it that there will be an impact? This is illustrated Table 8.28 below.

Table 8.28: Probability Indicators

Aspect	Transitional Impacts	Competition-related Impacts	Employment Impacts	Research & Development Impacts
Increased recycled content usage in fibre packaging products Increased recycled content usage of LDPE in packaging products	• Highly probable to require infrastructure investment • Somewhat probable • Neutral • Somewhat probably to be absorbed by current infrastructure • Highly probable to be absorbed by current infrastructure	• Highly probable to affect / change current structures • Somewhat probable to change / affect • Neutral • Somewhat improbable to change / affect current structures • Highly probable to affect / change	• Highly probable to create employment • Somewhat probable • Neutral • Somewhat improbable • Improbable to create employment	• Highly probable to stimulate additional R&D • Somewhat probable • Neutral • Somewhat improbable • Improbable to stimulate additional R&D

Phase Two

The second phase of the assessment was structured on consequence indicators, eg,, how significant is an impact likely to be? This is illustrated in Table 8.29 below.

Table 8.29: Consequence Indicators

Aspect	Higher probability impacts	Consequence level
Increased recycled content usage in fibre packaging products Increased recycled content in LDPE packaging products	As identified in Phase 1 of assessment	• Nationally significant • Some significance to some sectors of society • Limited significance to limited sectors of society • Negligible significance

b) Assessment Results

Impact Probability

Table 8.30: Impact Probability

Aspect	Transitional Impacts	Competition-related Impacts	Employment Impacts	Research & Development Impacts
Increased recycled content usage in fibre packaging products	Somewhat probable infrastructure investment requirement	Neutral	Neutral	Somewhat probable to stimulate R&D
Increased recycled content usage of LDPE in packaging products	Highly probable infrastructure investment requirement	Highly probable to affect / change current structures	Somewhat probable to create employment growth	Highly probable to stimulate R&D

Impact Consequence

Table 8.31: Impact Consequence

Aspect	Higher probability impacts	Consequence level
Increased recycled content usage in fibre packaging products	Somewhat probable infrastructure investment requirements and R&D stimulation	Limited significance to limited sectors of society
Increased recycled content in LDPE packaging products	• Highly probable infrastructure investment requirement • Highly probable to affect / change current structures • Somewhat probable to create employment growth • Highly probable to stimulate R&D	Some significance to some sectors of society

Discussion

The establishment (and, very importantly, assumed achievement) of a target for the use of more recyclate in packaging and other products would have a different impact on different packaging recyclate materials and their supply chains. The structure of the Australian packaging recovery chain is heterogeneous and any "across-the-board" target will affect some sectors of it more than others. Indeed, a mandated recycled content quota for packaging that does not reflect the fundamental differences between materials would necessarily advantage some materials over others – some of which would most likely not be able to achieve the target regardless of their efforts or expenditure.

In the fibre sector, given the well-developed current reprocessing infrastructure, market concentration, ample collection systems to service increased demand, vertical integration of the two significant players, and assuming relative stability in recyclate pricing, it is probable that increases can be accommodated for a comparatively limited cost. For example, it could necessitate an upgrading of fibre reprocessing facilities to allow them to accept more material that is currently considered a contaminant, such as waxed material. Industry sources advise that the inclusion of recycled content in high wet strength packaging may also be an outcome in the future. In the short term, it could also lead to an increase in the amount of exported fibre recyclate as supply could exceed demand, as well as the technical limits of how much fibre can be produced locally. Importantly, the degree to which fibre reprocessors / packaging manufacturers will be able to pass this cost on to their customers (and further down the chain) is highly doubtful. Therefore, there will be an impact on the profitability of fibre reprocessors / packaging manufacturers, including Amcor and Visy.

In the LDPE sector, given the lack of current reprocessing infrastructure, market fragmentation, lack of collection systems to service any increased demand, and lack of end-market applications, it is probable that increases can only be accommodated for a comparatively high systemic cost. For example, additional costs – allowing for assumed relative stability in recyclate pricing - would need to be incurred in terms of:

- Establishment of collection and sorting capacity (with costs to Councils and reprocessors);
- Conduct of public education campaigns to raise awareness about LDPE recyclability (with costs to Councils and various parts of industry);
- Establishment of reprocessing infrastructure (with costs to reprocessors);
- Development of alternative specifications / technical designs for use of recycled LDPE in products (with costs to reprocessors and the plastics industry);
- Re-tooling of infrastructure in the plastics packaging extrusion sector (with costs to the plastics industry), and;
- Establishment of new commercial relationships and distribution channels (with costs to reprocessors and the plastics industry).

All of the above costs / impacts would be incurred assuming that it is actually possible to establish an end market for recycled LDPE in packaging products. In reality, given the costs outlined above, it is difficult to envisage recycled LDPE competing against virgin LDPE without some form of either public or private subsidization.

In sum, the setting and achievement of a comprehensive target for increased use of packaging recyclate in products is likely to have highly differentiated impacts according to material type / sector of the packaging recovery chain. To revisit the threshold questions put earlier:

- *Will increased packaging recyclate usage necessitate capital infrastructure investment in Australia beyond what is currently likely? If yes, to what extent?*

  Yes, additional infrastructure investment will be required. The requirements will be greater in some sectors – particularly less mature ones such as non-PET plastics – than others. It will be difficult for the costs of such an increase to be absorbed in either increased market take-up, share, or by passing on to other players.

- *Will increased packaging recyclate usage affect the competitive balances in the current Australian packaging supply and recovery chains? If yes, to what extent?*

  In some cases. Due to the heterogeneous nature of the sectors involved, there will be different implications for different sectors. In the very established fibre reprocessing / manufacturing sector, it is unlikely for there to be significant structural implications. In the less mature sectors, it is highly likely that the additional cost requirements would lead to a consolidation of players, with the smaller players the least likely to survive.

- *Will increased packaging recyclate usage generate sustainable employment opportunities in Australia beyond what is currently likely? If yes, to what extent?*

  Yes, it is likely that employment opportunities would be generated in Australia if a target for increased recyclate usage were to be attained. However, this needs to be qualified. First, the majority of jobs generated would be largely low-skilled, process-type work. Secondly, any net job increase would only take place after industry restructuring and consolidation. Hence, the employment growth could be geographically limited in scope.

- *Will increased packaging recyclate usage stimulate additional research and development, and the creation of new intellectual capital in Australia beyond what is currently likely? If yes, to what extent?*

  Yes, it is very likely that further R&D will be needed to effect an increased usage of recyclate from packaging. If grants issued by public sector agencies for R&D in the recycling industry are to be used as an indicator, this new R&D could be worth approximately $5 to $10m per year.

Further analysis – on a sector-by-sector basis – would be required to determine if the net environmental benefits of recyclate usage increase (as determined elsewhere in this RIS) outweighed the cumulative sectoral costs, and or justified their uneven distribution among players. Finally, it should be noted that in the European Union what is mandated are recovery and recycling rates but not recycled content levels in products. Moreover, the EU's targets are established on a sectoral basis.

c) Broad economic impacts

Increasing the use of recycled materials in new products targets the demand for recycled materials. That is, by forcing demand for recycled materials up, and hence raw materials down, there are efficiency gains through moving closer to the full lifecycle impact of materials. This target is likely to counteract the effect of increased supply of recycling materials on the price of raw materials. In effect, the two targets together constitute a supply chain response to the distortion in the use of raw and recycled materials. The first target boosts supply and the second boosts demand – both to ensure that there is a market for the increased supply and to support prices for recycled materials.

While the public impact of this target is positive, there are likely to be private costs for business, depending on how the target is implemented. If businesses are required to increase their use of recycled materials in new products, then this may require some costly changes to capital equipment or skills and training.

REQUEST FOR FEEDBACK FROM EXISTING AND POTENTIAL COVENANT SIGNATORIES:

Feedback from existing and potential Covenant signatories is sought on the extent to which your organisation could increase your use of recycled packaging materials (ie. increased recycled content) in new products, including expected associated costs and potential barriers.

8.7 Overarching Target Area - Continuous Performance Improvements by individual signatories

8.7.1 Background and Brief

a) Intent

An overarching target in this area is aimed at ensuring that all Covenant signatories contribute individually towards fulfilling the Covenant's goals and outcomes. This includes activity in the design of packaging in ways that improve the use of resources, their potential for recovery, and their overall performance. It also includes activities like public education and litter management programs.

This target is intended to apply to all signatories, however, for the purposes of modelling in this RIS, the focus has been on potential improvement indicators which could be demonstrated by industry.

b) Predicted Changes

Whilst three elements have been modelled as potential indicators of environmental improvement, it is acknowledged that improved environmental performance is intended to be demonstrated through reporting by all signatories against relevant KPIs in Schedule 1 of the revised Covenant and using their own baseline data on an annual basis.. These span the full lifecycle of the packaging supply and packaging recovery chains including aspects which will reflect progress against the other overarching target areas.

Given this, and the built in reporting and compliance elements of the revised Covenant, a specific target in this area may not add significant value.

The three elements modelled in the RIS are indicative of the types of improvement which could occur.:

- *The rate of participation of the packaging supply chain in the revised Covenant will go from current 80 per cent coverage to 90 per cent coverage.*

- *Continued lightweighting of major packaging material groups by average decrease in weight per unit of 1 per cent to 5 per cent across all materials (on a net basis).*

  Industry has reported lightweighting as a key packaging trend for several years and such activity is currently enshrined in Action Plans. The assumed further lightweighting trend is highly conservative given that the glass, aluminium, steel, cardboard, and plastics sectors have all produced significantly higher gains in the last decade.

- *The environmental performance of signatories will increase by between 2 per cent and 5 per cent.*

8.7.2 Impacts

a) Economic

The economic impacts of a continuous improvement target cannot be robustly quantified at this stage, separate to the other targets. There is no baseline for how signatories will improve their environmental performance regardless of the changes to the Covenant. For instance, the trend to light-weighting is an improvement in business environmental performance, but it is difficult to distinguish the impact of a specific continuous improvement target on this.

Reporting continuous improvement is likely to increase data and administration costs, both for current signatories and for new signatories. The 10 percentage point increase in participation will increase administration costs by less than $0.5m, and probably by much less as new signatories will tend to be smaller businesses (see combined economic impacts).

In terms of operational costs, businesses are likely to improve in those areas where they can achieve gains at the least cost. As lower costs operational changes are removed, businesses may have to make modifications that generate the environmental improvements at an increased cost. However, note that many operational changes can occur at the time of capital replacement, making them less costly.

b) Environmental

In this section, an attempt has been made to assess the impact of the revised Covenant on the overall environmental performance of the supply chain, i.e., changes due to new management practices in it packaging production and raw material acquisition. The assumptions are stated above and refer to the following two factors:

- Lightweighting of packaging (1 per cent and 5 per cent);
- Signatory participation increased from 80 per cent to 90 per cent, with environmental performance of the new signatories improving by 5 per cent and 10 per cent; and
- Environmental performance of current signatories improving by 2 per cent and 5 per cent.

Environmental benefits arising from these changes have been quantified by applying the percentage changes to the total tonnages of packaging materials produced in Australia (see Table 8.1). A review of relevant LCA databases - predominantly those on packaging materials undertaken by RMIT for EcoRecycle Victoria (Grant et al, 2001), as well as international work such as Hanssen O.J. (1998) - confirmed that recycling reduces the overall environmental impact of packaging production by approximately 50 per cent.

Based on this, the impact of local packaging production could be assessed applying the findings of the *Independent Assessment of Kerbside Recycling* (Nolan-ITU, 2001). 'High and low' values were calculated to reflect the changing environmental impact/benefit due to different recycling mixes. The values applied were Eco$422 – 522 for each tonne of recyclate collected, transported, reprocessed and sold. These values were then doubled for each tonne of packaging (mix) produced on the basis that the international work referred to above confirms that recycling reduces the overall environmental impact of packaging production by approximately 50 per cent. This methodology and the qualifications associated with its use are discussed further in section 7.2 and Appendix B.

Two scenarios have been modelled:

- 'Low end' (conservative scenario) - (ie. 1% lightweighting, environmental performance of new signatories improving by at least 5%, 80% signatory participation and environmental performance of current signatories improving by at least 2%), resulting in an overall environmental benefit of at least Eco$50 million.

- 'High end' (optimistic scenario) – (ie. 5% lightweighting, environmental performance of new signatories improving by at least 10%, 90% signatory participation and environmental performance of current signatories improving by at least 5%), resulting in an overall environmental benefit of at least Eco$200 million.

Table B.7, Appendix B provides further detail about these calculations. As described above, total environmental improvements in the packaging supply chain are expected to be greater than $Eco 50m.

c) Broader economic impacts

There is no baseline for improvement under existing Covenant arrangement with which to compare the impact of a strengthened Covenant. It is thus not possible to provide any robust economic quantification, in the time limits available.

A continuous improvement target applied to business would also need to reflect the work that each business has done to date in improving their life cycle management of packaging. It is likely that businesses have achieved their current positions at fairly minimal cost. As further improvements occur, these costs are likely to increase, depending on the speed of improvement. For example, businesses may have adjusted their practices to incorporate recyclability and recycling where possible, but without changing manufacturing processes or capital. As with broader environmental goals, the costs to business may not be substantial if improved performance coincides with the adjustment in the capital stock rather than replacing capital stock that is not fully depreciated.

A set target for all businesses may not be the least cost way to achieve overall environmental gains. Some businesses may be able to achieve environmental gains at a lower cost than others.

Increasing participation in the Covenant and improving environmental performance has broad economic impacts similar to those of the other targets, as continuous improvement is sought in all areas of lifecycle management covered by the KPIs.

8.7.3 Contribution of Packaging to Total Environmental Performance

As described earlier and illustrated in Section 8.5.3b), a number of studies have found that the environmental impact of packaging was relatively small compared to manufacturing the products and using them. Given that packaging plays a link role between primary production and the consumer, its improvement could cascade both up and down the supply chain. Any improvement of environmental performance of packaging could potentially have a multiplier effect in the broader supply chains that utilise packaging, such as the food industry. Even a one percent improvement in these areas would achieve a much greater benefit than the supply chain environmental benefit estimated above. For the purpose of this RIS, these benefits have not been included in the environmental assessment. However, it is likely that they will accrue as a result of many of the KPI's that are featured in the revised Covenant (eg total energy use).

9 SOCIAL ASSESSMENT OF PREFERRED OPTION

9.1 Impact Assessment Results

The social impacts associated with changes from the revised Covenant / NEPM package are likely to be minor or neutral. A low level of impacts on workers in the packaging supply and recovery chains, as well as some minor additional inconveniences for some ratepayers, is offset by greater empowerment of consumers and greater access to best practice recycling for members of the general public. The net social impacts are not of a level of significance to affect the net welfare assessment. The evaluation is further discussed below.

Table 9.1: Impact Assessment Results

OH&S	Labour Relations	Consumer Empowerment	Residential Amenity
Low level manageable impacts	Low level manageable impacts	Beneficial	Beneficial

9.1.1 Occupational Health & Safety & Labour Relations

The revised Covenant / NEPM package is likely to produce several changes with potential implication for the occupational health and safety of employees in the packaging supply and recovery chains, as well as for labour relations. These changes stem largely from the revised package's emphases on:

- Target for recycled content usage and KPIs for product stewardship implementation by companies;
- Increased recovery target / landfill diversion target and KPIs for greater away-from-home recycling activity; and
- 'best practice' implementation in domestic kerbside recycling by more Councils and their contractors.

The changes include:

- Some different procedures and practices in product / packaging design, manufacture, and distribution, including changes associated with cleaner production, recycled content usage, and/or greater source segregation of materials in workplaces;
- New or more systems for away-from-home recycling by companies in the packaging recovery chain;

- Increased volumes of material in overall recycling collection schemes and reprocessing facilities; and

- Better quality of material in recycling collection schemes and reprocessing facilities.

However, the consequences of the above potential changes are negligible and manageable; eg,, they are not out of the ordinary or unexpected and can be readily accommodated by the primarily affected stakeholders. For example, companies and other institutions in the both packaging supply and recovery chains regularly change and improve their internal processes, and have existing systems for both OH&S and human resources management. As identified in the Independent Evaluation of the Covenant, many companies and their employees in the packaging supply chain have become somewhat accustomed to Covenant compliance requirements to date. Given steady increases to date, there is no reason to believe that Councils and companies and their employees in the packaging recovery chain are unaccustomed to further incremental increases in material volumes. It should be noted that there have been no recorded incidents of OHS or labour relations problems that are attributable to the Covenant to date.

Moreover, an increased emphasis on KPIs about material selection and product / package design may lead to benefits related to recyclate quality. Equally, the on-going emphasis on best practice in Council schemes may also provide the benefit of lower contamination levels in materials collected. The envisaged education and communication scheme also adds impetus in these regards.

9.1.2 Consumer Empowerment

The revised Covenant / NEPM package is likely to produce several changes with potential implication for consumer empowerment with regard to the environmental life-cycle of packaging. These changes stem from the revised package's emphases on:

- KPIs related to consumer information for companies in the packaging supply chain, and;

- Conduct of a dedicated and structured communication and education program.

The changes include:

- Consumers have more environmentally-related information on which to base their purchasing decisions;

- Consumers have more environmentally-related information on which to base their reuse and recycling activity;

- Consumers have greater access to recycling infrastructure away from their homes, and;

- Greater contribution to inter-generational equity.

The impacts of the above changes are likely to be positive. For example, increased information provision by companies, governments, and non-governmental organisations about the environmental performance of plastic shopping bags, as well as alternative options to them, has led to a swift shift by Australian consumers to reusable bags. This shift has not only produced a measurable environmental benefit, but is also likely to have positively contributed to social cohesion, eg,, a shared sense that the community is doing what it practically can.

9.1.3 Residential Amenity

The revised Covenant / NEPM package is likely to produce changes with potential implication for residential amenity.

The changes stem from:

- 'best practice' implementation in domestic kerbside recycling by more Councils and their contractors, including further "containerisation" where it may not currently exist, less frequent collections, and community education about material presentation.

- greater presence of 'away-from-home' recycling infrastructure in workplaces, public places, and special events.

In terms of kerbside recycling, the change is likely to result in greater "user-friendliness" and convenience of services. It may also result in less truck movements in residential areas. On the other hand, it may cause concerns among some ratepayers that "material being collected isn't being recycled or is stock-piled".

In terms of away-from-home recycling, amenity for some residents and citizens will be increased through improved availability of away-from-home recycling infrastructure. This has two dimensions: the sense of contributing to environmental protection, and; potentially improved visual amenity through less littered packaging.

On balance, the changes are beneficial. A greater number of people actually benefit from the change to kerbside recycling than the number of people who would be concerned about potentially stockpiling recyclable material for additional periods of time. There would be few members of the community who would be disadvantaged by greater access to recycling infrastructure in non-domestic settings.

10 SUMMARY OF IMPACTS OF PREFERRED OPTION

This section provides a summary of the impacts of the preferred option as described in sections 8 and 9. It contains:

- a brief description of each of the impact areas assessed, including the overarching target areas;
- a break down of the financial costs and benefits, the environmental costs and benefits and the social costs and benefits;
- an overall summary of the assessment; and
- an identification of the key risks bearing on the assessment.

10.1 Key impact areas

10.1.1 Broad impacts across all target areas

This section describes broad impacts that cannot be attributed to any specific target area, or to the monitoring, administration, or reporting requirements of the revised Covenant. In addition to environmental benefits, this section identifies some financial benefits of the Covenant.

10.1.2 Monitoring, Reporting and Administration

There will be some non-quantifiable benefits from increased information flows. There will, however, be additional costs associated with monitoring, reporting and administration. These costs are estimated to be $1 - $1.5 M per year for all participating businesses, and approximately $0.35 M per year for Governments. Related costs for Local Government are considered negligible given that they are already conforming to the administrative provisions of the NEPM.

10.1.3 Overarching Target Area - Increased Packaging Recycling

To reduce the number of scenarios and simplify the key outcomes, Table 10.1 lists additional quantities of packaging that would be recovered in 2010 under the target recycling rates considered. Two Baselines were to be modelled, one assuming a current 40 per cent recovery rate and one assuming a current 50 per cent recovery rate. The table also provide an average of these two baselines, with quantities between 285,000 t/yr (60 per cent recovery) and 655,000 t/yr (80 per cent recovery rate). These figures include public place recycling quantities which are discussed in Section 8.4.3a).

Table 10.1: Summary of Additional Packaging Recycled from the Domestic Sector in 2010 for the Targets Considered

Municipal	60%	70%	80%
40% Baseline	410,000	610,000	820,000
50% Baseline	160,000	330,000	490,000
Average	*285,000*	*470,000*	*655,000*
kg/hhld/week increase	0.75	1.15	1.54

In a similar fashion to the domestic packaging recycling estimates, Table 10.2 provides an average of additional packaging recycled from industry & commerce (away-from-home) in 2010 for the targets considered.

Table 10.2: Summary of Additional Packaging Recycled from Industry & Commerce (Away-from-home) in 2010 for the Targets Considered

Commercial & Industrial	60%	70%	80%
40% Baseline	650,000	970,000	1,290,000
50% Baseline	260,000	520,000	780,000
Average	*455,000*	*745,000*	*1,035,000*

It has been assumed that there would be some increase in the amount of material recycled in 2008 and 2010 even without the Covenant, due to increases in population and GDP. The quantities presented in Table 8.10 are over and above these 'no Covenant' increases.

Impact on Waste to Landfill

To determine the effects of increased packaging recycling on quantities of packaging waste disposed of to landfill, the packaging waste to landfill was calculated by subtracting the amount of packaging consumed (accounting for economic and population growth) from the amount recycled. For all targets - and for both baselines - under consideration, the amount of packaging disposed to landfill will reduce from current levels. The extent of the reduction varies dependent on targets and baseline assumed.

10.1.4 Overarching Target Area - Reduced Non – Recyclable Packaging

Financial costs related to this target can occur in three key areas.

- Increased processing costs paid by local government or businesses.
- R&D and market development work. It is noted that although costs may occur here initially, such costs have the potential to be paid off over time and result in financial benefits.

- Costs associated with business using different packaging materials.

An estimate has been made of the potential costs to local government of increased processing. Although initial estimates have been made of the costs to business for R&D (see section 8.6 and section 10.1.5 below), no estimates have been made of the costs associated with using different packaging materials.

The assessment discusses the life-cycle impacts of packaging and packaged products and concludes that recyclability and recycling is generally preferable over non-recyclability however, it provides a number of references to illustrate that other aspects of the life-cycle can have much higher impacts (or gains) on the environment than the narrow aspect of recyclability and recycling.

The main issues identified in terms of non-recyclable packaging were therefore not the proportion of what can and what cannot be recycled in theory but much rather how and at what costs consumers (and businesses) can gain access to recycling services and how the range of materials commonly collected for recycling could be extended.

10.1.5 Overarching Target Area - Increased Use of Recycled Packaging Materials in New Products

Additional infrastructure investment will be required. The requirements will be greater in some sectors – particularly less mature ones such as non-PET plastics – than others. It will be difficult for the costs of such an increase to be absorbed in either increased market take-up, share, or by passing on to other players.

Due to the heterogeneous nature of the sectors involved, there will be different implications for different sectors. In the very established fibre reprocessing / manufacturing sector, it is unlikely for there to be significant structural implications. In the less mature sectors, it is highly likely that the additional cost requirements would lead to a consolidation of players, with smaller players the least likely to survive. Further analysis is required to determine specific impacts to other sectors.

It is likely that employment opportunities would be generated in Australia if a target for increased recyclate usage were to be attained. However, this needs to be qualified. First, the majority of jobs generated would be largely low-skilled, process-type work. Secondly, any net job increase would only take place after industry restructuring and consolidation. Hence, the employment growth could be geographically limited in scope.

It is very likely that further R&D will be needed to affect an increased usage of recyclate from packaging. If grants issued by public sector agencies for R&D in the recycling industry are to be used as an indicator, this new R&D could be worth approximately $5 to $10m per year.

10.1.6 Overarching Target Area - Continuous Performance Improvement

An attempt has been made to assess the number of separate performance elements as indicators of improved performance. It should be noted however, that improved environmental performance is intended to be demonstrated through reporting by all signatories against relevant KPIs in Schedule 1 of the revised Covenant. These span the full lifecycle of the packaging supply and packaging recovery chains including aspects which will reflect progress against the other overarching target areas.

The strengthened Action Plan and reporting elements of the revised Covenant are designed to ensure that all signatories that all signatories are demonstrating improved performance against their own baseline data on an annual basis.

10.2 Break down of costs and benefits

10.2.1 Financial costs and benefits

Table 10.3 illustrates the breakdown of costs and benefits of the revised Covenant with a particular emphasis on its proposed target areas and a number of actions that are likely to be required to meet them. It is noted that these have been selected based on the professional judgement of the authors, that they are partially interchangeable, and that each of these would require a more detailed analysis and implementation plan prior to execution. The options are presented purely as a basis for strategic policy decisions, and are not researched in sufficient detail for financing and/or funding arrangements for individual options/actions.

With this in mind, Table 10.3 illustrates potential additional packaging quantities recycled, likely costs incurred, an indication of the range of environmental benefits achievable, and – in the last row for each action- a cost–efficiency ratio i.e. an indicator expressing how much 'environmental improvement' is likely to be achieved for each dollar spent. To keep the table down to a meaningful size, only averages are presented for the two baselines (40 per cent and 50 per cent current packaging recycling rate), and only the targets under consideration for 2010 are used (NB: These targets correspond relatively closely with those considered for the Year 2008; for details refer to earlier Sections in the Impact Assessment).

Table 10.3: The Financial Costs and Benefits of Revising the Covenant

Year 2010	60%	70%	80%	Initial Cost Distribution
Extend current kerbside recycling				
t/yr increase	*254,972*	*389,932*	*519,915*	Councils
Cost ($M)	-16	-36	-55	
Away-from-home Recycling - Public Place				
t/yr increase	*10,000*	15,000	*20,000*	Councils
Cost ($M)	3	4.5	6	
Away-from-home Recycling – Shopping Centres				
t/yr increase	*20,000*	25,000	*30,000*	Shopping Centres/Retail Businesses
Cost ($M)	8	14	20	
Extend Kerbside Recycling to include all rigid packaging				
t/yr increase	-	40,000	*50,000*	Councils
Cost ($M)	-	6	*7*	
Extend Kerbside Recycling to Include all flexible packaging				
t/yr increase	-	-	*35,000*	Councils
Cost ($M)	-	-	*8*	
Extend C&I Recycling				
t/yr increase	455,000	745,000	1,035,000	Businesses
Cost ($M)	25	37	50	
Continuous Supply Chain Performance Improvement				
Cost ($M)	Not separately assessed			
Inseparable costs and benefits				
Costs to business ($M)	6 – 12			Businesses
Cost to State and Federal government ($M)	0.35			State and Federal Government
Benefits to business ($M)	0 – 10			Businesses
Benefits to Councils of increased efficiency ($M)	1.5 – 3.0			Councils
Total Financial Costs	**26 - 32**	**30 – 36**	**42 – 48**	

Table 10.3 shows estimates of the costs incurred by business and government from the strengthening the Covenant. Where possible, these figures reflect direct estimate as discussed in the previous sections. If these estimates are not available, information on the cost of the Covenant to date is used to guide the estimation of costs, obtained through stakeholder consultation.

Table 10.4: Summary of the Financial Costs and Benefits

Category	The Revised Covenant Additional cost ($m/year)	Source
Business		
Administration	1 to 2	Increase in signatories Current Covenant costs
Commercial recycling	25 to 50	Modelled
Shopping centre recycling	8 to 20	Modelled
Other	5 to 10	Current Covenant costs
Business total	**39 to 82**	
Local Government		
Kerbside	-16 to -55	Modelled
Public place	3 to 6	Modelled
Types of materials collected	6 to 15	Modelled
Efficiency benefits	-1.5 to –3	
Local Government total	**-8.5 to –37**	
State	0.25	Current Covenant costs
Commonwealth	0.1	Current Covenant costs
State and Federal Government	**-8 to –37**	
OVERALL TOTAL	**≈ 31 to 45**	

(Commonwealth, State and Territory governments; Office of Small Business; survey of businesses)

10.2.2 Environmental costs and benefits

As described in Section 7.2, Section 8, and Appendix B, the environmental costs and benefits have been assessed using an environmental economics evaluation technique. The adopted approach is one method of expressing environmental gains (and burdens) as a single indicator. The Eco-dollar is a conceptual and strategic indicator of potential costs and benefits rather than a definitive valuation. In this context, it is important to note that the final dollar valuation is not intended to represent actual environmental benefits but rather to indicate the relative significance of environmental results for different targets and actual financial costs.

Increased recycling

An attempt has been made to assess the impact of the revised Covenant on increased *overall recycling*. This is expected to be greater than Eco$250m.

It also considered the *overall environmental performance of the supply chain*, i.e., changes due to new management practices in it packaging production and raw material acquisition. Total environmental improvements in the packaging supply chain are expected to be greater than Eco$50m.

The net environmental benefit of the revised Covenant was found to be significant, and is estimated to be greater than Eco$300m per year.

10.2.3 Social Impacts

The social impact of the revised Covenant is negligible to somewhat beneficial. While the recovery of more material will have some largely manageable impacts in terms of staff and other related practices in business, these are outweighed by several community benefits such as:

- Increased access to recycling in non-household settings.
- Increased access to best practice kerbside recycling where it may not currently exist.
- Improved consumer information on which to base decisions about packaging, waste minimisation behaviours including purchasing and recycling.

The above benefits are likely to provide the Australian community with the overall sense that it has the opportunity to and is making a greater contribution to intergenerational equity.

10.3 Overall summary of assessment

In summary, the RIS determined the following aspects:

- When evaluated against a set of holistic criteria for public policy effectiveness, the revised Covenant / NEPM package performed better than other alternative policy approaches. While other approaches could potentially produce higher environmental benefits, they would also be more difficult to implement and would most likely involve a greater economic and social impact than the revised Covenant / NEPM package.
- While there will be different effects on different stakeholder groups, the financial costs of the revised package are likely to exceed its financial benefits. However, the total financial cost of the revised Covenant is estimated to be $31m - $46m. In large measure, these costs will be borne by business and ultimately passed on to consumers. These costs are largely attributable to increased participation in commercial and industrial resource recovery initiatives.
- Businesses undertaking increased packaging recycling are likely to have average increased financial costs of between $50 and $100 per business per year (or between $25m and $50m nationally). These businesses could be Covenant signatories or other businesses that take up increased opportunities to recycle.

- In terms of the distribution of financial costs, smaller business signatories – those with a turnover of less than $10m per year and comprising approximately one-third of current Covenant signatories - are likely to face disproportionately higher net costs than big business under the revised Covenant package. This situation arises largely because the costs associated with preparing action plans and annual reports. It is estimated that these costs will be somewhat in excess of $2,000 per year.

- It is likely that local government will incur some savings from the revised Covenant. Costs associated with the provision of additional away-from-home recycling services by Councils ($3m - $6m) may be offset by cost reductions in the provision of kerbside recycling (resulting from improved efficiencies and materials yields) ($18m – $51m). These cost estimates are average predictions for the local government sector in general and may not apply to each individual local Council.

- Significant environmental benefits will arise from the revised Covenant. This is attributable to greater gains from increased resource recovery of packaging, as well as improved product stewardship by private sector companies in packaging's environmental life-cycle.

- To determine the effects of increased packaging recycling on quantities of packaging waste disposed of to landfill, the packaging waste to landfill was calculated by subtracting the amount of packaging consumed (accounting for economic and population growth) from the amount recycled. For all targets - and for both baselines - under consideration, the amount of packaging disposed to landfill will reduce from current levels. The extent of the reduction varies dependent on targets and baseline assumed.

- The social impact of the revised Covenant package is negligible to somewhat beneficial.

The RIS also attempted to identify where the major costs of the Covenant are likely to fall. The largest costs are likely to be borne by business through commercial recycling. This will be offset to some extent by benefits cited by businesses such as increased communication along the supply chain. Smaller businesses are likely to be more affected than larger businesses due to many of the costs being subject to economies of scale. Consumers will benefit from the improved information on recycling 'quality' attributes of products. Government is likely to face a small net cost, reflecting increased monitoring by State and Territory governments and increased collection costs for local Councils, partially offset by efficiency gains in collection. Councils in non-metropolitan areas in particular are likely to face costs from increased kerbside recycling.

10.4 Key Risks Bearing on the Assessment

10.4.1 Data Limitations

While it does appear that the revised Covenant / NEPM package would lead to a welfare gain for Australia, the relative paucity of quantitative evidence suggests caution. In particular, for the purposes of the economic assessment, only a small sample of businesses was surveyed, and these tended to be larger businesses. This means there is substantial uncertainty about the costs and benefits to business from the introduction of the Covenant, and also less certainty about the effects of strengthening of the Covenant.

10.4.2 Interrelated Markets

Increasing the amount of recycling by consumers and firms will only lead to environmental gains if it results in less use of raw materials than would otherwise have been the case. This relies on outcomes in the recycling transformation industry. Capacity constraints in the recycling transformation industry may limit the short-term gains from increased recycling. On the other hand, increased recyclable materials may also bolster the industry by enabling economies of scale to be realised.

The impact of a revised Covenant on the collection services market is also important in determining the welfare implications, since this market is not efficient. It is not clear whether councils are collecting less than or more than the efficient amount of recyclables, given the absence of price signals in this market.

The strengthening of the Covenant appears likely to increase both raw and recycled material prices. This compares to decreasing these prices if the environmental externality was corrected directly, as directly increasing the raw material price would lead to increased demand for recycled materials. So while the Covenant may improve the relative price of raw and recycled materials, and thus lead to efficiency gains, it distorts the relative price of these materials against other prices in the economy. For example, the decrease in prices may lead to increased use of packaging materials, relative to the outcome of direct regulation. There may also be dynamic effects, such as decreasing investment in recycling technologies.

Economic analysis suggests that there is further scope for efficiency gains through more direct regulation. In particular, addressing the externality through the raw materials market may reduce the distortion in the relative price of raw and recycled materials and thus result in environmental gains. The Covenant as it stands is a largely voluntary exercise, with many business signatories noting that their packaging decisions are driven by financial gain. This suggests that there is further room for environmental gains through changing the incentives businesses face in making their packaging decisions.

10.4.3 Changing Marginal Costs and Benefits

The Eco-dollar benefits of increased recycling have been assumed constant throughout the analysis. However, it is unlikely that large changes in the amount of recycling will leave the cost of raw and recycled materials unchanged. In particular, the marginal cost of recycled materials in terms of energy and other costs might rise as the quantity of recycled materials produced increased. Similarly, falls in the production of raw materials could lower the marginal costs of this input. As such, the analysis may somewhat overstate the environmental benefits accruing to strengthening the Covenant. However, since the volumes of raw materials involved relative to total usage are small, these risks are minimal.

11 CONSULTATION

11.1 Description

The following description of the consultative process thus far about the revised Covenant proposal is based on information provided by the National Packaging Covenant Council (NPC Council).

In finalising their proposal for a revised Covenant, the NPC Council reports that it sought to create opportunities for stakeholder input, collected viewpoints, and took into account the findings of separate independent reviews of the Covenant, including an evaluation commissioned by the NPC Council and undertaken by Nolan-ITU. The Nolan-ITU report considered the extent to which the Covenant achieved its stated and related objectives and made a series of recommendations to strengthen the current Covenant / NEPM model.

Key consultative elements of the Nolan-ITU review were:

- A questionnaire survey sent to all signatories, including governments and industry bodies, to obtain feedback on their perceptions of the performance of the Covenant – 204 responses were received, representing 33 per cent of all signatories.
- Four facilitated consultative sessions were promoted and held in Melbourne, Sydney, Brisbane and Adelaide for stakeholders and members of the public, and were attended by approximately 74 people.
- A series of 25 one-on-one stakeholder interviews was conducted across all sectors and non-government organisations.

Written submissions were solicited and 18 were received.

The NPC Council and the Australian Local Government Association (ALGA), in consultation with all State-based Local Government associations, also agreed to undertake a review of the Covenant specifically focused on local government issues. Meinhardt Infrastructure & Environment were appointed to undertake this review, which included the following consultative elements:

- A survey of all Australian local governments and state associations – 78 responses received, representing 19 per cent of Australian local government.
- Written submissions.
- Individual discussions with key stakeholders.

The NPC Council reports that it took into account the findings of these and related reviews when it further developed a 'Consultation Proposal for Strengthening the National Packaging Covenant'. That document contained the NPC Council's recommendations for concrete actions and changes to the current Covenant / NEPM model.

The Consultation Proposal containing 29 initiatives was announced on June 28, 2004 through a public media release, circulated to all signatories and stakeholders by newsletter, and posted on the Covenant website. Details of a further consultation process, including workshop dates and venues, were included. This subsequently consisted of:

- Eight professionally and independently facilitated consultation workshops held in State and Territory capital cities during July and early August. All signatories and many key stakeholders were notified individually. A total of approximately 280 people attended representing the following sectors:
    - Local Government: 34%
    - Packaging Supply Chain: 43%
    - Packaging Recovery Chain: 4%
    - State Government: 9%
    - Non-governmental organisations and others: 10%.
- Written submissions were sought and a total of 26 submissions were received from:
    - Local Government: 7
    - Packaging Supply Chain: 10
    - Other Industry: 3
    - State Government: 2
    - Non-governmental organisations and others: 4.
- The Department of Environment & Heritage organised round-table consultation in Canberra that was attended by representatives of all relevant Commonwealth departments and the ACT Government.

According to the NPC Council, the feedback from this consultation process was broadly supportive of the proposed revised Covenant arrangements and the specific proposals put forward in the Consultation Proposal.

Feedback focused in particular on the need for specific environmentally focused performance goals. The NPC Council reports that, as a result, it developed environmentally focused performance goals, and has included them in the revised Covenant proposal.

Other feedback and responses included:

1) Adoption of **enhanced reporting and compulsory targets**. The initial response of the NPC Council was that targets were unnecessary based on the view that improved performance will be driven through the use of specific KPIs and a strengthened governance and compliance procedure. Equally, specific targets were not favoured due to a lack of baseline data. (The EPHC subsequently determined at its December 2004 meeting to introduce performance targets into the revised Covenant.)

2) The **inclusion of KPIs** that enable measurement of the Covenant's effectiveness over its next term was strongly supported. While stakeholders have generally agreed with the proposed Covenant KPI's, the NPC Council has undertaken further refinement of the KPI's through negotiation with industry and local government. The new KPI's are included in a new Schedule to the Covenant document.

3) Strong disagreement with including **newsprint and magazines** under the Covenant. In response to this feedback, the NPC Council recommended against including newsprint and magazines in the coverage of the revised Covenant.

4) The proposal that a mechanism be established for **suspending/expelling non-compliant signatories** was strongly supported. In response, the NPC Council included a new Schedule to the Covenant document outlining compliance provisions.

5) The proposal to broaden the **scope of project funding** under the Covenant met with support. For Local Government, this support focused on the need to expand programs beyond kerbside. The NPC Council took the view that the inclusion of emphasis on other recovery systems such as drop off, public place and workplace recycling systems will address this. For industry, there was also support for industry-based supply chain projects to receive funding.

The NPC Council considered all written submissions and the feedback from consultation sessions in finalising the revised Covenant. The core Covenant document was updated where necessary. However, it retained the essential elements and intent of the original document and its principles.

The revised Covenant proposal was posted to the website for stakeholder review. Details were been circulated by newsletter and sent individually to each of the organisations that prepared a written submission inviting further comment.

EPHC was briefed on progress to date at its December 2004 meeting, including the results of the consultative efforts. At that meeting, EPHC resolved to introduce performance targets in four key performance areas of the revised Covenant. Dialogue between stakeholder groups and EPHC officials about the final regime / levels of targets commenced in late 2004 and early 2005, but remains unresolved. Covenant documentation will need to be subsequently updated

For further reference, the following reports can be accessed from the Covenant website:

- Nolan-ITU, Meinhardt and NSW Nature Conservation Council evaluations;
- Covenant Proposal paper;

- Consultation Workshop information;
- Draft Revised Covenant (Note: this draft has not as yet been updated to include targets.)

11.2 Assessment

The following conclusions can be drawn:

- Specific and structured opportunities were created for key stakeholders to have input. This is particularly so for the packaging supply and recovery chains, local government, and other governments.
- There was no significant feedback from stakeholders to indicate any strong concern about the potential costs of the revised Covenant.
- There was a range of feedback about operational aspects of the revised Covenant, and the NPC Council has outlined (as described above) its consideration of and responses to that feedback.
- Both within and without the official consultation processes, there were representations from some stakeholders – particularly environmental non-governmental organisations - to include performance targets in the revised Covenant. EPHC resolved to introduce targets into the revised Covenant at its December 2004 meeting.

It should be noted that there are numerous guidelines available for the conduct of public and stakeholder consultation in the development of public policy. These include leading practice principles issued by the NSW Department of Planning, Infrastructure & Resources (DIPNR) which are in turn based on "best practices" advocated by the International Association for Public Participation (IAP2). The revised Covenant consultation process can therefore be assessed on the following basis (Table 11.1).

Table 11.1: Assessment of Consultation Process

Leading Practice Principle	Comment
Clarity of purpose	The NPC Council appeared clear about why it was consulting and what it wanted to achieve from the process. Specifically, it appeared to seek greater engagement with stakeholders and get their feedback on a set of proposals.
Commitment	Sufficient resources were allocated to the consultative process. Additionally, there was senior management commitment present at the consultative sessions.
Communication	Communication in the consultative process was open, honest, accountable and well informed.
Evidence	The consultative process could have better used latest available information about the environmental management of the lifecycle of packaging. However, it could be argued that the diverse knowledge levels of the stakeholders dictated a certain common denominator in approach.
Flexibility and responsiveness	The consultative process selected a range of techniques that allowed many different sectors to participate in different ways.
Timeliness	Potentially, more time could have been allocated to the consultative process, but the overall period was not of the NPC Council's choosing.
Inclusiveness	The consultative techniques used were clearly selected with inclusiveness in mind. Potentially, more could have been done to ensure comprehensive representation of Covenant constituencies at consultative sessions.
Collaboration	The consultative approach used was participatory and non-prescriptive.

Equally, there are several frameworks available for the "best practice" development of voluntary environmental agreements, including by the Organisation for Economic Cooperation and Development (OECD), the United Nations Environment Program (UNEP), and the Canadian Government. Has the consultation process for the revised Covenant address and/or aspired to the best practice elements for voluntary agreements? The question, using OECD recommendations for best practice as a basis for analysis, is addressed in Table 11.2.

Table 11.2: OECD Basis for Analysis

Interpreted OECD element	Comment
Has the revised Covenant set clearly defined targets in quantitative terms?	Somewhat. While EPHC has resolved to introduce overarching targets into the revised Covenant, the final regime / levels are still to be finalised. It should also be noted that the NPC Council believes that the revised Covenant will also drive improved performance through the specific KPIs and a strengthened governance and compliance procedure. After baseline data against new KPI's has been established, signatories will be expected to set targets within their Action Plans.
Have business as usual trends been established prior to establishing targets?	See comment above.
Does the revised Covenant / NEPM package provide negative incentives including a threat of regulation to encourage organisations to go beyond business as usual?	Somewhat. The NEPM for Used Packaging Materials provides a negative incentive for brand-owners, who may in turn exert commercial pressure on others in the packaging supply chain. Additionally, jurisdictions have signalled their intention to increase enforcement aspects of the NEPM in future. There are limited to no negative incentives on those in the packaging recovery chain, local governments or State Governments.
Does the revised Covenant / NEPM package set and impose penalties for non-compliance?	Yes. As stated above, jurisdictions have signalled their intention to increase enforcement aspects of the NEPM in future.
Does the revised Covenant / NEPM package provide positive incentives (such as technical assistance, workshops and information)?	Yes. Key changes to the revised proposal include: a dedicated communications program, an improved Action Plan schedule, and resources for administration of the Covenant including advice provision to participants.
Does the revised Covenant / NEPM package intend to monitor progress toward objectives at the organisational and sector levels and report the results?	Yes. The establishment of overarching targets, as well as overall and company-specific KPIs, and data collection and reporting against all of them, are among the key changes in the revised proposal. Additionally, interim reviews of the total approach have been scheduled during its duration.
Have stakeholders been involved in setting the objectives of the revised Covenant / NEPM package?	Yes. The environmentally focussed objectives of the revised proposal flow from a multi-stakeholder process. Dialogue, albeit unresolved at time of authorship, has also been held with a range of stakeholders in an attempt to determine the final regime / levels of performance targets.
Is it proposed to involve third parties in monitoring the progress of the revised Covenant / NEPM package?	Yes. The Covenant process, including the NPC Council itself, is by its nature a collaboration of many stakeholders with many interests and perspectives. Its membership has been further diversified following an EPHC decision in December 2004 to include a community representative. Additionally, all Action Plans are subject to public scrutiny as well as lodgement of complaints. Also, the NPC Council has flagged the intention to increase and better resource the random auditing of Action Plans and Annual Reports.

12 IMPLEMENTATION & REVIEW

12.1 Implementation Aspects

12.1.1 Action Plans

As with the initial Covenant, the key implementation instrument of the approach will be that all Covenant signatories will need to prepare, lodge and report against an Action Plan. However, the revised Covenant is more prescriptive with regard to Action Plans. In future, according to a new Schedule in the Covenant document, Action Plans will need to be prepared, lodged, enacted and reported against in line with quantified organisational targets against specified KPIs that seek to drive the performance of the signatory parties. Additionally, Action Plans will need to be signed by the senior manager of the signatory party that may in turn drive organisational commitment. To achieve greater consistency, signatories will be encouraged to develop three-year long Action Plans. Greater take-up of a revised Environmental Code of Packaging, to provide additional guidance about product stewardship to companies, is also anticipated.

At this stage, it would appear that the issue of what responsibility individual signatories will have in terms of "contributing" to the achievement of overarching Covenant targets has not been fully addressed. This is potentially a very significant issue that requires the urgent attention of officials and stakeholders, and subsequent explanation of approach. That approach is likely to have substantial influence on how individual / sectoral signatories structure their Action Plans, and where they put the emphasis in their efforts. The approach will also partially dictate data collection and performance measurement methods for the Covenant regime.

12.1.2 Projects

As with the initial Covenant, funding will be collected from signatories for the purposes of conducting projects. However, and as is enshrined in a new Schedule, the revised Covenant has a broader scope for the types of projects that can be conducted. Currently, the scope of projects is limited to the improvement of kerbside recycling. In future, projects from the total environmental life-cycle of packaging can receive funding and be conducted. Also, non-signatories will be eligible for projects, subject to several conditions.

This change of scope mirrors the overall emphasis that the revised Covenant – including its overarching targets – puts on recovery of materials from away-from-home contexts.

12.1.3 Structures

The initial Covenant featured several bodies for its implementation, but the overall structural arrangements were fairly loosely defined. In the revised Covenant / NEPM package, there is a new Schedule that outlines governance procedures. The authority of the Covenant Council has been increased, and the roles and responsibilities of all bodies have been clarified. At its December 2004 meeting, the EPHC has decided to extend Covenant Council membership to a community / environmental non-government organisation representative. The scope of recycling-related Covenant groups – both at the national and jurisdictional levels - has been revised to align with the total environmental life-cycle of packaging. Funding has been pre-allocated to five full-time national positions with responsibility for reviewing Action Plans, delivering a communications program, compiling system-wide data and reporting, and other implementation functions.

12.1.4 Enforcement

The revised Covenant / NEPM package features a new Schedule that outlines compliance enforcement procedures. It seeks to provide a highly detailed and transparent process to determine when a signatory is no longer complying with the spirit of the Covenant, and to bring those non-compliant signatories to the attention of the relevant State or Territory for possible action under the NEPM. Government agencies have also publicly flagged and committed to a ramped up implementation of the provisions of the revised Covenant's regulatory underpinning, the NEPM in future.

12.2 Review

The revised Covenant / NEPM package has made specific provision for monitoring of, reporting about and reviewing effectiveness. There are several elements of note in this regard:

- Development of a nationally consistent data collection methodology and then collection of baseline and trend data about the environmental life-cycle of packaging and other related aspects;
- Organisational reporting against Action Plan targets and KPIs on an annual basis;
- Random and other auditing of signatory performance against Action Plan commitments;
- Covenant Council reporting against the revised Covenant's new explicit performance goals and lead indicators on an annual basis, including signatories per sector, signatory market share per sector, non-compliant signatories referred to jurisdictions, non-compliant signatories against whom action has been taken by jurisdictions, and outcomes from funded projects, and;
- Formal, independent evaluation by December 31, 2008.

At the time of authorship, the documentation for the revised Covenant had not yet been updated to address how monitoring of and reporting against the four overarching target areas will take place.

12.3 Legal Aspects

In its legal and administrative architecture, the revised Covenant is substantially identical to the current Covenant and minimal additional implications are foreseen. There may be some additional costs (at the NPC Council level) from the new procedures for referring non-performers or poor performers from the Covenant to jurisdictions for NEPM action.

At this stage, there has been no suggestion to amend the NEPM and therefore no implication. There may be some additional costs (to jurisdictions) from the mooted increased enforcement activity around the NEPM.

Subsequent to the introduction of four target areas, as decided by the EPHC at its December 2004 meeting, the potential issue of signatory responsibility / liability for the achievement / non-achievement of overarching targets is still to be addressed.

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Appendix A

Degree of Coverage of Policy Options across the Packaging Life Cycle

Appendix A

Degree of Coverage of Policy Options across the Packaging Life Cycle

The following table attempts to provide a qualitative analysis of the extent to which each of the policy approaches considered in the RIS impact on each stage of the lifecycle of packaging. Each option was examined for its impact on the following stages:

- Materials manufacturing
- Packaging manufacturing
- Packaging usage (filling & packaging)
- Packaging distribution (sales)
- Consumption
- Recovery
- Disposal and litter

Six key questions were for each policy approach and for each lifecycle stage. Answers were based on known equivalent schemes. The questions were:

1. Does the policy approach apply to this stage of the packaging life-cycle?
2. Is the life-cycle stage covered by provisions for specific action in most equivalent schemes?
3. Does the approach's policy signal (eg, strong driver of environmental improvement action) apply in this stage?
4. Is the approach's policy objective (eg, what the scheme is mostly seeking to achieve) relevant in this phase?
5. Do costs of most equivalent schemes get borne in this phase?
6. Is the scheme's performance quantifiably measurable in this phase?

Table A.1: Policy Option Ambits across the Packaging Life Cycle

Policy Option	Materials manufacturing	Packaging manufacturing	Packaging usage (filling & packing)	Packaging distribution (sales)	Consumption	Recovery	Disposal & Litter
Voluntary approach	1. Not necessarily within scope; 2. No specific provisions; 3. Not necessarily subject to policy signal; 4. Not necessarily relevant to policy objective; 5. Not necessarily subject to any costs; 6. Not necessarily measurable.	1. Not necessarily within scope; 2. No specific provisions; 3. Not necessarily subject to policy signal; 4. Not necessarily relevant to policy objective; 5. Not necessarily subject to any costs; 6. Not necessarily measurable.	1. Not necessarily within scope; 2. No specific provisions; 3. Not necessarily subject to policy signal; 4. Not necessarily relevant to policy objective; 5. Not necessarily subject to any costs; 6. Not necessarily measurable.	1. Not necessarily within scope; 2. No specific provisions; 3. Not necessarily subject to policy signal; 4. Not necessarily relevant to policy objective; 5. Not necessarily subject to any costs; 6. Not necessarily measurable.	1. Not necessarily within scope; 2. No specific provisions; 3. Not necessarily subject to policy signal; 4. Not necessarily relevant to policy objective; 5. Not necessarily subject to any costs; 6. Not necessarily measurable.	1. Not necessarily within scope; 2. No specific provisions; 3. Not necessarily subject to policy signal; 4. Not necessarily relevant to policy objective; 5. Not necessarily subject to any costs; 6. Not necessarily measurable.	1. Not necessarily within scope; 2. No specific provisions; 3. Not necessarily subject to policy signal; 4. Not necessarily relevant to policy objective; 5. Not necessarily subject to any costs; 6. Not necessarily measurable.
Current Covenant/NEPM	1. Within scope; 2. Some general provisions for action; 3. Not subject to policy signal; 4. Relevant to policy objective; 5. Subject to some costs; 6. Difficult to measure.	1. Within scope; 2. Some general provisions for action; 3. Not subject to policy signal; 4. Relevant to policy objective; 5. Subject to some costs; 6. Difficult to measure.	1. Within scope; 2. Provisions for action; 3. Subject to policy signal – NEPM aimed at brand-owners; 4. Relevant to policy objective; 5. Subject to some costs; 6. Difficult to measure.	1. Within scope; 2. Provisions for action; 3. Subject to policy signal – NEPM aimed at brand-owners; 4. Relevant to policy objective; 5. Subject to some costs; 6. Difficult to measure.	1. Within scope; 2. Some general provisions for action; 3. Not subject to policy signal; 4. Relevant to policy objective; 5. Subject to some costs; 6. Difficult to measure.	1. Within scope; 2. Provisions for action; 3. Not subject to policy signal; 4. Strongly relevant to policy objective; 5. Subject to some costs and some funding; 6. Difficult to measure.	1. Partially within scope; 2. Some general provisions for action; 3. Not subject to policy signal; 4. Disposal relevant to policy objective, but litter not necessarily; 5. Subject to some costs; 6. Difficult to measure.
Revised Covenant/NEPM	1. Within scope; 2. Provisions for action; 3. Not subject to	1. Within scope; 2. Provisions for action; 3. Not subject to	1. Within scope; 2. Provisions for action; 3. Subject to	1. Within scope; 2. Provisions for action; 3. Subject to	1. Within scope; 2. Provisions for action; 3. Not subject to	1. Within scope; 2. Provisions for action; 3. Not subject to	1. Within scope; 2. Provisions for action; 3. Not subject to policy signal;

Policy Option	Materials manufacturing	Packaging manufacturing	Packaging usage (filling & packing)	Packaging distribution (sales)	Consumption	Recovery	Disposal & Litter
	policy signal; 4. Relevant to policy objective; 5. Subject to some costs and funding; 6. Measurable.	policy signal; 4. Relevant to policy objective; 5. Subject to some costs and funding; 6. Measurable.	policy signal – NEPM aimed at brand-owners; 4. Relevant to policy objective; 5. Subject to some costs and funding; 6. Measurable.	policy signal – NEPM aimed at brand-owners; 4. Relevant to policy objective; 5. Subject to some costs and funding; 6. Measurable.	policy signal; 4. Relevant to policy objective; 5. Subject to some costs and funding; 6. Measurable.	policy signal; 4. Strongly relevant to policy objective; 5. Subject to some costs and funding; 6. Measurable.	4. Relevant to policy objective; 5. Subject to some costs and funding; 6. Measurable.
Advance Recycling Fees	1. Not within scope; 2. No provisions for action; 3. Not subject to policy signal; 4. Not relevant to policy signal; 5. Not subject to costs; 6. Measurement not applicable.	1. Within scope; 2. Provisions for action limited to recovery aspects; 3. Subject to policy signal; 4. Subject to costs; 5. Highly measurable.	1. Within scope; 2. Provisions for action limited to recovery aspects; 3. Subject to policy signal; 4. Subject to costs; 5. Highly measurable.	1. Within scope; 2. Provisions for action limited to recovery aspects; 3. Subject to policy signal; 4. Subject to costs; 5. Highly measurable.	1. Within scope; 2. Provisions for action; 3. Subject to policy signal; 4. Subject to costs; 5. Highly measurable.	1. Within scope; 2. Provisions for action; 3. Subject to policy signal; 4. Subject to funding; 5. Highly measurable.	1. Litter not within scope; 2. No provisions for litter action; 3. Litter not subject to policy signal; 4. Subject to costs; 5. Measurable.
Mandatory take-back and utilization	1. Within scope; 2. Provisions for action; 3. Subject to policy signal; 4. Subject to funding; 5. Highly measurable.	1. Within scope; 2. Provisions for action limited to recovery aspects; 3. Subject to policy signal; 4. Subject to costs; 5. Highly measurable.	1. Within scope; 2. Provisions for action limited to recovery aspects; 3. Subject to policy signal; 4. Subject to costs; 5. Highly measurable.	1. Within scope; 2. Provisions for action limited to recovery aspects; 3. Subject to policy signal; 4. Subject to costs; 5. Highly measurable.	1. Within scope; 2. Provisions for action; 3. Subject to policy signal; 4. Subject to costs; 5. Highly measurable.	1. Within scope; 2. Provisions for action; 3. Subject to policy signal; 4. Subject to costs; 5. Highly measurable.	1. Within scope; 2. Provisions for action; 3. Subject to policy signal; 4. Subject to funding; 5. Measurable.
Mandatory container deposit scheme	1. Not within scope; 2. No provisions for action;	1. Not within scope; 2. No provisions for action;	1. Within scope; 2. Direct provisions for action limited	1. Within scope; 2. Direct provisions for action limited	1. Within scope; 2. Direct provisions for action limited	1. Within scope; 2. Direct provisions for action limited	1. Non-beverage litter not within scope; 2, No provisions for non-beverage litter action;

Policy Option	Materials manufacturing	Packaging manufacturing	Packaging usage (filling & packing)	Packaging distribution (sales)	Consumption	Recovery	Disposal & Litter
	3. Not subject to policy signal; 4. Not relevant to policy signal; 5. Not subject to costs; 6. Measurement not applicable.	3. Not subject to policy signal; 4. Not relevant to policy objective; 5. Not subject to direct costs; 6. Measurement not applicable.	to recovery aspects; 3. Strongly subject to policy signal; 4. Subject to high costs; 5. Highly measurable.	to recovery aspects; 3. Subject to policy signal; 4. Subject to costs; 5. Measurable.	to recovery aspects; 3. Subject to policy signal; 4. Subject to costs; 5. Measurable.	to recovery aspects; 3. Strongly subject to policy signal; 4. Subject to significant funding; 5. Highly measurable.	3. Highly relevant to policy signal as concerns beverage containers; 4. Subject to costs and funding; 5. Measurable.
	1. Within scope; 2. Provisions for action in relation to landfilled material only; 3. Somewhat subject to policy signal; 4. Somewhat relevant to policy signal; 5. Subject to costs; 6. Not directly measurable.	1. Within scope; 2. Provisions for action in relation to landfilled material only; 3. Somewhat subject to policy signal; 4. Somewhat relevant to policy signal; 5. Subject to costs; 6. Not directly measurable.	1. Within scope; 2. Provisions for action in relation to landfilled material only; 3. Somewhat subject to policy signal; 4. Somewhat relevant to policy signal; 5. Subject to costs; 6. Not directly measurable.	1. Within scope; 2. Provisions for action in relation to landfilled material only; 3. Somewhat subject to policy signal; 4. Somewhat relevant to policy signal; 5. Subject to costs; 6. Not directly measurable.	1. Within scope; 2. Provisions for action in relation to landfilled material only; 3. Somewhat subject to policy signal; 4. Somewhat relevant to policy signal; 5. Subject to costs; 6. Not directly measurable.	1. Within scope; 2. Provisions for action in relation to landfilled material only; 3. Subject to policy signal; 4. Relevant to policy signal; 5. Subject to costs and indirect funding support; 6. Not directly measurable.	1. Disposal very much within scope - litter not within scope; 2. Strong provisions for disposal - no provisions for litter action; 3. Disposal highly relevant to policy signal - litter not relevant to policy signal; 4. Subject to high costs in terms of disposal; 5. Highly measurable.

Appendix B

Environmental Valuation – Method Summary

1 ENVIRONMENTAL ECONOMIC VALUATION – METHOD SUMMARY

A summary of the approach used to derive environmental economic values is provided in this Appendix. For a more detailed methodological description, the original studies should be referenced. These include (in order of relevance):

- Nolan ITU (2001): *Independent Assessment of Kerbside Recycling in Australia*, National Packaging Covenant Council. Peer reviewed by Terry Coleman (UK EPA), Peter White (Procter & Gamble Newcastle/UK), Ross Chapman (CIE, Sydney).

- RMIT in association with Nolan-ITU (2003): Life Cycle Assessment of Waste and Resource Recovery Options (including Energy from Waste). For EcoRecycle Victoria. Peer reviewed by Dominic Hogg, Eunomia, Bristol/UK.

- Nolan-ITU (2004): *Getting more from our recycling systems – assessment of domestic waste and recycling systems*, for NSW Department of Environment and Conservation, ISBN: 1 920887 09 1, March 2004.

The methodology has not been subjected to detailed analysis in preparing this Regulatory Impact Statement (RIS). The results of this analysis should be read in conjunction with Section 7.2 of the RIS.

2 METHODOLOGY OVERVIEW

The environmental cost / benefit assessment step includes:

- Life Cycle Assessment – Inventory Data Application
- Environmental Economic Valuation using the *Eco-Dollar Method*

Traditional LCA steps of *Goal and Scope Definition* and *Interpretation* are dealt with by the steps outlined in section 7.2.2.

a) Life Cycle Assessment – Inventory Data Application

Life Cycle Inventory data on material and energy inputs and outputs of processes was acquired from a range of data sources. For the original study, the commercial LCA software tool, the Integrated Solid Waste Management Model[8] was used to apply LCA data to the systems studied. While this model has been superseded, it merely served the purpose of data management and remains a perfectly valid, albeit simple LCA model for Waste Management.

b) Environmental Economic Valuation using the Eco-Dollar Method

Pollutant and resource loads have been assigned monetary values based on environmental economic valuations within published government reports. These are obtained for the impact categories of air pollution, water pollution, global warming, traffic and landfill. For those loads for which no existing valuation data could be found, scientifically derived equivalency factors (rankings) were applied to allocate the relative economic value. A similar approach has been used by the US based research group, the Tellus Institute, to value environmental abatement costs[9] and assess various waste policy and management options.

[8] White, P.R., Franke, M., Hindle, P., (1995) *Integrated Solid Waste Management – A Lifecycle Inventory*

[9] Tellus Institute (May 92) *CSG/Tellus Packaging Study - Assessing the impacts of production and disposal of packaging and public policy measures to alter its mix - Volume I*

3 LIFE CYCLE ASSESSMENT – INVENTORY DATA APPLICATION

The Model

The model used for the inventory analysis of the system is the *Integrated Solid Waste Management Model* originally developed for Procter & Gamble by Dr Peter White (UK), Dr Marina Franke (Germany) and P Hindle (Belgium) and modified for broader decision making. The model enables vast amounts of inventory data relating to the system to be allocated based on input data such as waste generation & composition, recycling yields and transport by material and landfill management practice. The model capabilities include landfill and recycling assessment and three waste to energy alternatives including Refuse Derived Fuel (RDF).

Life Cycle Assessment Inventory Data

The LCA inventory data used by the model have been reviewed and data which are more appropriate for present Australian conditions, have been substituted. LCA data are the pollutant loads to air and water arising from processes or products within the waste system including avoided product credits. The list of emissions in the inventory data are presented in Table B1.

Table B.1: Life Cycle Assessment Inventory Pollutant Range

Emissions to air	Emissions to water
Particulates	BOD/COD
CO	Suspended solids
CO_2	Total organic compounds
CH_4	AOX (adsorbable organic halides)
NOx	Chlorinated HC's
N_2	Dioxins/furans (TEQ)
SOx	Phenol
HCl	Ammonium
HF	Total metals
H_2S	Arsenic
Total hydrocarbons (HC)	Cadmium
Chlorinated hydrocarbons	Chromium
Dioxins/furans (TEQ)	Copper
Ammonia	Iron
Arsenic	Lead
Cadmium	Mercury
Copper	Zinc
Lead	Chloride
Mercury	Fluoride
Nickel	Nitrate
Zinc	Sulphide

For this study, primary data have been obtained directly from industry and government where possible in order to characterise the system. All LCA inventory data are from secondary sources (ie: existing LCA studies, literature and reports). Data is sourced largely from the CRC for Waste Management and Pollution Control, *Life Cycle Inventory Data for Australia* and Eco Recycle Victoria, *Packaging Life Cycle Assessment of Used Packaging in Victoria*.

Table B.2: LCA Inventory Data Source by Material

Data g / tonne	Glass	Steel	Aluminium	PET	Paper ONP	Board & Paper	Rigid (HDPE)
Yield at reprocessing	98% White/ERV	92.5 - 95 % White/ERV	85%-95% White	87% ERV	85% White	90% White	85% White
Avoided Product Credit (1 tonne production)	CRC 99'	CRC 99'	Buwal 98'	CRC 99'	White adapted by Buwal 98 (wood-C uncoated)	White adapted by CRC 99' LPB Buwal P. 247	CRC 99' HDPE
Recycled (1 tonne output)	ERV 99'	ERV 99'	Buwal 98'	ERV 99'	White adapted Buwal 98' ONP Rec	CRC 99'	White Rigid
Savings	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated

Data benchmarking and sensitivity analysis has been performed to ensure the selection of the most appropriate data sets. Data benchmarking has used the indicator of carbon (Metric tonnes of Carbon Equivalents) published by the USEPA [10] and benchmarking has involved the calculation of average deviations across 5 different LCA inventory data sets to minimise any data deviation prior to incorporation into the model. As a range of data sources have been used, not all data sets contain all the same information, nor use the same pollutant categories, technology mix or system boundaries. Therefore, it has sometimes been necessary to convert data from other sources into the categories required.

This process has proceeded on the basis of an extensive review of available LCA data and is considered to be the best available data within the project budget. The analysis has only been possible due to the data availability from prior research projects of the CRC for Waste Management and Pollution Control, Eco Recycle Victoria and international research bodies. Data for these projects was developed by the Centre for Water and Waste Technology at the University of NSW, the Centre for Design at RMIT and the Victorian University of Technology.

[10] US Environment Protection Agency (Sep 1998) *Greenhouse Gas Emissions from Management of Selected Materials in Municipal Solid Waste*

Table B.3: Data Modelling and Sources

LCA System Units	Model application and data assumptions	LCA data source	Comments
Point of discard	Bin production & bin wash included. Household Wash of material excluded.	White ISWM	Impact relatively small – data is adequate
Collection & Transfer - ISWM systems analysis	Collection truck hours include allowances for the stop start nature of waste collection. Waste Collection & Recycling Model (Warren, 1997) used to assess average transport requirements (in collection hours) for each system and each region.	EcoRecycle Victoria - Australian Waste Collection Truck (Grant, 1999). White model, 1995 Waste Collection & Recycling Model (Warren, 1997)	Data benchmarking of ERV data to White Model & Buwal LCI data indicates small variation in net air and net water emission for collection vehicle - variation of < 5%.
Collection & Transfer – *Material analysis*	Apply known material densities & actual truck capacity, assume one way transport only – ie: backloading. Actual plant locations used for > 80% of material . Yields, rejects per material based on industry interviews and literature. Qualitative assessment provided based on LCA data findings and industry knowledge.	Recycling and avoided product credits as listed in Table B.2 with adapted electricity & transport from CRC WMPC, 1999. Industry interviews for transport and processing.	See sensitivity analysis results for transport and electricity. Data benchmarking against USEPA data for global warming as MTCE for all materials (USEPA, September 1998)
Transport	Transport distances derived for each material in each region of each state (8 by 16). LCA Allocation for backloading is conducted based on industry information – one way transport is assumed for all materials. Material compaction efficiency and density influence the truck load size and fuel consumption per tonne (White, 1995).	Industry interview and distancing modelling. White Pollutant data	The first 15 km assume urban roads, the remaining distance assumes freeway conditions.
MRF OPERATION	Yield based on contamination, contamination composition and rejects sourced from industry and White. MRF electricity & fuel use based on industry data.	Industry interview (White Model, 1995)	Variation between published data and industry interview small.
ELECTRICITY DATA	Percent state mix Black Coal, Brown Coal, Natural Gas and Crude oil (ABARE, 1995). Data based on generating share; total generating capacity by state (Electricity Supply Association of Australia - ESAA, 1996)	CRC WMPC 1999	Sensitivity analysis of CRC with White data showed low variation of 0.01% for 20 air pollutants & 4.2 % for 22 water pollutants.
REPROCESSING DATA	Plant rejects and processing yield from industry and White data. Data sources detailed in Table B.2.		

4 ENVIRONMENTAL ECONOMIC VALUATION USING THE ECO-DOLLAR METHOD

When developing the environmental economic valuation method, it was agreed that published government valuations for pollutant and resource consumption loads should be used where possible. While this approach may not be preferred in an academic model, it minimised the scope for criticism in a process that involved many stakeholder groups. Unfortunately, while there is a lot of local information on valuation approaches, there is a lack of published valuation data on actual loads (for example: on a per tonne of pollutant basis).

Environmental economic valuations where obtained for the impact categories of air pollution, water pollution, global warming, traffic and landfill. The least controversial of these is global warming. This is due to the extensive work on pricing carbon (the technology abatement cost) and the wide acceptance of IPCC greenhouse gas factors or equivalence relationships.

For valuation of air and water pollution loads, estimated benefits arising from emission control was selected as an appropriate valuation approach. This was based on local[11] and international work in this field[12]. Economic values were then determined for other pollutants using existing an equivalence ratio determined by regulatory standards. Where pollutants, within the nominated inventory data range, were not covered by a local regulation, overseas data was used.

4.1 Air and Water Pollutant Valuation

The pollutant valuations used have primarily used the market based technique of repair cost for human and other capital – ie: expenditure incurred as a measure of the fall in the quality of an environmental good[13].

Any remaining pollutant valuation gaps have been met by applying government established pollutant load weights or LCA equivalence factors to a base for fine particulates to determine the relative relationship. The relative assessment has applied to the impact classification category of air and water pollutant loads to include chemical stressor impacts excluding global warming.

[11] New South Wales Environmental Protection Authority, (Jun 1995) *Environmental Valuation Database Envalue*

[12] International Institute for Applied Systems Analysis, (Nov 1999) *Economic Evaluation of a Directive on National Emission Ceilings for Certain Atmospheric Pollutants – Part B: Benefit Analysis; Final Report.*

[13] NSW EPA (Jun 1995) *Envalue, Environmental Valuation Database*

Base Valuation

The NSW EPA has investigated the possible benefits arising from discharge reductions. The EPA's final valuation of fine particulates is $18.50 per kg - a value which it estimates is conservative[14]. In the absence of direct cost benefit valuations, this value has been applied to determine the value of other pollutants based on established pollutant weights[15].

Benchmarked valuation

The valuation of pollutant loads has been compared with overseas values assigned to pollutants. A range is presented in Table B.4 below.

Table B.4: International Valuation of Pollutant Loads[16] ($A/tonne)

Study	Characteristic	SO_2	NO_x	Fine Particulates
Australian Data used		$440	$3,817	$18,500
ExternE – EC1	High estimate	$10,083.33	$21,016.67	$26,766.67
	Low estimate	$6,900.00	$0.00	$26,766.67
Estimating Fuel Cycle Externalities – ORNL/DOE Southeast reference site	High estimate	NA	NA	NA
	Mid estimate	$1,670.00	$3,338.33	$56,673.33
	Low estimate	$1,003.33	$2,005.00	$31,673.33
NewYork Environmental Externalities Cost Study -Central estimates	Urban	$170.00	$1,505.00	$14,173.33
	Other	$2,000.00	$1,833.33	$80,500.00
	Rural	$1,333.33	$1,500.00	$12,833.33

4.2 Greenhouse Gas Emissions

The Australian Greenhouse Office (AGO) reviewed a range of estimates of prices of a permit to emit one tonne of CO_2 and concluded that a range of A $10.00 - A$ 50.00 was feasible with an agreed value of A$ 30.00[17].

[14] New South Wales Environment Protection Authority, (1998) *Regulatory Impact Statement Proposed Pollution Control Regulation 1998.*

[15] New South Wales Environment Protection Authority, (1998) *Regulatory Impact Statement Proposed Pollution Control Regulation 1998- Appendix C*

[16] OECD, (1997) Full Cost Pricing Annex I: Expert Group on the United Nations Framework Convention on Climate Change – Working Paper No3 Paris: Conversion from US to Aus assumes A$ 1 = US $0.60

[17] Hamilton C., (Nov 1999) *The Aluminium Industry and Climate Change*

In NSW, the Global Warming Potential (GWP) value of one tonne of CO_2 has been estimated between \$7.80 – 14.60[18].

The mean of this range \$11.2/tonne has been compared with the estimated value of the AGO of \$30.00 to derive the value used by the study of \$ 20.60/ tonne CO_2 equivalents.

4.3 Traffic

Environmental damage of heavy trucks has been valued[18] at \$0.26 – 0.28 per km for noise, congestion emissions, air pollution and accident costs.

The fuel consumption of trucks assumed by the model of 0.321 l/km places the value at \$ 0.87 per litre. Of this, it has been estimated based on the relative value of associated air emissions, that the cost for noise is \$ 0.20 per litre.

It is assumed that collection vehicles operate 90% of time in both urban and rural settings. Material transport vehicles have been estimated to operate only 10 % of time in an urban setting.

4.4 Solid Waste Landfill

Landfill environmental values as determined by cost benefit analysis[19] are estimated to be between \$ 13.10 and \$33.20 per tonne in metropolitan centres and between \$10.50 and 25.80 per tonne in rural areas.

After removing the cost components for chemical stressor impacts, the valuation used for landfill is based on amenity & intergenerational equity values of between \$3.00/t –\$15.70/t. The final values used are \$9.35 per tonne for metropolitan centres and \$5.60 per tonne for landfills in rural areas.

[18] New South Wales Environment Protection Agency, (1996) *Regulatory Impact Statement - Proposed Waste Minimisation and Management Regulation 1996 Appendix – External costs of waste disposal*

[19] New South Wales Environment Protection Agency, (1996) *Regulatory Impact Statement - Proposed Waste Minimisation and Management Regulation 1996 Appendix – External costs of waste disposal*

5 RESOURCE VALUATION

Environmental values for resources have been referenced from published Australian valuation studies or estimated based on the application of international LCA equivalency factors. These factors have been used to rank resources in terms of their known relative impacts. The stark absence of Australian data on the environmental valuation of forest resources has meant that published government "hypothetical" estimates of forest values have been used.

Resource valuation has excluded emission and global warming impacts to avoid double counting. Impacts valued relate to land use and the sustainability of resource access.

5.1 Mineral Resource Values

The environmental economic valuation of mineral resource use has included categories of resource sustainability and land use impacts for the non-chemical impact valuation of extracting resources.

This approach was adopted for the application of avoided costs to black coal based electricity generation in Western Australia as used by the Commonwealth government[20] in the valuation of externalities associated with natural resources.

The assessment of mineral resource values applies a base valuation to other mineral resources based on their relative ranking as determined by scientific literature on land use impacts[21].

Base Valuation

The environmental externalities associated with the extraction of coal have been estimated for mining land rehabilitation costs at 0.02 $/kWh and between 0.013 and 0.13 $/kWh for resource depletion costs (7). A conservative net value of 0.057$/kWh is used to develop the environmental resource cost for coal at $47.50 per tonne of coal.

Mining land rehabilitation costs	0.02 $/kWh	0.01226 $/ kg coal
Resource depletion costs	0.05749 $/kWh	0.03524 $/ kg coal

The final resource value cost of coal at $47.50 per tonne of coal has been applied to determine the resource costs of other mineral resources.

Resource values have been calculated based on their relative ranking with coal in regard to land use values and the sustainability of resource access.

[20] Department of the Environment, Sport and Territories, (1997) *Environmental Economics Research Paper No 2 Subsidies to the use of Natural Resources*

[21] SETAC Workshop, (1998) *Report Workshop on Land Use Impacts (including survey)*

The assessment of land use values has used two variables: net free primary productivity (fNPP) and land use impact on vascular plant diversity per tonne of mineral extraction ($\propto$).

Measuring land use values

The environmental effects of land use for minerals extraction have been quantitatively assessed on a continuous scale[22] internationally for use in LCA studies. This has included assessment of:

1. biodiversity as a basis for evaluating land use changes; and

2. the loss of free productivity as a measure for degradation.

The indicators used include 'local loss of species diversity' which have been measured with a parameter defined as α for vascular plant diversity and 'loss of free net primary biomass productivity' measured with fNPP[23]. This indicator was developed to quantify the loss of natural values within the scope of LCA. The value of quality loss has been related to LCA input or mineral resource use categories. This field of study is being actively researched by LCA practitioners internationally[24].

The indicators developed overseas have been assessed to determine the ratio of coal land use impacts to land use impacts of other minerals and the economic value has been allocated on this basis.

Measuring Resource Sustainability

Resource sustainability is based on comparative assessment of minerals against coal assuming that the sustainability factor is 0.05 percent of the total environmental resource cost.

Annual global production[25] of coal is estimated to be $4.5 * 10^{12.}$ With a global resource base of $3 * 10^{15}$ it is estimated that the period of remaining use[26] is 666 years. Similar categories are used for a range of mineral resources and these are applied to the dollar valuation for coal.

[22] Lindeijer.E. and van Kampen. M., (Aug 1998) *Biodiversity and Life Support Indicators for Land use Impacts in LCA*

[23] van Dobben, H.F., Schouwenburg, E.P.A.G, Nabuurs, G.J, Prins, A.H (Aug 1998) *Biodiversity and Productivity Parameters as a Basis for Evaluating Land use Impacts in LCA*

[24] Society of Environmental Toxicology and Chemistry (1998) *-Report Workshop on Land Use Impacts 8th Annual SETAC- Europe Meeting*

[25] World Energy Council 1995 *Resource Update*

[26] Lippiat, B., of the US Dept of Commerce, (Apr 1998) *BEES 1.0 Software Tool. Building for Environmental and Economic Sustainability - Technical Manual*

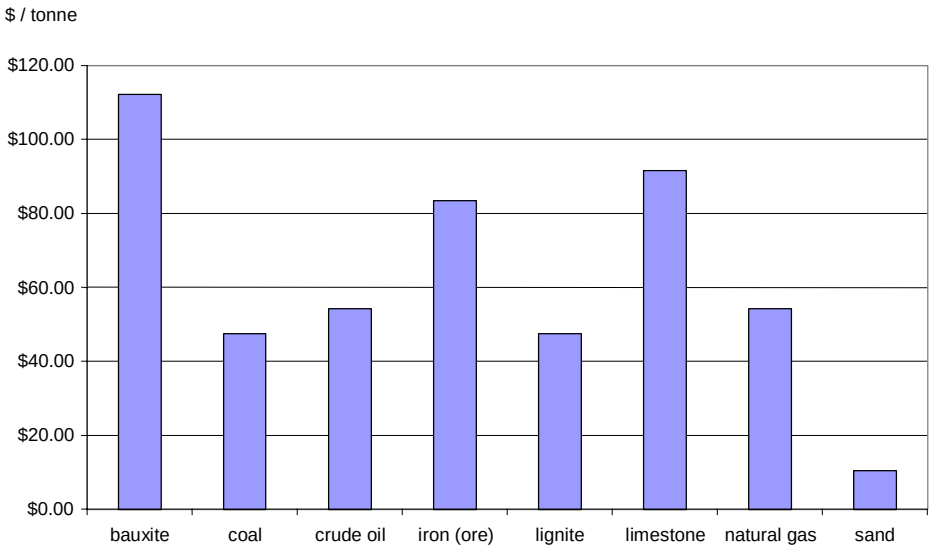

Figure B.1: Environmental Valuation of Mineral Resources

5.2 Forest Resource Values

While the methodologies for the environmental valuation of forest timber are well documented for Australia[27], no published data on environmental values could be sourced. This was despite extensive enquiries with industry, government and conservation groups. It was agreed to proceed with an environmental valuation of forest resources in the hope that the adoption of a value would prompt further debate and research in the area.

In order to develop a conservative value of forest resources for the production of paper including newsprint in Australia. The Productivity Commission has estimated[28] "hypothetical non-wood charges" for forest resources. Tree age is the only variable. A range of values for average tree ages of between 30–130 years is provided and an average of 60 years has been assumed.

[27] Grey. F., Department of Environment Sport and Territories, (undated) *Commonwealth of Australia Forest Externalities – Estimating Values for Australia's Native Forests*

[28] Industry Commission, (Feb 1991) *Report No.6 Recycling in Australia,- Appendix H, Forestry*

Table B.5: Assumptions in the estimation of a conservative value for forest resources

Feature	Estimate	Unit
Tree Age	60	years
Non Wood Value	575	$/ha/yr
Estimated Aust. Production Capacity	5	m^3/ha/yr
Calculated Value Per Cubic Metre	115	$/$m^3$
Density Wet Woodchip	3.2	m^3/t
Calculated value of forest yield	368	$/t
Estimated harvest yield based on sustainable harvest of 9.7% per annum.	36	$/t

Based on this conservative estimate of the environmental value of timber from native forests, values for regrowth eucalypt timber and plantation timber have been made using a proposed weighting for land use classes[29]. The indicators used are based on the findings of a multi-criteria analysis incorporating biological accumulation, regeneration, free net primary biomass productivity and biodiversity (through a measure on vascular plant species diversity).

The assessment is considered conservative as many aspects involved in a financial valuation of forest resources as are beyond the scope of this study.

[29] Lindeijer et al. Ministry of Transport, Public Works and Water Management & Institute for Forestry and Nature Research (Aug 1998) *Biodiversity and Life Support Indicators for Land use Impacts in LCA*

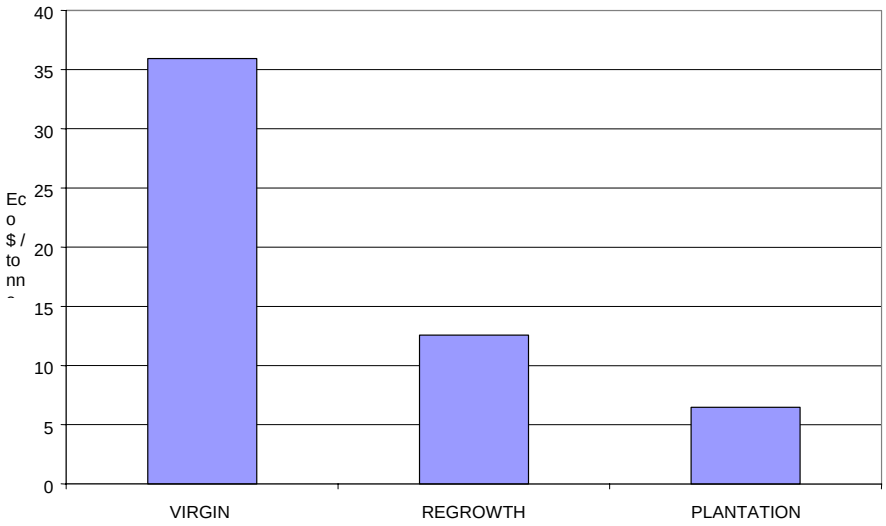

Figure B.2: Environmental valuation of forestry resources

A summary of the environmental valuation method is presented below. The base pollutant and equivalence relationship varied for each impact category as illustrated by in Table B.6 below.

Table B.6: Summary of Environmental Valuation Methodology

Impact Category	Original Valuation Approach	Valuation Reference	Base Pollutant Valuation	Equivalence Relationship	Non-base Values
Global Warming	Estimated emission permit fee or technology abatement cost	Hamilton C., (Nov 1999) The Aluminium Industry and Climate Change	Carbon Dioxide	IPCC factors for 100 years	none
Air Pollution	Estimated benefits arising from emission control (repair cost for human and other capital)	NSW EPA (Jun 1995) Envalue, Environmental Valuation Database	Fine Particulates	1. NSW EPA, Load Based Licensing weights	SO2; NO2; CO
Water Pollution	Estimated benefits arising from emission control	NSW EPA (Jun 1995) Envalue, Environmental Valuation Database	As above	1. NSW EPA, Load Based Licensing weights	None
Landfill Costs	Hedonic pricing of amenity and intergenerational costs	New South Wales Environment Protection Agency, (1996) RIS - Proposed Waste Minimisation and Management Regulation 1996	Landfill space	N/A	N/A
Resource Loads (Mineral)	Scarcity and rehabilitation costs	Department of the Environment, Sport and Territories, (1997) Environmental Economics Research Paper No 2 Subsidies to the use of Natural Resources	Black Coal	Years of remaining use - World Energy Council 1995 Resource Update Sustainability -US Dept of Commerce, (Apr 1998) BEES 1.0	None
Resource Loads (Forest)	Estimated replacement value	Industry Commission, (Feb 1991) Report No.6 Recycling in Australia,- Appendix H, Forestry	Virgin, Regrowth, Plantation	N/A	None

6 RESULTS OF ORIGINAL STUDY FOR NPCC

The average national environmental benefit of kerbside collection and recycling systems in metropolitan and regional centres was conservatively estimated to be $68 per household per year (between $41 and $119 depending on the system and location). Based on the analysis, the total national environmental benefit of kerbside recycling is estimated to be in the order of $424 million per year.

The environmental impact categories which contribute to the overall benefit of current collection and recycling systems are presented in Figure B3. The majority of the impact - 75 percent, comes from *air and water pollution* credits arising from the avoided product system associated with the avoided manufacture from virgin materials. The *natural resource* value of recycling is the next most influential factor at 21 percent of the benefit. This is followed by *global warming* credits, valued at 4 percent, and *landfill* savings at 1.6 percent. *Traffic (Noise and Traffic)* represents a net environmental cost to the system of 2 percent. All impact categories represent the balance of the marginal net collection and recycling system –i.e. waste collection, transport, sorting, landfill and recycling.

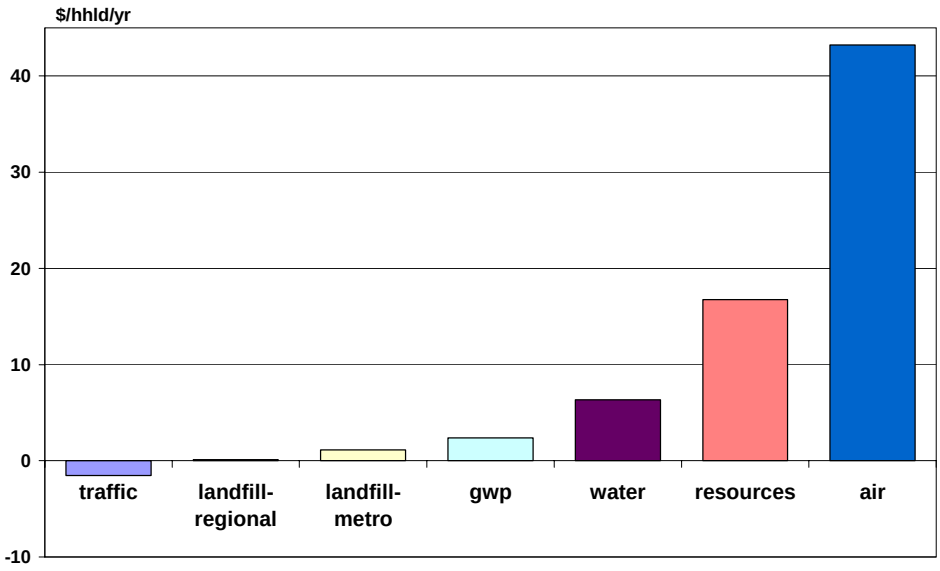

Figure B3: Environmental Costs and Benefits by Impact Category ($ per household per year - Population Weighted National Average)

7 DATA SENSITIVITY ANALYSIS

Sensitivity analyses are conducted on adopted air pollutant values and forest resource values.

7.1 Air Pollutant Sensitivity

Air pollution is the dominant environmental impact category for all systems studied. To ensure that the data used for valuation of air pollutants was reliable and comparable with values adopted for other international studies, a sensitivity analysis was conducted.

The valuation approach used for air pollutants was based on:

1. Published government cost/benefit findings for air pollutant loads; and

2. The application of equivalence factors based primarily on Load Based Licensing (LBL) weights developed by the NSW Environmental Protection Authority.

a) Methodology

The sensitivity or influence on the final results was tested in the following ways:

Test 1: By determining the percent contribution of pollutant values for which there are "known" values based on published government cost–benefit valuations (ie: excluding characterisation by LBL weights);

Test 2: The influence on the final results if published international air pollutant values are substituted for the local values and only "known" values are used. International values adopted were from one of the most extensive pollutant valuation study ever performed – The European Union's (EU) ExternE project and using the "low Estimate" for all pollutant value substitutions.

b) Sensitivity Results

Test 1: Between 92 and 95 percent of the net value of the air pollutant impact of the systems studied comes from the pollutants for which there are "known" values – ie: based on published government cost–benefit valuations.

Test 2: The adoption of the "low estimate" of the value of the benefit of pollutants from the selected international source and exclusion of all other air pollutant values produced the following result. The net value of current recycling systems changed using the overseas EU air pollutant valuation data from $68 per household per year to $97 per household per year.

These findings have enabled us to confirm that the values used by the study are relatively conservative when compared with similar studies and that trace pollutant contaminants are neither significant in the final valuation nor contributing to anomalies in the final results.

7.2 Forest Valuation Sensitivity

The forest resource valuation used by the study was considered to be the most subject valuation adopted as despite exhaustive efforts no sound published valuation could be sourced.

To ensure that the data used for valuation of forest resources not the source of significant error, a sensitivity analysis was conducted.

The valuation approach used for forest resources was based on:

The estimation of [30] "hypothetical non-wood charges" for forest resources assuming a sustainable harvest yield from the forest and application of LCA equivalency factors to determine values for regrowth eucalypt timber and plantation timber based on a proposed weighting for land use classes[31].

a) Methodology

The sensitivity or influence on the final results was tested in the following ways:

Test 1: By determining the influence on the final results of adopting a zero value for timber resources;

Test 2: By using the estimated value of timber per hectare without allowing for the sustainable harvest yield described above.

b) Sensitivity Results

Test 1: The adoption of a zero value for forest resources reduces the national average value of recycling from $68 to $64 per household per year.

Test 2: The adoption of the calculated value of forest yield of $368 per tonne changes the national average value of recycling from $68 to $ 96 per household per year

7.3 Summary

To test the robustness of the outcomes, data sensitivity analyses have been conducted on the most sensitive and subjective variables. The main results are as follows:

- Between 92 and 95% of the net environmental benefit associated with air pollution comes from the pollutants for which the values are based directly on published Australian government cost–benefit valuations.

[30] Industry Commission, (Feb 1991) *Report No.6 Recycling in Australia,- Appendix H, Forestry*

[31] Lindeijer et al. Ministry of Transport, Public Works and Water Management & Institute for Forestry and Nature Research (Aug 1998) *Biodiversity and Life Support Indicators for Land use Impacts in LCA*

- Using the "low" values of a highly acclaimed overseas air pollutant valuation study, the net environmental benefit of current systems increased from $68 to $97 per household per year.

- The adoption of a *zero* value for forest resources reduces the net environmental benefit by 6% from $68 to $64 per household per year. Forest valuation is the least certain value used.

- The adoption of the only published Australian value for forest resources changes the national average value of recycling from $68 to $96 per household per year.

8 CALCULATION DETAILS

Calculations about the environmental benefit of more recycling are included in Section 8.4. Details of the calculations relating to continuous performance improvement are set out below.

A review of relevant LCA databases - predominantly those on packaging materials undertaken by RMIT for EcoRecycle Victoria (Grant et al, 2001), as well as international work such as Hanssen O.J. (1998) - confirmed that recycling reduces the overall environmental impact of packaging production by approximately 50 per cent.

Based on this, the impact of local packaging production could be assessed applying the findings of the *Independent Assessment of Kerbside Recycling* (Nolan-ITU, 2001). 'High and low' values were calculated to reflect the changing environmental impact/benefit due to different recycling mixes. The values applied were Eco$422 – 522 for each tonne of recyclate collected, transported, reprocessed and sold. These values were then doubled for each tonne of packaging (mix) produced on the basis that the international work referred to above confirms that recycling reduces the overall environmental impact of packaging production by approximately 50 per cent. This methodology and the qualifications associated with its use are discussed further in section 7.2.

Two scenarios have been modelled:

- 'Low end' (conservative scenario) - (ie. 1% lightweighting, environmental performance of new signatories improving by at least 5%, 80% signatory participation and environmental performance of current signatories improving by at least 2%), resulting in an overall environmental benefit of at least Eco$50 million.

- 'High end' (optimistic scenario) – (ie. 5% lightweighting, environmental performance of new signatories improving by at least 10%, 90% signatory participation and environmental performance of current signatories improving by at least 5%), resulting in an overall environmental benefit of at least Eco$200 million.

Table B.7 provides the relevant figures for Current and Revised Covenant (high and low) environmental improvements in the packaging supply chain which are:

- in addition to benefits due to enhanced recycling performance, and;

- attributable to the implementation of the Revised Covenant (i.e., assuming Current as the baseline).

These range from Eco$49 – 61m for "Revised Covenant Low" to Eco$210 - 260m for "Revised Covenant High".

Table B.7: Estimation of Supply Chain Performance

	Eco$'000 Low	Eco$'000 High
Total impact per tonne of packaging	0.844	1.044
Total impact through packaging production	2,334,000	2,887,000
No Revised Covenant		
Participation from 80% - 90%	-	-
Performance of current signatories	-	-
Lightweighting	23,300	28,900
Total impact	**23,300**	**28,900**
Revised Covenant – Low Estimate		
Participation from 80% - 90%	11,700	14,400
Performance of current signatories	37,300	46,200
Lightweighting	23,300	28,900
Total impact	**72,300**	**89,500**
Revised Covenant – High Estimate		
Participation from 80% - 90%	23,300	28,900
Performance of current signatories	93,400	115,500
Lightweighting	116,700	144,400
Total impact	**233,400**	**288,700**
'Performance' encompasses virgin material extraction, refining and packaging production emissions		

The net environmental benefit of the revised Covenant was found to be significant, and is estimated to be greater than Eco$300m per year, which comprises greater than Eco$250m from increased recycling and greater than Eco$50 from continuous performance improvement across the supply chain, as illustrated in Table B.8 below.

Table B.8: Summary of Environmental Benefits

Year 2010	60%	70%	80%
Extend current kerbside recycling			
t/yr increase	*254,972*	*389,932*	*519,915*
Enviro (Eco$ M)	120	184	245
Away-from-home Recycling - Public Place			
t/yr increase	*10,000*	15,000	*20,000*
Enviro (Eco$ M)	5	7	9
Away-from-home Recycling – Shopping Centres			
t/yr increase	*20,000*	25,000	*30,000*
Enviro (Eco$ M)	9	12	14
Extend Kerbside Recycling to include all rigid packaging			
t/yr increase	-	40,000	*50,000*
Enviro (Eco$ M)	-	19	24
Extend Kerbside Recycling to Include all flexible packaging			
t/yr increase	-	-	*35,000*
Enviro (Eco$ M)	-	-	17
Extend C&I Recycling			
t/yr increase	455,000	745,000	1,035,000
Enviro (Eco$ M)	215	352	489
Continuous Supply Chain Performance Improvement			
Enviro (Eco$ M)	49 – 260		
Total Environmental Benefits [1)]	400 to 600 (320 to 470)	620 to 830 (490 to 650)	830 to 1040 (650 to 820)

[1)] Figures in brackets indicate range without 21 % of the value attributed to resource conservation, as this component of the evaluation has been questioned by some stakeholders.

Appendix C

Amount of Packaging Practically Recyclable

Amount of Packaging Practically Recyclable

Although the information in this Appendix does not describe the impacts of the Covenant, it does provide useful context. By estimating the proportion of material types that are theoretically recyclable it helps inform debate and decisions around target setting. This analysis does not consider the environmental benefits associated with these recycling rates. Further analysis about the environmental and economic benefits (considering transportation and other system requirements) of recycling at these rates would need to be considered in order to determine optimum recycling rates.

Prior to considering any targets to increase the amount of packaging recycled and the amount of recyclable packaging in the market, it needs to be recognised that it would not be possible to recycle 100 per cent of packaging consumed. Our ability to recycle all packaging is affected by issues like breakage, food contamination, and use of small closures like caps. To date, no published figures have been available to address this question. The following is a first attempt to derive estimates of how much packaging is practically recyclable.

Current Packaging Consumption and Recycling

Figures on packaging consumed in Australia have been taken from the most recent Packaging Database study (Nolan-ITU, 2005). Packaging recycled is taken from that same project where all major reprocessors had been surveyed. It is interesting to note that the figure of 1.75M t/yr of packaging recycled is almost identical to the one derived from individual reports (predominantly State Governments) on domestic and commercial & industrial recycling (refer Section 8.4.2).

Technical Barriers and Technical Recyclability

Table C.1 then lists any 'technical barriers' to recycling of the various packaging materials. In most instances, technical barriers are related to sorting losses (including breakage), contamination of packaging with food, unsuitable MRF (sorting) technology, and – in one instance - absence of reprocessing facilities. Based on this, the next column to the right estimates the technical recyclability with the last column showing the resulting tonnes of material.

Practical Barriers and Resulting Overall Recyclability

Table C.2 continues by listing 'practical barriers' to recycling of the various packaging materials. These practical barriers are predominantly 'small arisings' i.e. packaging in small quantities and small units such as bottle caps, small wrappers etc.

Resulting Actual Recyclability

The resulting 'actual recyclability' is then calculated by multiplying 'technical' and 'practical' recyclability. The resulting tonnages indicate that almost 85 per cent of all packaging consumed in Australia is 'actually recyclable'.

Table C.1: Estimate of Packaging that is 'Technically Recyclable'

Packaging Material	Packaging Consumption (Tonnes)	Recycling (Tonnes)	Recycling Rate (%)	Technical Barriers	Technical Recyclability (%)	Technical Recyclability (Tonnes)
Glass	850,000	323,000	38.0%	Collection and sorting losses	90.0%	765,000
Aluminium rigid	45,200	30,962	68.5%	None	100.0%	45,200
Alum. semi-rigid	unknown	0	0.0%	Potentially high smelting losses; Food contamination issues	70.0%	-
Steel	82,100	34,500	42.0%	None	100.0%	82,100
PET	117,900	41,700	35.4%	None	100.0%	117,900
HDPE	160,800	51,900	32.3%	Currently unsuitable MRF technology for film sorting; Composite packaging materials	50.0%	80,400
PVC	12,200	2,000	16.4%	Currently unsuitable MRF technology for film sorting; Composite packaging materials	50.0%	6,100
L/LLDPE	211,300	30,900	14.6%	Currently unsuitable MRF technology for film sorting	40.0%	84,520
PP	108,200	6,000	5.5%	Currently unsuitable MRF technology for film sorting; Composite packaging materials	50.0%	54,100
PS/EPS	42,400	2,000	4.7%	None	100.0%	42,400
ABS/SAN	6,500	500	7.7%	No post-consumer reprocessing facilities	10.0%	650
Cardboard - corrugated	1,333,000	1,039,740	78.0%	None	100.0%	1,333,000
Cardboard - boxboard	204,900	159,822	78.0%	None	100.0%	204,900
Cardboard - high wet-strength	16,000	12,480	78.0%	Sorting losses	90.0%	14,400
Liquid paper board	26,400	3,000	unknown	Sorting losses	70.0%	18,480
Paper - kraft/bag / wrap & conv	74,200	10,000	unknown	Food contamination issues	70.0%	51,940
Paper - moulded fibre	21,000	16,380	78.0%	Food contamination issues	80.0%	16,800
TOTAL	3,312,100	1,764,884	53.3%			**2,917,890**
					Technical Recyclability	**88.1%**

Table C.2: Estimate of Packaging that is 'Practically Recyclable', and Resulting 'Actual Recyclability'

Packaging Material	Practicability Barriers	Practical Recyclability	Resulting Actual Recyclability	Actual Recyclability (Tonnes)	Additional Recovery Potential (Tonnes)
Glass	None	100.0%	90.0% [1)]	765,000	442,000
Aluminium rigid	None	100.0%	100.0%	45,200	14,238
Aluminium semi-rigid	Small arisings	80.0%	56.0%	-	-
Steel		100.0%	100.0%	82,100	47,600
PET	Small arisings	90.0%	90.0%	106,110	64,410
HDPE	Small arisings (eg closures)	90.0%	45.0%	72,360	20,460
PVC	Small arisings	70.0%	35.0%	4,270	2,270
L/LLDPE	Small arisings (eg closures)	70.0%	28.0%	59,164	28,264
PP	Small arisings (eg closures)	70.0%	35.0%	37,870	31,870
PS/EPS	Low density; Small arisings	60.0%	60.0%	25,440	23,440
ABS/SAN	Small arisings	100.0%	10.0%	650	150
Cardboard - corrugated	None	100.0%	100.0% [1)]	1,333,000	293,260
Cardboard - boxboard	Small arisings	90.0%	90.0% [1)]	184,410	24,588
Cardboard - high wet-strength	None	100.0%	90.0%	14,400	1,920
Liquid paper board	Small arisings	90.0%	63.0%	16,632	13,632
Paper - kraft/bag / wrap. & converting	Small arisings	80.0%	56.0%	41,552	31,552
Paper - moulded fibre	None	100.0%	80.0%	16,800	420
TOTAL				**2,804,958**	**1,040,074**
			Technical and Practical Recyclability	**84.7%**	

1) Example Sweden: Recycling rate for glass was 92% in 2003, for cardboard was 82% in 1998

The current 'technical' recyclability of packaging is in the order of 90 per cent. 'Actual' (or 'practicable') packaging recyclability is 85%. This is unexpectedly high. Modelling the costs of increasing the proportion of recyclable packaging from this high level is fraught with uncertainties and hence of limited value. This section therefore discusses how more of the 'recyclable' packaging could be recovered (from a current recovery rate of 45-50 per cent) and its implications.

As discussed in the body of this report, there are two reasons for the difference between recyclability and actual recycling. These are:

1. *Accessibility:* Recycling pathways are not accessible everywhere for all materials; and

2. *Separation Rate:* Separation by waste generators (with access to recycling systems) is less than 100 per cent.

In the domestic sector, accessibility to recycling services is high with close to 90 per cent of the Australian population connected. For the commercial sector, accessibility is similar. However, the services are not being *utilised* to a great extent due to the costs of collection (which are not borne by Local Government as is the case for residential kerbside recycling) and the costs of segregation ('in-house' costs). For more details on commercial sector recycling refer to Section 8.2.