

**EPHC Mid-Term Review of the National Packaging
Covenant:
Report 1: Recycling Performance and Data Integrity**

*Prepared by Dave West and the Total Environment Centre
findings endorsed by the Boomerang Alliance*

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*Level 4, 78 Liverpool Street
Sydney 2000
Ph: (02) 9261 3437; Fax: (02) 9261 3990
www.tec.org.au*

1. Executive Summary

In order to obtain an accurate view of performance against targets, good data quality is essential. In recent years assistance has been obtained from Pitcher Partners to review the confidence level of the data supplied by the National Packaging Covenant Council (NPCC). We understand the Pitcher review did not acquire data or sample the data in the field. Some improvements and adjustments have been made by the NPCC but significant problems remain with the level of confidence over the five year period declining from 4.5 in 02-03 to 3.9 in 06-07. The least confidence is for consumption for glass and plastic and imported finished goods cardboard and collection of steel can data which has been suspended by industry.

We have extended the analysis in terms of obtaining additional data, applying several 'tests' and examining other packaging materials that come under the ambit of the NPC but which have so far been excluded, for example, the significant volumes of composite, aseptics and liquid paperboard packaging and tertiary packaging, transport packaging and bulk goods packaging.

It is clear that consumption has been understated and this has the effect of overstating the reported recycling rate. For example, the fastest growing packaging sector – plastic – is shown by the NPCC as having a decreasing consumption rate over the last five years despite increases in population and vigorous economic growth in Australia.

We estimate 2006-07 recycling as 48%, not the 56% reported by the NPCC (see table below). Further the overall target of 65% by 2010 is unlikely to be met taking account of NPCC projects, even under an optimistic scenario.

Progress to	2005 NPC Claimed Performance*	2010 Minimum Target	2007 Performance		Improve/ Decline of revis'd on '05
			Claimed*	Revised	
TARGET 1: Recycling Rates					
Total Packaging Recycling	46.4%	65%	55.8%	48.3%	+1.9%
Paper & Cardboard Packaging Recycling	57%	70%	65.2%		+8.2%
Glass Packaging Recycling	34.2%	50%	46%	36.5%	+2.3%
Plastics Packaging Recycling	22.2%	30%	30.5%	20.5%	-1.7%
Steel Can Recycling	37.6%	60%	37.6%	36.1%	-1.5%
Aluminium Recycling	70.8%	70%	70.3%	70.3%	-0.5%
TARGET 2: Non-Recyclable Packaging	Baseline	Target	Claimed	Revised	
Liquid Paper Board (estimate)	Unknown	25%	-	Approx 11%	
Aseptics Packaging	Nil	25%	-	<1%	
Plastics - PVC	Unknown	25%	-	Approx 2.3%	
Plastics - Polypropylene	Unknown	25%	-	Approx 10.5%	
Plastics Polystyrene	Unknown	25%	-	Approx. 8.5%	
Plastics - EPS	Unknown	25%	-	Approx. 2.5%	
Plastics ABS/SAN	Unknown	25%	-	<1%	
Other Plastics	Unknown	25%	-	<1%	
TARGET 3: No new Packaging to landfill		Target	Claimed	Revised	Increase
Total Tonnes to landfill	2,202,530	2,350,891	1,880,406	2,518,652	+7.1%

* NPCC October 2008, Pitcher Data Report

More needs to be done to produce figures that can withstand scrutiny and it is recommended that in order to increase confidence levels so that robust policy decisions can be made, further work is commissioned from Pitcher Partners into data veracity and scope. A substantial assessment of packaging on imported finished goods should also be undertaken.

2 NPC Targets

When the National Packaging Covenant was renewed in 2005 a number of overarching targets were established to outline the minimum acceptable performance level. They are¹:

Target 1: Increased recycling of post consumer packaging

Signatories will work together to increase the amount of post consumer packaging recycled from its current rate of 48% (2003 baseline data) to 65% by 2010.

Packaging made from specific materials will make a contribution to the overarching target as follows:

- *Paper & Cardboard 70–80% (currently 64%)*
- *Glass 50–60% (currently 35%)*
- *Steel 60–65% (currently 44%)*
- *Aluminium 70–75% (currently 64%)*
- *Plastics 30–35% (currently 20%)*

[Note: More recent data commissioned by the NPCC for 2002-03 has adjusted the baseline to 39.9%. Also this was not the 'current rate' in 2005 when the current NPC was renewed – the rate was 46.4%.]²

Target 2: Non Recyclable Packaging

Industry signatories will work to increase the recycling of some specific materials that are currently either not recycled or recycled at very low rates due to their design, lack of collection/processing infrastructure or lack of markets. These materials are plastics coded (4) to (7) and non-recyclable paper & cardboard packaging.

The recycling of packaging manufactured using these materials will be increased from the existing 10% recycling rate (2003 baseline data) to 25% by 2010.

Composite packaging is another packaging type with very low recovery rates. No baseline data is currently available for composites and the applicability of the 25% target to these materials will be considered following analysis of baseline data at the end of 2006.

Target 3: Packaging to Landfill

It is recognized that through increased consumption and population growth the amount of packaging disposed of to landfill could still increase substantially. To address this, a target has been established of no new packaging to landfill (against 2003 baseline data). This means that any additional packaging will need to be recovered for recycling and not disposed of to landfill.

In real terms, Target 3 established an effective cap on the total volume of packaging disposed of to landfill. The calculation was based on the data presented to the EPHC. It was claimed that there was 3,473,854 tonnes of packaging produced³ annually with an estimated 1,122,963 tonnes of packaging recycled. This means the cap on packaging disposed to landfill is 2,350,891 tonnes.

[Note: The NPCC has released revised figures for 2002-03 and proposes that this adjusts the baseline cap to 2,470,746. Further, at the time the NPC MkII was established the then 'current rate' of packaging to landfill in 2005 was 2,202,530].

Given that the 'intent' of the original proposal was to establish a maximum number of tonnes of packaging disposed Boomerang Alliance and TEC both take the view that the minimum performance expectations that must be met to even consider retaining the NPC in its current form remain fixed (in real terms) to those established at the time of renewal. Specifically, this implies that the maximum number of tonnes to landfill is intended to be 2,350,891 tonnes per annum.

¹ The National Packaging Covenant 'Strategic partnerships in Packaging' 15 July 2005-30 June 2010

² Pitcher Partners (August 2008). Data Review Report Covering the NPCC Consumption and Recycling Data for Years 03/03 to 06/07

³ Later investigations discovered that industry's claimed consumption had been significantly understated

3. NPC MkII Performance to Targets

As at the time of publishing this report the NPCC has presented the performance for 2006-07 as follows:

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

3.1 Consumer packaging that has been excluded from NPC calculations without formal agreement

It should be noted from the outset that reporting on the overall consumption and recycling of packaging is badly flawed through the simple fact that a significant proportion of consumer packaging has been excluded from these calculations. Further, the types of consumer packaging not considered are amongst the areas where recycling rates are poorest. Some of the types of consumer packaging excluded from reporting includes:

- Composite and aseptic packaging (where combinations of plastic, paper, and aluminium are 'welded into a single packaging material. Examples of products that are commonly sold in composite of aseptic include fruit juice 'poppers', new wine 'skin' replacements for glass bottled wine, plastic/foil chip packets, pharmaceutical product packaging for pills and tablets, packaging for convenience focussed 'meal solutions' packaging and 'boutique packaging' particularly in personal care and cosmetics.⁴
- Liquid Paperboard - commonly used for milk, dairy products, home & personal care products and food products.
- Aluminium foils and soft metal wraps used in frozen foods, seals, 'oven ready' products etc.
- Steel, aluminium and plastic drums of 20+litres. Consumer markets for these types of products are most commonly home and hardware type products such as paint, household chemicals, pool chlorine, and bulk food products such as vegetable oils and distilled water.
- Tertiary Packaging such as plastic shrink wrap, pallets, reels, shelf ready packaging, dump bins and counter displays etc. Please note this material has not been included in any revisions suggested later in this report. However it should be noted that the NPC definition of 'consumer packaging' includes packaging for product handling and marketing to consumer markets; and as such the majority of tertiary packaging should be included.

These exclusions create a significant distortion in the overall picture of packaging consumption and recycling as will be demonstrated later in this report, based on international information and the limited Australian data it is clear that the types of packaging excluded:

- **Means overall packaging consumption is understated by between 4.7 – 10%**

3.2 Data limitations

In order to obtain an accurate view of performance against targets, good data quality is essential. The NPCC (and other agencies) have been struggling with the challenge of obtaining accurate data.

Problems with the NPC assessing the level of packaging consumption and recycling is not a new trend, with industry claims of reduced consumption challenged by the Institute for Sustainable Futures (ISF) review of the First NPC for the NSW Nature Conservation Council noting⁵:

⁴ Information collated through various annual 'Rexam Global Consumer Packaging Reports' and an inspection of product packaging found on shelf at Coles Supermarket Mooloolaba 11/10/08

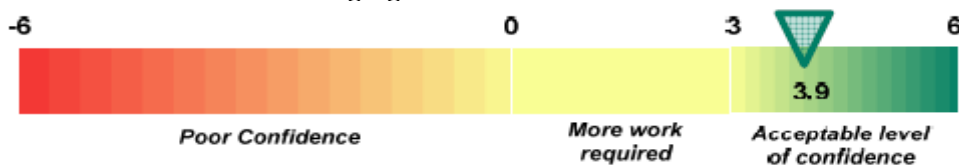
⁵ ISF "Review of the National Packaging Covenant Version 1.4" for NSW Nature Conservation Council

"...there are no specific requirements for baseline data collection, coordination and standardised data collection and assumptions. Hence, there is no accurate, accessible and consistent measure of the trends in packaging waste generated and diversion from landfill."; and

"There are several claims by industry that light-weighting has led to a reduction in the generation of packaging waste (BIEC, 2004). Whilst light-weighting has reduced the mass of glass per litre of beverage by 4% between 1996 and 2002 (BIEC, 2003), this has been overcompensated for by the 10% increase in beverages packed in glass (by volume) leaving a 6% net increase in glass production by mass."

This is an important consideration as most individual brand owners claim that their consumption figures cannot be released under 'commercial in confidence'. However we note that in a regulated system reporting of this data would be required while maintaining confidentiality with any failure to report or misreporting carrying serious penalties.

In an effort to review the confidence level of data Pitcher Partners were retained. We understand they did not acquire data or test the data in the field. Pitcher Partners confidence rating of NPC data is based on a scale ranging from -6 to +6 for 06/07 was assessed overall as being:



While, with Pitcher Partners input, there has been some improvements and adjustments made, significant problems remain with the level of confidence. In particular it should be noted that over the five year period the assessed overall confidence rating has steadily declined from 4.5 in 02-03 to 3.9 in 06-07.

Material Type	02/03	03/04	04/05	05/06	06/07
Overall Confidence	4.5	4.4	4.4	4.3	3.9

Pitcher Partners also highlighted that they had the least confidence in consumption including glass and plastic and imported finished goods cardboard and collection of steel can data which has been suspended by industry.⁶ Pitcher Partners reports the following levels of confidence in the NPCC data:

Material Type		02/03	03/04	04/05	05/06	06/07
Paper/Cardboard	Consumption	5	5	5	5	4
	Recycling	5	5	5	5	5
Glass	Consumption	4	3	3	3	2
	Recycling	5	5	5	4	4
Plastics	Consumption	2	2	2	2	2
	Recycling	2	3	3	3	3
Steel Cans	Consumption	0	0	0	-1	-3
	Recycling	4	4	4	2	0
Aluminium Cans	Consumption	4	5	5	5	5
	Recycling	5	5	5	5	5

The Pitcher Partners brief did not extend to considering whether the materials identified covered all areas of packaging, and as such the packaging sectors excluded by the NPCC reporting need to be factored into the equation. We have adapted the following Pitcher Partners scoring methodology as follows:

⁶ Pitcher Partners op cit

Information Characteristics	Description	Example Focus Areas
Appropriateness of Content	The appropriateness of the information that is measured.	<ul style="list-style-type: none"> → Has the information been specifically defined? → Is the information representative of what needs to be measured (consumption and recycling)? → Is the information gathered for the correct date range (financial or calendar)?
Credibility of Source	The level of credible reliance that can be placed on the source of the information.	<ul style="list-style-type: none"> → Is the information independently audited? → Are internal reviews undertaken to verify the accuracy of the information? → Is the information viewed and signed of by senior executives eg in management reports? → Is the information gathered from sound systems and processes (eg formal or informal systems)? → Can the information be cross checked with other independent sources?
Appropriateness of Depth and Detail	The level to which the information is based on underlying data that displays depth and provides sufficient detail.	<ul style="list-style-type: none"> → Is there further detail made available to identify the origins of the information presented? → Does the information need to be extrapolated in order for it to be relevant to the requirements? → Is the information based on actual granular figures or broader estimates.
Suitability of Assumptions	The level to which the information is based on appropriate assumptions.	<ul style="list-style-type: none"> → How sound are the assumptions used to determine the relevance of the information? → Have assumptions been communicated and agreed to by key stakeholders?
Consistency and Accuracy of Calculations	The level to which the information is derived using consistent and accurate calculations.	<ul style="list-style-type: none"> → Are calculations undertaken to derive the information conducted in a consistent and accurate manner? → Have specific procedures been designed to gather the information and are these undertaken by appropriately trained and knowledgeable staff?
Coherence and Comparability of Information	The level to which the information can be compared or combined with other information to provide coherent results.	<ul style="list-style-type: none"> → Can consumption and recycling be compared to provide a coherent recycling rate?

Each of the 6 criteria above have been given scores of '+' or '-' 1 for each Pitcher characteristic by us. If the overall confidence scores were adjusted to reflect the extent of materials considered the overall scores would have to change as follows:

Information Characteristic	Score	Rationale adopted by TEC
Appropriateness of Content	-1	The information used has not been defined properly nor is it representative of what needs to be measured.
Credibility of Source	-1	Ongoing problems with credibility of consultants and indirect industry sources who have not exposed the exclusions.
Appropriate Depth and Detail	-1	All significant international reports on packaging consumption (Euromonitor, World Packaging Organisation, and Rexmark Global Consumer packaging Reports) highlight that significant forms of consumer packaging had not been included.
Suitability of Assumption	-1	Assumptions have been made to narrow the 'definition' of packaging without consulting stakeholders, and data was not based on a sound understanding of the consumer packaging market.

Accordingly, while we agree with Pitcher Partners overall levels of confidence in NPCC reporting, we feel it is important to highlight that the overall confidence level is based on an average of the confidence scores in each material as Pitcher Partners were not asked to assess the level of confidence in whether the NPC overall consumption and recycling figures captured all consumer packaging as defined under the NPC MkII. If the overall level of confidence was based on the broader consideration of capturing all packaging, we believe that (based on the above), the scores would be approximately adjusted to the following:

	02/03	03/04	04/05	05/06	06/07
Overall Confidence (Pitcher Partners Average)	4.5	4.4	4.4	4.3	3.9
Suggested adjustments as outlined above	-4	-4	-4	-4	-4
Revised Confidence Rating in NPC combined recycling rates	0.5	0.4	0.4	0.3	-0.1

We have also extended the analysis in terms of obtaining additional data, applying several 'tests' and examining other packaging materials that come under the ambit of the NPC but which have so far been excluded, for example, the significant volumes of composite, aseptics and liquid paperboard packaging. These tests have also been used to assess both the areas and extent to which overall packaging consumption and recycling should be adjusted.

4. Tests applied to review NPCC claimed packaging consumption and recycling

In order to consider the validity of claimed consumption and recycling of packaging made by the NPCC we undertook a detailed evaluation using seven tests.

Claimed consumption and recycling figures were reviewed against the issues identified by Pitcher Partners 'Data Review Report' (August 2008); we have endeavoured to look at the 'impact' of the identified areas of weakness and to also consider the types of packaging that have been excluded from the NPC reporting, which we understand was outside of the mandate provided to Pitcher Partners.

Our confidence in NPCC claims was also examined by a comparison between the barriers to improved recycling identified by Hyder Consulting's 'NPC Structural Barriers Investigation' (June 2007) to see if the trends were consistent with claimed improvement. While our comments are not definitive they open the way for further questions as found below.

Barrier	Hyder Impact Rating	Material Focus	TEC Comment
Contracted kerbside collections limited to residential areas	5	Cardboard / Glass	The 2006/07 NEPC annual report on the used packaging NEPM indicates that there is just 686,000 tonnes of paper & cardboard packaging recovered via MSW recycling. This means that over 60% of all paper recovery is sourced via C&I recycling, which is difficult to believe.
Declining recycling collection service from hotels and clubs (+ cafes & food courts)	5	Cardboard / Glass	If these statements are valid, there are questions regarding claims that glass recycling has increased by approx. 70% over 5 years.
Real reduction in some materials buy back "prices"	4	Glass / Steel / LPB / Cardboard	This notion creates significant scepticism about a number of recycling claims - see 'Test 5 Recyclate claims and market conditions', later in this report.
Changes in the amount and type of packaging demanded	4	Plastics / Aluminium Foils / Paper	The trends towards single serve packaging and individually wrapped packaging should significantly impact on packaging recycling rates. We have assumed this is not apparent in claimed rates as these changes could probably be balanced by light weighting of packaging. Accordingly we have provisionally assumed there is a zero balance impact between light weighting and the trend towards single serve packaging.
Lack of full picture on imported packaging	3	N/A	This is a very serious data gap in consumption claims and requires some adjustment to claimed recycling.
Low market prices for some packaging materials deters collection	3	Glass / Plastics	This notion creates significant scepticism about a number of recycling claims - see 'Test 5'.
Financial drivers for brand owners	4	All	This leads to questions about the significant claimed increases in packaging recycling.
Lack of physical space to locate additional waste systems	4	All	As above
Increased glass breakage from collection and sorting systems	4	Glass	This trend is causing increased loss of glass in transport and unloading and in increasing contamination of paper. To achieve the recycling rates claimed, without significant capital investment and process change, glass and paper recovery rates would need to be around 75% and 60% respectively.

To add to the issues that should be explored, the writer then conducted a literature review to source information regarding trends in packaging consumption and recycling⁷. These reports highlighted a number of trends - internationally consumption was increasing at rates above or near GDP growth rates; the proportion of other packaging like liquid paper board, composite and aseptic packaging was significant; and claimed improvements in recycling seemed high based on changes in commodity pricing and collection infrastructure.

With this in mind, we sought to apply a series of tests to compare claimed consumption to other indicators to assess whether the reported NPC figures were reasonable. These included testing consumption growth in changes to GDP and inflation; comparing same to movement in commodity prices and reprocessing infrastructure; trends in packaging growth internationally; and comparing specific aspects of recycling and consumption claims against alternate published sources. In nearly every measure it is indicated that claimed recycling rates are significantly exaggerated. A table summarising these tests and how well each major material source measured against the validity tests applied can be found below:

Validity Tests	All Packaging	Paper Etc	Glass	Plastics	Alumin.	Steel	LPB	Other Packaging
1: NPC consumption changes are tracking GDP Growth	-2	-2	-2	-2	-2	-2	-2	-2
2. NPC consumption increasing with population growth	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3. Comparison of consumption growth compared to NZ / global trend	-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4. Rate of per capita consumption growth compared to New Zealand	-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5. Recycling Growth compared to changes in commodity prices & reprocessing infrastructure	-2	-1	-2	+1	+2	-2	-2	-2
6. Comparison to alternate data sources	-1	+2	+1	-2	0	0	-2	-2
Overall confidence from validity tests	-1.5	-0.5	-1	-1	0	-1.2	-2	-2

+ 2 = the test indicates that the NPC data reported is conservative;

+1 = the test shows results that are in line with NPC reporting;

0 = the test indicates that potential overestimates are not significant (<2.5% exaggeration)

-1 = the test indicates that potential overestimates in NPC scoring is significant (2.5-5% exaggeration)

-2 = the test indicates that potential overestimates in NPC scoring is material to assessment (>5% exaggeration)

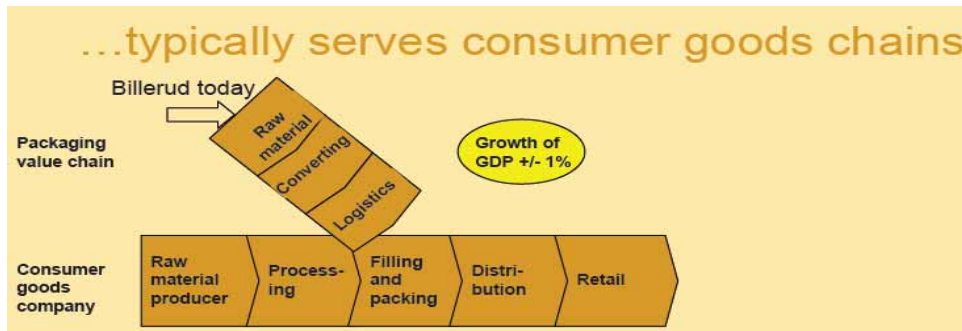
⁷ Relevant publications found are: Australian Packaging Issues & Trends – Packaging Council of Aust, 2005. Analysis of the North American Paperboard and Kraft Paper Markets; 2005-2007 Consumer Packaging Report (annual series that analyses global trends in packaging trends in consumption by market, segment, and material) – Rexam; Market Statistics and Trends in Global Packaging Production – World Packaging Organisation 2008.

4.1 Economic driver tests

Test 1: Comparison of claimed changes in consumption to real GDP growth

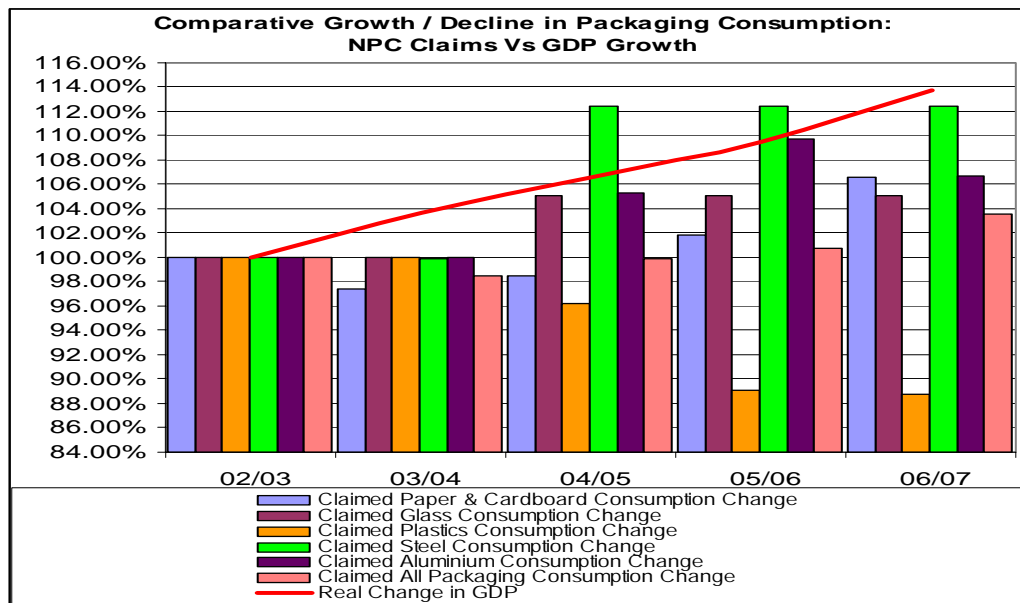
A number of well regarded experts and industry groups in both Australia and internationally have indicated that growth in packaging consumption is reasonably consistent with the growth in Gross Domestic Product (GDP). For example:

- Billerud is a major packaging company based in Europe which operates in 11 countries and employ over 2,200 people. In a presentation to capital markets in Stockholm in November 2006 Billerud reported that the 'traditional' packaging value chain grew at a rate that was "+/-1% of GDP growth"



- World Packaging Organization Report "Market Statistics and Future Trends in Global Packaging" published this year states that, "Used in a wide range of industries across food and drink, healthcare, cosmetics and other consumer goods as well as a range of industrial sectors, packaging has become an essential everyday item, with its usage growing broadly in line with the global economy. As such, the health of the packaging industry is linked to that of the world economy as a whole."

To this end the first test used to assess the validity of the claimed improvement in packaging recycling was to measure claimed consumption of packaging (and increasing recycling rates) against GDP growth:



When industry data presented to the NPCC regarding changed packaging consumption levels are compared to real GDP growth over the same period (a compound 13.7% between January 1st, 2004 and Dec 31st 2007⁸) it becomes clear that consumption levels have been consistently and

⁸ GDP growth based on calculations from The Economist, www.economist.com

significantly understated (notably without considering imports or packaging materials excluded from NPCC calculations).

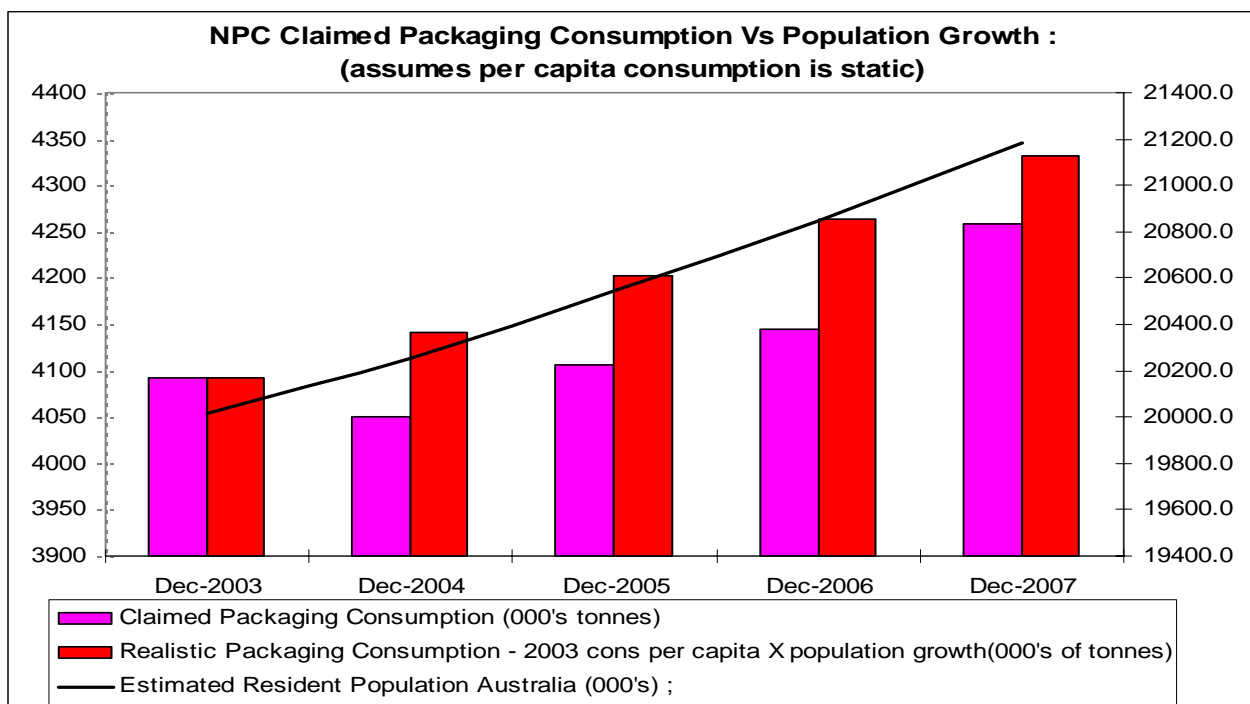
On a simplistic measure, if packaging consumption over the period from 2003 to 2007 grew at the same rate as GDP growth overall, packaging consumption would be 4,676,520 tonnes representing an increase of some 418,003 tonnes. Instead it is claimed packaging consumption has grown by just 164,984 tonnes over the past 4 years and:

- 11% less plastics packaging is consumed today than it was in 2003, while the economy has grown by over 13.7% overall
- The overall consumption of packaging is growing at a rate that is 66% slower than economic growth (4% growth compared to over 13.7% in GDP growth)
- In all sectors of packaging only steel cans are growing at comparable rates to the overall economy.

Applying a simple adjustment of increasing packaging consumption growth to be comparable to GDP growth overall, packaging recycling rates would plummet from the claimed 55.84% to just 50.8%

Test 2: Growth in consumption compared to population growth

The second test we applied was to compare claimed packaging consumption to population growth⁹. Once again the test shows that there is little reason to have confidence in the NPCC's claimed performance.



Test 3: Comparison of consumption per capita compared internationally

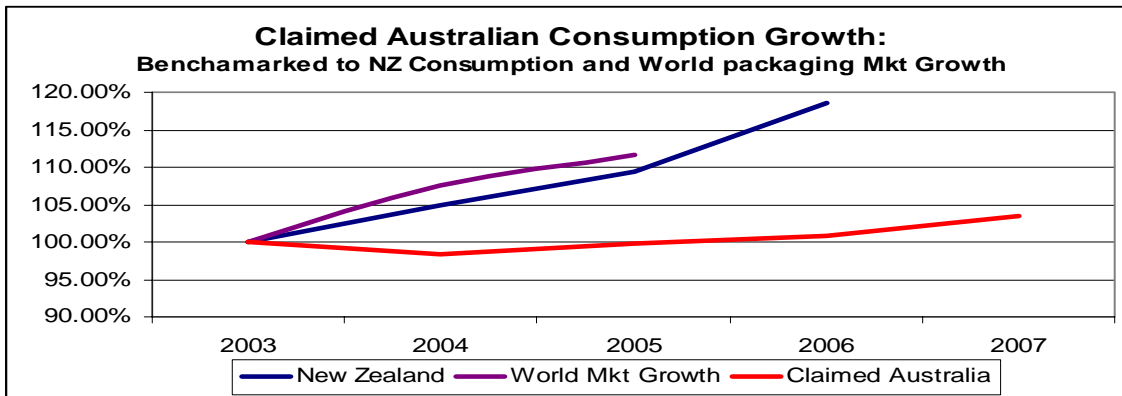
A third test was applied comparing the NPCC claimed changes in packaging consumption between 2003 and 2007, to the international experience. Claimed growth for Australian packaging consumption was compared to New Zealand¹⁰ and overall global packaging market growth¹¹. While overall market growth is distorted by the booming Asian economies (e.g. China and India) it is worth noting that while New Zealand growth broadly tracked growth globally, the NPCC data

⁹ Population Data Source: ABS

¹⁰ Reporting by the New Zealand Packaging Covenant 2003 - 2007

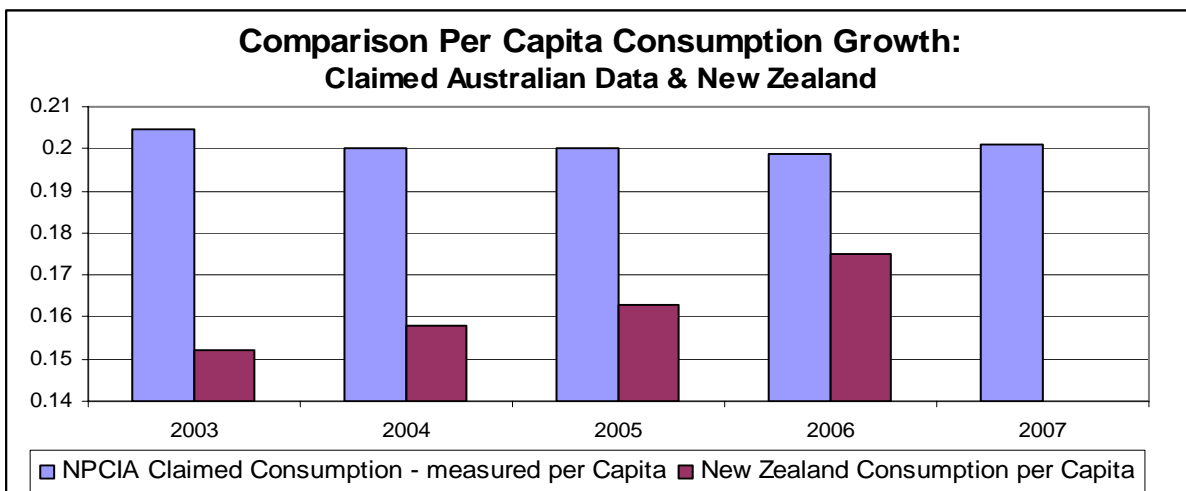
¹¹ World Packaging Organisation: Market Statistics & Future Trends in Packaging Growth

shows that Australian growth is much slower than either of these points of comparison, when the Australian economy has grown faster than the global indices and New Zealand.



Test 4: Changes in consumption per capita

This test sought to measure changes in consumption, compared to New Zealand. New Zealand consumption has traditionally been lower than Australia and its economic growth has been much slower. However this graph shows that New Zealand consumption per capita has steadily increased, while the NPCIA shows consumption per capita in Australia (despite a booming economy) has generally been slowly declining or flat. There has been no significant change in the market conditions, nor has there been any major education program to justify this supposed trend.



Test 5: Recycling claims and market conditions

The table below compares the growth in mean recycle commodity values between June 2005 and June 2008¹² and inflationary changes over the same period¹³:

¹² Figures represent the 'mid way point' of commodity ranges found in Hyder Consulting's NPC Contextual Review, September 2008

¹³ Reserve Bank Inflation Calculator <http://www.rba.gov.au/calculator/calc.go#divFrmCalcQ>

Packaging material	Mean Commodity Increase ('05-'08)	Inflationary Change (June '05 - June '08)	Difference
Mixed paper grade1	10.14%	10.92%	-0.78%
Cardboard1	3.27%	10.92%	-7.65%
Glass	0.00%	10.92%	-10.92%
Plastic 1 – PET	15.00%	10.92%	4.08%
Plastic 2 – HDPE	20.00%	10.92%	9.08%
Plastic 3 – PVC	20.83%	10.92%	9.91%
Plastic 4 – LDPE/LLDPE	66.67%	10.92%	55.75%
Plastic 5 – PP	33.33%	10.92%	22.41%
Plastic 6 – PS/EPS	Nil	10.92%	-10.92%
Plastic 7 – Mixed bales	30.00%	10.92%	19.08%
Aluminium	33.33%	10.92%	22.41%
Steel (tin-plate)	-3.33%	10.92%	-14.25%

This tables demonstrates that in real terms the market conditions to sell recycle actually declined in the paper; cardboard, glass, and steel markets – thus ameliorating a growth driver.

It is possible that diminishing commodity values have been largely offset by the expansion of regional reprocessing facilities or more intense competitive forces - however, once again the realities do not support this proposition:

Commodity	Claimed Improvement 2003 - 2007	Real Improvement/ Decline in Commodity Value	Reprocessing Infrastructure
Paper	509,000	Value has declined by 1-7%	Reprocessing facilities in WA & NSW closed
Glass	173,200	Value has declined by 10+%	Glass beneficiation in WA closed
Plastics	43,434	Modest increase in value of major plastics (PET 4% & HDPE 9%). Good increase in LDPE (55%) and PP (22%)	Limited expansion from 27 plants in 2003 to 29 in 2007
Steel	4,889	Significant decline in value (14%)	Only de-tinning plant in Australia closed now all exported
Aluminium	5,300	Significant increase in commodity value (22%)	No change
Overall	735,823	93% of claimed improvement has supposedly came from commodities where market has experienced significant decline	There has been little to no reprocessing infrastructure expansion to justify claimed growth. Glass and paper are claimed to have experienced significant growth with reducing reprocessing capacity.

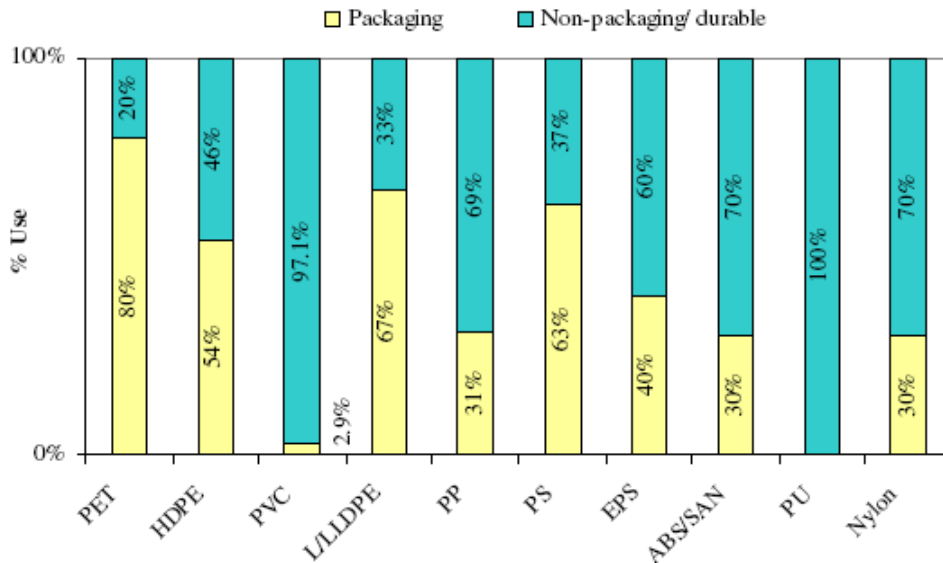
Test 6: Additional data tests

Plastics

The lack of transparency in industry reporting on the consumption and recycling of packaging is poor; consequently there are only limited points of comparison where the claimed recycling activity of industry can be validated. However there are a number of points where comparisons may be made.

PVC packaging recycling:

It is claimed by the NPCC that plastic packaging consumption has actually reduced by 11,000 tonnes or 89% of the benchmark year or 0.89. One of the plastics materials (PVC) had an alternate data source (the Vinyl Council of Australia) and as such it was chosen for comparison. The source data for plastics consumption is PACIA's 'National Plastics Recycling Survey'. In the 2007 Report the proportion of PVC that is packaging is shown as:



This

Figure 3-2 Packaging and non-packaging/durable use of plastics

equates to 6,655 tonnes of PVC packaging consumption in 2007. However, the Vinyl Council of Australia estimates that the proportion of PVC production that is packaging is as follows:¹⁴

- 3,600 tonnes of PVC bottles
- 5,300 tonnes of PVC blister packs
- + an unknown volume of PVC sleeves on PET and other plastic bottles

Thus it appears in just one small sector of plastics there is an understatement of consumption of 2,245 tonnes or 34%,

Pre-consumer recycling as a proportion of all plastics recycling:

The PACIA ‘Plastics Recycling Survey’ does not detail the breakdown of packaging recycling specifically. However it is possible to estimate the amount of material that includes pre-consumer recycling of packaging included in NPCC estimates. Pre-consumer recycling is generally excluded from estimates (which is the case in NPCC figures for paper, glass, and aluminium) as it also reduces consumption (avoided purchase of resin) by feeding the recovered material and into the same production process and subsequently also causes double counting. Including pre-consumer recycling also fails to meet the recycling definitions under the NPCC which addresses post-consumer packaging:

“**recycle**” for a product, means recover the **product** and use it as a raw material to produce another product.

“**recycled content**” is the percentage by weight or volume of post-industrial and/or postconsumer recycled material in the raw materials used for the manufacture of a product.

Using a simple extrapolation from data about the amount of pre-consumer industrial recycling in overall plastics recycling allows us to create a picture of the amount of plastic packaging recovery that, consequently, should be excluded from NPC reporting. This represents around 100,000 tonnes or 40% of total plastics recycling activity. This is revealing and indicates that pre-consumer recycling (which is excluded from all other recycling rate calculations as it leads to ‘double counting’) is factored into plastics packaging recycling rates. For example:

LDPE/LLDPE:

- According to the PACIA report there are 270,000 tonnes of LDPE consumed each year
- 67% of which is packaging (180,900 tonnes of LDPE packaging)

¹⁴ Vinyl – 2- Life: the Vinyl Council of Australia Waste Management Action Plan

- Once pre-consumer recyclate is subtracted from total LDPE recycling, total recycling activity represents approx. 31,000 tonnes per annum
- This means that even if every tonne of post-consumer recycling is packaging (meaning there is no recycling of LDPE durables – which is simply untrue), the best possible recycling rate for LDPE is 17.1%.

HDPE:

- According to the PACIA report there are 298,000 tonnes of HDPE consumed each year
- 54% of which is packaging (161,000 tonnes of HDPE packaging)
- Once pre-consumer recyclate is subtracted, total HDPE recycling total recycling activity represents approx. 51,000 tonnes per annum
- This means that even if every tonne of post-consumer recycling is packaging (meaning there is no recycling of HDPE durables – which would be simply incorrect), the best possible recycling rate for HDPE is 31.6%.

Conclusion:

Both of these materials would need to have a recycling rate that is at least 10 percentage points higher for the claimed plastics packaging recycling rate of 31% to be realistic.

Liquid Paperboard

There are no estimates for the consumption or recycling of liquid paperboard included in NPCC reporting, despite the fact that it is specifically nominated as a sector where recycling levels must lift ('targets for non-recyclable packaging').

While available data is limited Visy industries '2007 Annual Sustainability Report' identifies that it produced some 17,500 tonnes of liquid paperboard in Australia and did not recover any materials. In 1998, Planet Ark estimated around 90,100 tonnes of liquid paperboard cartons were consumed in Australia annually with just 11% of products recycled. This material alone potentially increases consumption of packaging by some 2.5% and reduces recycling rates by a further 1%.

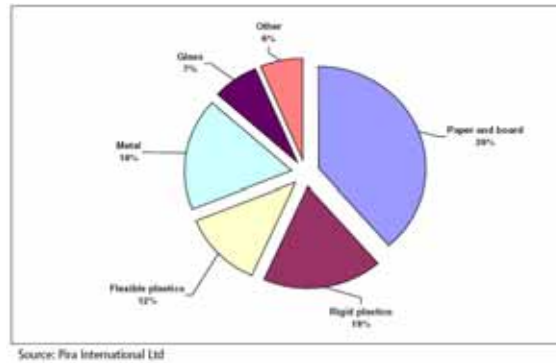
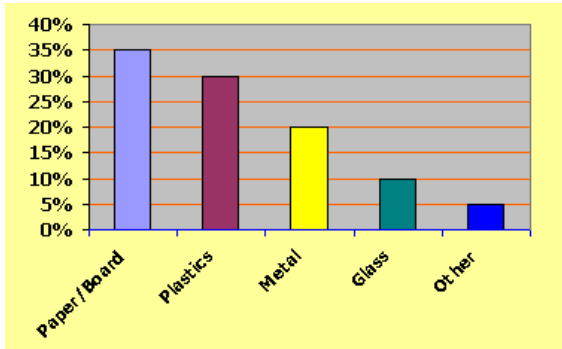
Composite and Aseptics

The Hyder Contextual Review of the NPC identifies that the consumption of composite packaging (excluding liquid paperboard) may be in the order of 20,000 tonnes per year or more (IDAS 2007), and that virtually none of this material is currently recycled. Other estimates place this higher, with the packaging Council estimating that 'other' packaging materials (composites, aseptics and LPB) etc. represents around 5% of all packaging, or approx. 215,000 tonnes per annum (of which approx. 90,100 tonnes of which is LPB).

The Packaging Council of Australia and World Packaging Council assessments regarding the 'market shares' of different packaging materials:

In June 2005 the Packaging Council of Australia (PCA) 'Packaging Issues & Trends' report identified the following breakdown of the different market share of Australian packaging by materials type. This estimate is broadly consistent with global calculations made by Pira and the World Packaging Organization. Given that industry, government and reviewers are now all confident that paper and cardboard packaging information is broadly accurate it would suggest that:

- Plastics consumption is dramatically understated and is likely that plastic's consumption is being understated by as much some 600,000 tonnes per annum
- That other packaging materials, wood, cloth, aseptics and composites are likely to represent around 5% of consumption or an additional 215,000 tonnes of non-recyclable materials.



Other consumption figures

Very few of the major producers of packaging publish changes in overall tonnes of packaging produced and sold each year. Visy Industries do provide this information via their annual sustainability reports. Based on these reports Visy produced some 735,500 tonnes of packaging product in the 2002/03 year. The annual 2007 Sustainability Report showed some 846,500 tonnes of packaging indicating a 15.09% growth in materials consumption to produce packaging (nett of any gains for light weighting etc.). While some of this could be attributed to increased market share, this number brings into question the relatively stagnant packaging consumption growth claimed in NPCC data (3.54% cumulative growth over a 4 year period). This gives an increased basis for questioning the data for consumption of packaging.

Test 7: Other trends

The Nolan ITU 'National Packaging Covenant Structural Barriers Investigation' identifies barriers to increased packaging recycling. This report shows that the trend is for more packaging to be produced and it will be more difficult to recover these materials for more recycling:

Section 4.2 on page 11: *It is acknowledged within industry that many brands are making packaging changes to boost sales growth and margins without assessment and alignment with recycling systems. The net impact of this will be more packaging with less recycled.*

Section 4.6 on page 14: *With a level of uncertainty about the scale of packaging imported, it is difficult to identify the true level of packaging recovery and disposal. Overall the level of import and export means Australia is a net importer of packaging and this can create a market imbalance.*

Section 6.8 on page 26: *The cost of recyclables collection and sorting is a combination of local government (ratepayer) contributions and the residual value of the recyclables when sorted. The value of most recyclables has been stable over the past five years but does not represent a large component of the overall cost of the service. The rising cost of labour, vehicle running costs and disposal of sorting residuals has led to an increased per household service cost. This is particularly the case in regional areas where the economies of scale in sorting are not as favourable.*

Conclusions:

1. Packaging consumption is significantly understated particularly in terms of plastics, glass, and overall consumption.
2. There are significant volumes of packaging materials that have been excluded from the NPCC calculations of packaging consumption where there is virtually no recycling activity (composites, liquid paperboard).
3. While most figures on the total number of tonnes recycled are solid, there are significant exaggerations in the plastics recycling figures presented by the NPCC.

5. Proposed adjustments to the data reported

Based on the research outlined above there are significant adjustments that should be made to ensure that the recycling performance of packaging is not exaggerated.

5.1 Paper and cardboard packaging

The data concerning paper and cardboard consumption represents a fairly accurate picture of Australian domestic production and growth in consumption from 2003 – 2007. It is reasonably consistent with GDP growth and other key indicators of consumption growth, which we have used to 'test' against reported growth (or shrinkage in some instances) in the total consumption of packaging.

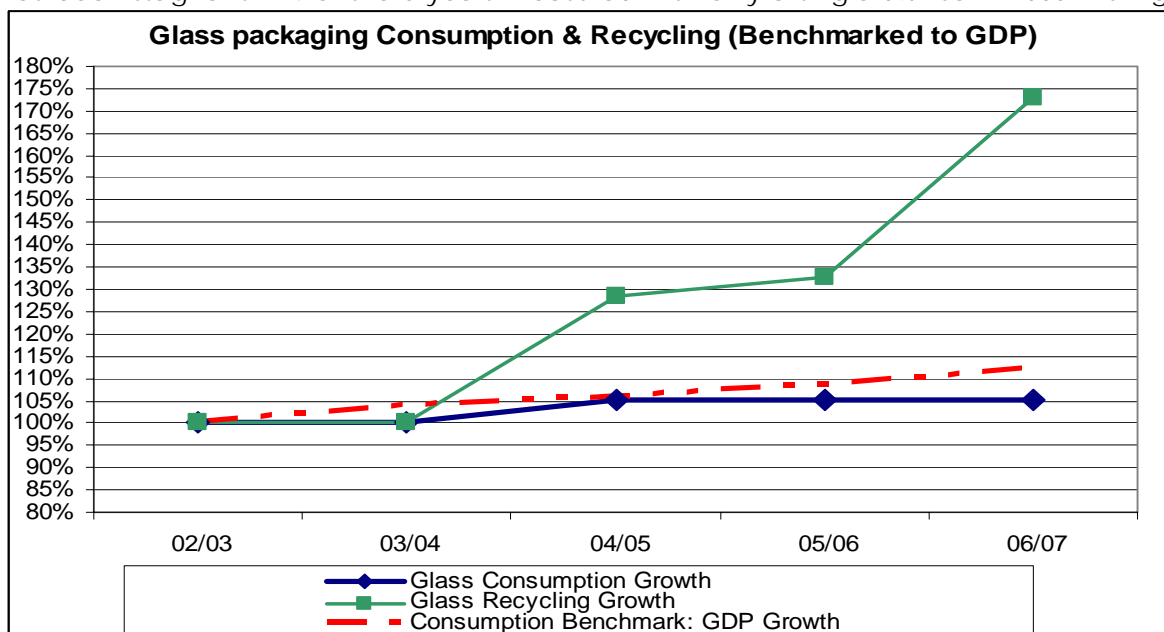
There are some questions regarding packaging of imported finished goods with the Hyder Consulting report for DECC entitled 'Preliminary Imported Packaging Quantification' (2006) identifying over 9,000 tonnes of cardboard that is not included in current reporting from just 4 sections of imported goods. There are also substantial quantities of cardboard packaging imported with finished goods such as white goods (refrigerators, washing machines, dishwashers, dryers); electronics (computers, mobile phones, microwave ovens, toasters, blenders, food processors); soft and hard furnishings (where IKEA alone imports a massive amount of finished product pre-packaged in cardboard). Subsequent revisions by Industry Edge have seen an estimated 1.270million tonnes of import paper and cardboard materials added to domestic consumption and we are satisfied that Industry Edge have produced the most reliable data possible within current circumstances.

While there remains some question regarding the differences in recovery of resources versus the actual recycling, we accept the claimed level of recycling and the rigour around investigations by Industry Edge and Pitcher Partners.

5.2 Glass

The picture painted in the NPCC data on glass packaging and consumption and recycling is difficult to accept. The market for recycled glass is the least viable recycling market in Australia. On closer investigation the following becomes apparent.

First, glass consumption rates have been a subject of much contention, with the original NPCIA consultant MS2 including New Zealand recycling collection in past data. While this has been adjusted there is a need to remain sceptical regarding claimed consumption. The chart below shows industry's claimed growth in consumption and recycling benchmarked against GDP growth. This chart exposes that industry figures for consumption are of poor quality with claims consumption has been stagnant in 4 of the 5 years measured with only a single 5% rise in 2005. During a similar



period Australia's GDP grew by 12%, significantly higher than the numbers claimed. Either the industry has been locked into a 5 year downturn or consumption numbers are underestimated.

Second, it is now well established glass is one of the areas where significant amounts of finished packaging arrives with imported goods (and is subsequently not included in consumption estimates). Significant glass imports include imported beer and wine, imported 'boutique' speciality foods such as olive oil. The Hyder Report (2006) on finished goods packaging identified an additional 50,570 tonnes of glass packaging imported from 3 sectors (beer, cooking oil, cosmetics). Once again there are substantial volumes of glass materials over and above these 4 categories including: beverages (sports and health drinks, boutique sparkling and still minerals waters); boutique foods (olives, antipasto, garnishes, sauces, pastes); and of course wine. As above we have added back almost double the Hyder estimate to reflect a more accurate picture of consumption (i.e. 96,000 tonnes). This remains significantly below the PCA's estimates of the market share of packaging that is glass.

To this end we have adjusted the consumption figures for glass packaging to reflect a conservative but more realistic figure, as follows:

Industry claimed level of consumption: 893,031 tonnes

Increase consumption by 5% (over 5 years): 96,000 tonnes
(reflecting difference between claimed industry growth of 5% and an arbitrary assumption that growth = at least 75% of GDP growth)

Increase consumption by 5% (over 5 years): 96,000 tonnes
(reflecting a conservative 5% nett difference between imported finished goods and exports)

Revised glass consumption in 2007 = 1,015,821 tonnes

NB: *These concerns are reflected by Pitcher Partners who were commissioned by the NPCC to rate the data reporting and expressed low confidence levels in glass consumption figures (scoring 1 – 2 out of 6) for the periods from 2003/04 – 2006-07.*

We remain sceptical of the claimed growth in glass recycling, particularly in 2005 and 2007 where reasons are not advanced for recycling increasing by 30% and 40% respectively in a single year. The market conditions test showed that the real value of glass recyclate had declined by some 11% over the past 3 years and some limited reduction in reprocessing infrastructure, which would in most circumstances indicate a significant weakening of materials reprocessed, (we would expect to see a fall in materials recovered by some 10% in these market conditions), yet industry data asks government and the community to accept that recovery gas actually improved by some 75%. However, given that there is no source information available to adjust these claims we will accept the current recycling figures. Notwithstanding this we would also note the Pitcher Partners rating of the data is very low with a '0' confidence rating, reinforcing our concerns.

We have made an adjustment to recycling based on identified stockpiles of glass collected for recycling and not sold to market (i.e. stockpiled), particularly in Western Australia. Therefore:

Industry claimed level of glass recycling: 410,700 tonnes

Less adjustment for pre-industrial recycling above: 15,000 tonnes

Revised glass recycling in 2007 = 395,700 tonnes

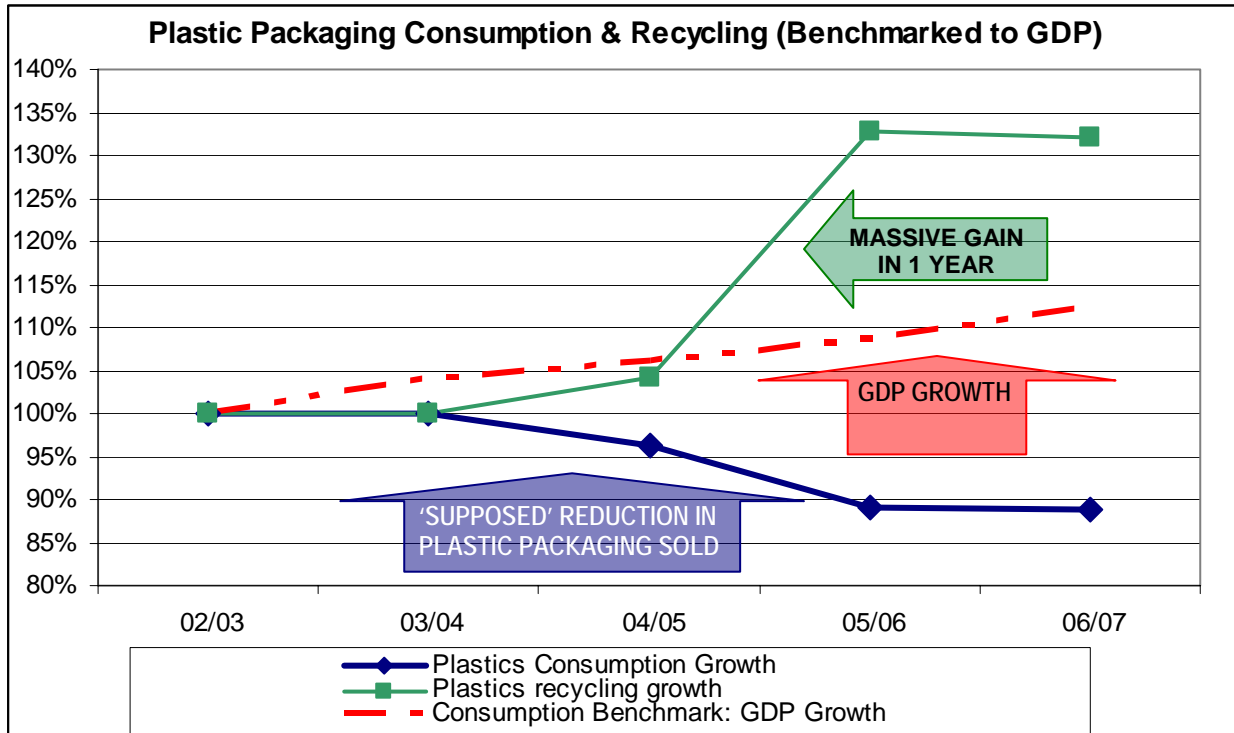
5.3 Plastics

Plastics is another area where a number of the claimed figures provided by industry need to be viewed with scepticism. In the first instance, PACIA reports significant reduction in plastics consumption.

This is most unlikely with many in the industry (and international trends) highlighting that plastics are the fastest growing sector of the packaging industry; and that the supposed reductions in consumption are in stark contrast when compared to economic growth (real GDP). See chart overleaf).

Doubts over the claimed plastics packaging consumption are further enhanced by our investigation into individual company growth or increasing levels of manufacturing. For example in 2004/05 Visy Industries produced 64,000 tonnes of PET bottles while in 2007/08 they produced 71,000 tonnes of the same product - an average growth in PET production of 9.9%. While this does not provide empirical evidence of overall plastics packaging consumption, it does support the argument that consumption is understated.

It is clear that industry figures for consumption of plastics (like glass packaging) are of poor quality, and that claiming negative growth in plastic packaging consumption is hard to accept.



Plastic packaging is another area where significant amounts of packaging arrives with finished imported goods (and is subsequently not included in consumption estimates). Significant plastic packaging on imports includes wrapping and blister packing on electronics, hardware etc, sports and 'new age' beverages are significant, as are products packaged to be 'shelf ready' particularly grocery goods imported from South East Asia. The 2006 Hyder report quoted above does not address many of the major sectors where this additional consumption is most likely; and to this end we have added 5% to plastics consumption.

Finally based on PCA and World Packaging Council estimates this revised level of consumption is likely to still be significantly understated.

To this end we have adjusted the consumption figures below to reflect a conservative but more realistic figure, for plastics packaging as follows:

Industry claimed level of consumption in 2002/03: 651,912 tonnes

Remove suggested reductions in packaging 2003-2007: 54,890 tonnes

Increase consumption to reflect 75% of GDP growth: 52,153 tonnes
(reflecting 8% growth over a 5 year period (or 75% of GDP growth))

Increase consumption by 5% (spread across 5 years): 32,597 tonnes
(reflecting a conservative 5% nett difference between imported finished goods over & exports)

Revised plastic consumption in 2007 = 791,552 tonnes

NB: *These concerns are reflected by Pitcher Partners who were commissioned by the NPCC to rate the data and expressed low confidence levels in plastics consumption figures (scoring 0 out of 6) for the periods from 2002/03 – 2006/07.*

There are also concerns regarding plastic recycling claims. In particular that it has been revealed that the source data includes pre-consumer recycling which is not included in other sectors. This data should not be included in measurements of recycling rates and was well established in the 1980's and 1990's where a number of producers of tissue and toilet paper products were exposed for claiming their products were made from recycled material, when in fact it was pre-consumer recovery. Further, it is illogical to include pre-consumer material when it is not yet even a product, in fact the benefit of using pre-consumer recycle is already counted as it leads to reduced volumes of resin used (reducing the consumption calculation) and as such if it is also included in recycling it is actually double counting the benefit.

While the PACIA report does not break down the separate sources of recycling for plastics packaging, it does do so for overall plastics recycling where some 30% or approx. 80,000 tonnes of total claimed recycling is identified as pre-consumer recycling.

We would consider it excessive to reduce the recovery of plastic packaging by this level as the predominant plastics recycling activity i.e. PET has lower levels of pre-consumer recycling. To this end we have calculated that:

- 54% of HDPE production is for packaging and there is 12,000 tonnes of pre-consumer recycling – reducing overall plastics packaging recycling by 6,500 tonnes
- 67% of LDPE production is for packaging and there is 7,500 tonnes of pre-consumer recycling – reducing overall plastics packaging recycling by 5,000 tonnes
- 31% of Polypropylene production is for packaging and there is 15,000 tonnes of pre-industrial recycling – reducing overall plastics recycling by 4,500 tonnes.

Therefore:

Industry claimed level of plastics recycling: 178,351 tonnes

Less adjustment for pre-industrial recycling above: 16,000 tonnes

Revised plastic recycling in 2007 = 162,351 tonnes

5.4 Steel cans

Data about steel can consumption seems arbitrary and appears to have been using 2004/05 data for 3 consecutive years. Accordingly we have adjusted consumption figures to reflect a growth rate to the equivalent of 75% of GDP (6.4%) to reflect population and overall consumption growth:

Industry claimed consumption: 92,399 tonnes

Plus 4.8% adjustment for growth from 2004/05: 4,435 tonnes

Revised steel consumption in 2007 = 96,834 tonnes

Typical consumption data used for this product type is based on steel cans and there are significant volumes of packaging such as large drums (20 litre+) that are not included in this assessment. While this sort of focus for recycling is important and a significant area of the industry missed by the NPCC it has not been included in any of the data sets and as such no attempt to adjust for these figures has been made in this section.

Steel can recycling has also reported the same tonnages as those reported in 2004/05; and since there is no source of information available to correct the information and as such we have not attempted to do same.

5.5 Aluminium cans

Aluminium cans data overall seems consistent, reliable and credible for both consumption and recycling as such we believe it forms the best available information available and accept same.

5.6 Other packaging

Liquid Paper Board (LPB) is not included (with Consultant Robert Eastmann arguing that LPB is not technically defined as packaging internationally; but items such as milk cartons etc. are clearly packaging and meets the definitions of consumer packaging within the NPC MkII) in consumption figures. To this end we have added an estimated 90,000 tonnes of LPB consumption into a separate group, with an estimated 10,000 tonnes of recycling activity.

A number of sources noted above confirm that other packaging such as composites, timber, aseptics etc represent around 5% of consumption.¹⁵ This represents around 215,000 tonnes of materials consumed for basically no recycling return. Therefore:

Add at least 215,000 tonnes of other packaging comprising:

90,000 tonnes of LPB

125,000 of other packaging materials

Add 10,000 tonnes of LPB recycling

¹⁵ Australian Packaging Issues & Trends – Packaging Council of Australia 2005. Market Statistics and Trends in Global Packaging Production – World Packaging Organisation 2008.

6. The revised 2006-07 Recycling Performance of the NPC

Validity Tests	All Pack'g	Paper, etc	Glass	Plastics	Alumin	Steel	LPB	Other Pack'g
Claimed '07 Packaging Consumption	4,258,517	2,639,000	893,031	585,296	48,791	92,399	0	0
Claimed '07 Packaging Recycling	2,378,111	1,720,000	410,700	178,351	34,300	34,760	0	0
Claimed '07 Recycling %	56%	65%	46%	31%	70%	38%	0	0
Adjustment: NPC consumption changes tracking GDP Growth	+152,588	0	+96,000	+107,043	0	+4,435	0	0
Adjustment: NPC consumption to include a conservative estimate of packaging on imported finished goods	+146,597	0	+96,000	+32,597	0	0	0	0
Adjustment: Add packaging materials not considered	+200,000	0	0	0	0	0	+90,000	+125,000
Adjustment: Include recycling of materials previously not considered	0	0	0	0	0	0	+10,000	0
Adjustment; Subtract pre-consumer recyclate and stockpiles from calculations	-31,000	0	-15,000 ^a	-16,000	0	0	0	0
REVISED CONSUMPTION	4,875,763	2,639,000	1,085,031	791,552	48,791	96,389	90,000	125,000
REVISED RECYCLING	2,357,111	1,720,000	395,700	162,351	34,300	34,760	10,000	0
CLAIMED NPC RECYCLING RATE	56%	65%	46%	31%	70%	38%		
REVISED RECYCLING %	48.34%	65.17%	36.47%	20.5%	70.3%	36.1%	11.1%	0%
(2010 Target)	65%	70-80%	50-60%	30-35%	70-75%	60-65%	25%	25%

Shaded red denotes consumption; Shaded green denotes recycling

"a" – denotes adjustments in tonnages identified in stockpiles but not recycled

Other Targets

Target 2 - Non-Recyclable Packaging: We believe there are a significant number of different packaging materials that are not meeting the minimum 25% established within Target 2 of the NPC MkII (although there is a significant lack of data and there is no formal calculation provided within the NPCC reports for the mid term review):

- | | |
|------------------------------------|--|
| ▪ Composites and Aseptic packaging | No recycling activity; |
| ▪ Liquid Paper Board Cartons | 11% recycling rate; |
| ▪ LDPE and LLDPE packaging | 17.1% recycling rate (at best); |
| ▪ Plastics coded 4-7 | Recycling rates of individual materials <1% -
10.1% |

Target 3 - Maximum Allowable Packaging to Landfill: The effective cap established by the NPC was for a maximum of 2,350,891 tonnes of consumer packaging to landfill each year. Based on the adjustments suggested above, we estimate that the amount of consumer packaging to landfill is already at 2,518,652 tonnes exceeding the cap by some 167,761 tonnes or 7.1%.

7 2010 Projections

It is now accepted that the Covenant cannot claim the sole credit for advances in recycling since 2003; and it is acknowledged by the NPCC that it is hard to determine its specific contribution.¹⁶ The recycling rates are those achieved by a mix of factors not under the control of the NPC including – growth of export markets; increased local government activity through kerbside collections; imposition of waste levies; and planning strategies to locate alternative waste treatment facilities. While consumption will increase to 2010, it can also be expected that recycling will also, to a degree depending on the policies and programs deployed.

Our recalibration of the 06/07 figures has not been accompanied by a recalculation of previous years – this is beyond our resources. However it can be assumed that recycling has grown in this period (if only because of export demand for recovered materials), but not as steeply as projected by the NPCC and various consultants who have used NPCC data.

Recycling projection with NPCC projects contribution

A key argument used by the NPCC to show that its program will lift recycling to the 65% target level is the contribution from funded projects. The NPCC commissioned COVEC (2008) to assess the projects. It reported on three possible levels of tonnes recycled – from 440,000 to 396,000 to 352,000. Unfortunately it highlighted the upper figure (as 'expected') in its report as does the NPCC. There are several qualifications such as the figures are forecasts from the grant applicants; a number are trials; and projects may not meet their completion timetables. However, COVEC did not undertake any 'additionality' tests, that is – would the project have occurred anyway? We selected a cut-off contribution of 10% to test additionality. A number of large projects have about or less than 10% funding from the NPCC and jurisdictions – these include the upgrade of the Wangara MRF; glass fines recovery; and C&I recycling services for SMEs.

We have therefore used the lower figure (which may still be too high) of 352,000 tonnes. Under a scenario, when added to our 2006-07 recycling rate and assuming conservative consumption growth of 2%pa and an optimistic 3%pa growth in recycling from other factors¹⁷ – the estimated 2010 rate would be 56.5%.

(It should also be recognised that to date the funded projects from this round and the previous NPC Mkl cannot demonstrably show any significant improvement in terms of increased recycling. At best, the NPCC initiatives are keeping up with growing consumption.)

The Landfill Limit

In regard to packaging waste to landfill the 2006-07 results show an increase of 167,761 tonnes on the original baseline; a small increase on the recalculated 2003 baseline; and an increase of over 316,000 tonnes on the 'current' 04-05 rate. We have used the baseline as a specific amount of tonnes as the issue in question is landfill capacity and life, as well as resource conservation. The NPC makes it clear the baseline was intended to set the basis for assessing whether increased growth and population and subsequent tonnes of waste generation were being addressed by improved recovery and recycling systems.

Non-recyclable Packaging

It is very difficult to assess the scale of progress on non-recyclable packaging (plastics coded 4-7) and types of paper and cardboard, because data is weak and consumption is understated for the reasons outlined in previous sections. As noted by the Hyder contextual study the plastics 4-7 are 'only recovered in any scale as a low value mixed plastic product which primarily goes to export.' Further data and analysis is required before any definitive conclusions can be made.

Away from Home

This continues to be a challenge for the NPC with large amounts of beverage containers and other packaging being generated. Public space collection systems and C&I collection are still plagued

¹⁶ See Hyder (2008), 'NPC mid-term review Contextual review'; Helen Lewis (2008), 'NPC Mid-term review Executive Document'.

¹⁷ This would include projects we have not attributed to the NPCC program

by contamination problems and inadequate infrastructure. As reported by Hyder (2008) recycling rates for beverage containers are low compared to residential collection, ranging from 17% for glass, 31% for aluminium and 17% for plastic. More needs to be done and the current investigation into a national container deposit system may assist in advancing this proven system.