Revive
RECYCLING

Submission to the Senate Committee Inquiry into the Management of Australia's Waste Streams

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Authorised by

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Markus Fraval

CEO
Revive Recycling
6/42-44 Garden Boulevard, Dingley, Victoria 3172

Tel: 03 9558 0344
Fax: 03 9558 0252
Email: mbfraval@revive-recycling.com.au

KEY POINT SUMMARY

Importance of Improving Container Recycling Rates

- Rigid containers (aluminium, steel, plastics, glass and liquid paperboard) are a high-value, high impact component of the packaging and municipal waste streams, whose average environmental costs per tonne are many times those of other streams such as paper and cardboard.
- Lifecycle assessment (LCA) demonstrates that the extraction and production phases dominate the environmental impacts (and externalities) of containers. The real significance of recycling, therefore, is not avoided landfill but avoided virgin material production.
- Average net environmental cost savings of recycling are put conservatively at 8-9 cents per container (roughly 3-5 times their financial value).
- Rigid container recycling rates at ~39% are well below economically optimal levels since proven systems could be employed to double current recycling rates at marginal costs still substantially below marginal benefits.
- The high environmental impacts and corresponding high recycling benefits, alongside greater financial value, mean that containers should be treated as a priority packaging stream. Disaggregated targets by material type are important to reflect such differences and Ministers should be congratulated for their introduction in NPC II.
- NPC II targets, while a major improvement, are not yet sufficient to reflect economically optimal levels – indeed container material targets should be at least as high as paper at 70-80%. Further delays in reaching optimal levels result in further unnecessary economic losses.

Deposit Systems Are Widely Proven to Work

- Even NPC II targets, however, are unlikely to be met without adoption of container deposits. International and Australian experience shows that deposits are the **only** proven method of reaching high recycling rates (e.g. 70%+). Even assuming it will be possible with a "business as usual" approach the costs involved will be very high and no parties appear willing to bear them.
- Container deposits' proven effectiveness is based on the fact that they provide both an economic incentive to recyclers and fund a convenient collection infrastructure, helping to address the growing volume of container packaging (estimated at >50%) consumed away from home.
- Deposits are an elegant, economically efficient form of product stewardship – they address the major externalities throughout a container's lifecycle by transferring the environmental costs of not recycling to consumers who choose not to redeem their containers, which in turn funds the collection system.
- Deposit systems are widely used around the world – e.g. in Europe, the US and Canada - and their use is expanding. Deposits have also long been adopted by the beverage industry as the most efficient and effective means of reaching high return rates when such an objective is in their commercial interests – e.g. for their own refillables, or when high enough one-way targets are enforced (e.g. in Sweden)
- A deposit system is not only the most cost-effective option but it requires no funding from government. Instead it provides a ready solution to funding the necessary away-from-home infrastructure from consumers themselves, and one that is widely supported by the community.

Constantly Improving Collection Technologies Lower Deposit System Costs Well Below Kerbside

- Reverse Vending Machines (RVMs) have long provided cost efficiencies to deposit system operators overseas. They do so by automatically sorting and auditing containers, and by providing clean sorted material streams, which can be compacted at the point of collection for lower transport costs.
- Similarly RVMs provide consumers with a convenient, attractive and efficient user interface for recycling their containers and redeeming the deposits.
- Tomra alone has >50,000 RVMs installed in over 50 markets worldwide, collecting over 26 billion containers annually (= almost twice Australia's annual consumption of containers)
- The recent emergence of self-contained RVM-based centres - known as Automated Collection and Recycling Centres (ARCs) - brings the benefits of RVMs to a broader variety of collection locations, imposes no operational burden on retailers and enables the collection of a comprehensive range of containers (metal, glass, plastic and LPB).
- These centres are being rapidly adopted in Europe, the US and Japan where they are typically located in high traffic areas such as shopping centre or supermarket car parks in partnership with retailers, and make deposit redemption a convenient and highly efficient process.
- Consumers simply return their containers when doing their usual shopping trip, avoiding the need for additional travel and time. The RVMs issue dockets with barcodes that can be redeemed at partner retailers for the value of their deposits. Retailers benefit from additional customer flow through their stores, and from promotional opportunities and increased customer loyalty. Tesco, for example is rolling out 100 ARCs in the UK in conjunction with its loyalty card.
- These proven technologies, combined with appropriate system design, dramatically raise efficiencies and lower costs of deposit systems to the point where direct cost impacts on producers / importers can be avoided (systems are funded by the additional material collected and unredeemed deposits only).
- Indeed ARCs' automated sorting, auditing and compaction contribute to the ability of deposit systems to operate at costs that are at least 30% lower than kerbside per tonne of recycled material.
- Meanwhile the convenience of ARCs – in terms of location and extended operational hours – combined with the incentive of a deposit is the key to rapidly doubling current container recycling rates (to approx. 80%)

Deposits Complement and Support Kerbside and Other Recycling Programs

- Deposits complement kerbside by addressing its key weakness (away-from-home recycling) and by substantially reducing the problems it faces from glass contamination and breakage
- It is a fallacy that deposits undermine kerbside financials – in fact they subsidise and support kerbside systems – raising revenues, lowering costs and providing greater stability
- A container deposit system is entirely consistent with all major waste management trends – e.g. the increase in Product Stewardship and EPR schemes and the move towards AWT[1]. Moreover it provides the basis for wider waste management reform by generating an infrastructure that can be harnessed for the collection and resource recovery of other priority waste streams

[1] Alternative Waste Treatment

Recommendations

- Revive Recycling strongly supports the introduction of a national deposit system and Senator Fielding's "Drink Container Recycling Bill 2008". Indeed it stands ready, along with its partner Tomra Systems, to work with the State and Federal Governments to assist with the design and operation of a system.
- The EPHC is to be congratulated on its initiative to conduct an investigation into a national container deposit scheme and to consider it as part of the mid-term review of the National Packaging Covenant (NPC II) later this year.
- National implementation could occur either through voluntary introduction by industry backed up by higher binding targets (as in Sweden for instance), or via legislation, but should not be delayed past 2008, particularly when the benefits of a deposit system are so clearly greater than the benefits of current approaches.
- Likewise the WA government is to be congratulated for its stated intention to introduce a state-level deposit system, and it is suggested that this be used in advance of a national system as a model for national roll-out.
- Revive recommends that the Senate Committee investigate the technology options that can transform the debate over container deposits and facilitate a low-cost system, which is attractive and convenient to consumers and results in very high recycling rates. Revive would like to request the opportunity to make a presentation on these technology options as part of the Senate Committee hearings.

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- Executive Summary - Businesses and Environmentalists Allied for Recycling (BEAR) 2002, "Understanding Beverage Container Recycling: A Value Chain Assessment prepared for the Multi-Stakeholder Recovery Project"
- Section 3.6.1 – (Distribution impacts on) Kerbside Recycling and Local Government - Institute for Sustainable Futures (ISF) 2001, "Independent Review of Container Deposit Legislation in New South Wales", prepared for Hon Bob Debus MP, Minister for the Environment, Sydney
- Tomra brochure on Automated Collection and Recycling Centres: "Automated Recycling Solutions – a new approach to recycling for consumers"

GLOSSARY

ARC	Automated Collection and Recycling Centre
AWT	Alternative Waste Treatment
CDL	Container Deposit Legislation
C&D	Construction and Demolition
C&I	Commercial and Industrial
EPHC	Environment Protection and Heritage Council
EPR	Extended Producer Responsibility
LCA	Lifecycle Assessment
LPB	Liquid Paperboard
MBI	Market Based Instrument
MRF	Materials Recovery Facility
NPC	National Packaging Covenant
RVM	Reverse Vending Machine

1. Introduction

Revive Recycling provides collection and sorting solutions, including technology and systems design, for the recycling of used packaging containers. Revive emerged out of Rofin Australia, a recent Australian Exports Award winner and a technology company with over 10 years experience providing sorting solutions to the recycling industry. Revive's senior management background includes extensive experience in the recycling market in Australia and overseas, including in kerbside sorting technology solutions, and in the beverage industry. It includes consulting work to the UN-based Zero Emissions Research Initiative, generating new approaches to the problems of "waste" by converting them to "resources" through the application of technology and more effective system design.

Through this experience Revive's founder and CEO recognized the potential of automated collection systems such as RVMs to contribute to efficient, consumer-focused EPR programmes that can help society advance significantly down the road towards Zero Waste. Revive is the exclusive distributor and operations partner of Tomra Systems, a leading international supplier of recycling technology and solutions and manufacturer of Reverse Vending Machines (RVMs), and has developed a detailed knowledge of international recycling systems for packaging - in particular deposit systems - and how they operate around the world.

This submission paper focuses on systems to recover rigid post-consumer containers (aluminium, plastics, glass, steel and liquid paperboard). It considers these in the wider context of packaging and municipal waste streams and current systems being employed to address these. It argues that the implementation of effective Product Stewardship (or Extended Producer Responsibility (EPR)[2]) schemes and Market Based Instruments (MBIs)[3] such as container deposit systems are proven to create significantly better outcomes – both from an economic and environmental perspective – particularly when considered from a whole-of-community basis. Moreover, it outlines proven technologies which, in conjunction with appropriate system design, can address the concerns of some packaging and beverage companies by enabling such systems – either voluntary or legislated – to be introduced and operated with minimal funding required from industry.

In light of the WA government's stated intention to introduce some form of container deposit legislation (CDL) Revive believes it is in all stakeholders' interests to support a cost-effective form of deposit system for national implementation in order to ensure a harmonized national system. This submission argues that options exist that would provide manufacturers / importers with significant benefits.

Finally it argues that such systems, and the infrastructure they fund, can then form the backbone of similar systems for a range of other problematic wastes – municipal, commercial and light industrial - ensuring the conversion of wastes into resources in a way that is both economically and environmentally beneficial and also financially cost-effective.

[2] EPR refers to systems in which the costs and responsibilities of dealing with products post-consumption, including as far as possible their environmental externalities, are borne by producers and ultimately consumers. Product Stewardship is similar in principle but generally applied to systems in which costs and responsibilities are shared between stakeholders throughout the product lifecycle.

[3] Mechanisms that harness the power of the market, or create the necessary market conditions, to reach optimal "waste" management outcomes.

2. Background

Of the estimated 16 billion rigid containers - aluminium, plastic, glass, steel and liquid paperboard (LPB) - produced and consumed every year in Australia, 61% (~10 billion containers or >800,000 tonnes) go to waste[4]. This represents not only a large environmental burden in terms of end-of-life issues (landfill and litter), but more significantly results in high environmental impacts through unnecessary extra virgin material production and the lost opportunity to offset these impacts through recycling. Additionally, if recovered for sale at present material values[5] this volume translates into $100-130 million in lost material value.

2.1 The Importance of Recycling in Container Lifecycles

The production of containers imposes an array of environmental burdens from natural resource consumption (energy and material usage) and solid wastes, to water and airborne pollutants including greenhouse gases. The production stage dominates the environmental impacts in the lifecycle of most containers[6]. Such impacts can be significantly reduced if the container is recycled such that additional virgin material production is averted. For instance, recycling averts the majority of costly airborne pollutants in container production, and avoids 93% of the energy required to produce aluminium ingots, and 76-80% of the embedded energy in the common plastic granulates[7]. Thus while recycling is just one component of a container's lifecycle it is one that, excluding impractical reductions in container weight, a radical shift in choices of materials, or the re-use of containers which is no longer considered a practical option in Australia, has by far the most impact on overall environmental burden.

Such burdens can be quantified and assigned an economic value, for instance as in the Independent Assessment of Kerbside Recycling in Australia (Nolan-ITU et al, 2001). While essential if one is to make decisions on a net cost/benefit basis, attributing dollar figures to environmental and social benefits is difficult and subject to value judgements. In general such costs are underestimated by excluding those which are not readily converted into monetary units (in the above-mentioned report, for instance, all litter costs were viewed as 'social costs' and excluded from any quantification and hence from the cost/benefit analysis). In addition, by focusing on value to the current generation, this process of assigning economic values to environmental benefits and costs tends to overlook or undervalue impacts on future generations, ignoring the important principles of sustainability and intergenerational equity.[8]

2.2 Containers as a Priority Waste Stream and the Case for Disaggregated Targets

The lifecycle environmental costs of different materials and packaging types vary widely, which is why it is important to set material specific targets, rather than purely aggregated ones. Largely due to the high environmental impacts within the production phase, the net benefits of recycling

[4] Revive estimates based on Martin Stewardship & Management Strategies and New Resource Solutions 2005, "National Packaging Covenant Gap Analysis" and industry estimates of average container weights and material breakdowns.
[5] Not unrealistic since Australia's supply is small relative to the international markets for most container materials, and in many cases existing recycling facilities are operating at significant undercapacity and others can be reopened.
[6] Grant et al, 2001, Life Cycle Assessment for Paper and Packaging Waste Management Scenarios in Victoria
[7] Grant et al, 2001, Life Cycle Assessment for Paper and Packaging Waste Management Scenarios in Victoria
[8] Alternative techniques such as multi-criteria analysis based on community values are becoming more widely used as a result.

rigid containers can be many times that of recycling other common materials such as paper / cardboard. Recycling one kilogram of Aluminium, for example, saves over 70 times (7000% of) the embodied energy of recycling one kilogram of corrugated board, over 15 times (1500%) the greenhouse emissions and over eight times (800%) the smog precursors. Recycling PET and HDPE save around 20 times (2000%) the embodied energy of recycling paper/cardboard, and over 70 times (7000%) and 280 times (28000%) the smog precursors respectively.[9]

Disaggregated targets allow a more accurate and hence more economically efficient correlation of targets with the environmental net benefits of recycling and Ministers should be congratulated for their inclusion in the NPC II. Nevertheless existing container material targets are well below optimal levels and should be increased at least to match those of paper/cardboard packaging (70-80%). The targets proposed in Senator Fielding's "Drink Container Recycling Bill 2008" – 75% within 2 years, and 80% within 5 years – are a major step in the right direction.

Of the municipal waste stream, rigid containers (plastic, glass, aluminium, steel, and paperboard), are more significant in volume than in weight (incurring an inflated burden on kerbside collection costs for instance), and have a disproportionate environmental and economic significance. They represent a resource-rich stream with high embedded energy and relatively high environmental impacts, as well as long lifetimes in the waste or litter streams. Moreover their recovery for recycling (in preference to landfill or energy recovery) enables significant avoided impacts and their ability to be sorted into homogenous streams means they are easily recycled and can attract significant financial value. In other words they are a "low hanging fruit". Finally there are proven, established mechanisms for the cost-effective collection and sorting of containers. These factors taken together mean that rigid containers should be treated as a priority municipal waste stream.

2.3 Market Failures

At present there are clear market failures in the management of post-consumer containers (and other "waste" streams) that have the effect of keeping recycling rates at suboptimal, low levels. The following are examples:

1) Costs of end-of-life disposal (including recycling, landfill) are shifted from producers and consumers to local governments and rate payers. As a result there is no price signal included in the price of goods to take such costs into account and affect purchase decisions. Moreover recycling is then subject to the limited budgets of local government.[10] EPR schemes, in which producers (and ultimately consumers) take responsibility for such costs, are designed to address such externalities.[11]

2) Likewise the costs of littering – for example environmental impacts on wildlife and waterways, safety issues from broken glass, visual amenity and effects on tourism and

[9] Grant et al, 2001, Life Cycle Assessment for Paper and Packaging Waste Management Scenarios in Victoria
[10] Although the National Packaging Covenant is framed in terms of a "Product Stewardship" approach, in practice industry contributions towards recycling costs is negligible – just 3% or less of the kerbside recycling costs and this ignores kerbside waste collection, landfill and litter collection costs.
[11] Note that examples of EPR exist for kerbside also. In European "green dot" schemes for example producers bear up to 100% of the costs of kerbside and drop-off systems; while in Canada, Quebec has instituted legislation in which the net costs of kerbside will be funded up to 50% by the brand owners of packaging materials. However such systems tend to have far lower recovery rates and do not address the environmental externalities through the entire product lifecycle and so do not achieve optimal outcomes. Those that achieve high recovery targets, e.g. the green dot scheme used in Germany prior to the introduction of deposits on one-way containers, are prohibitively expensive.

community perceptions – are not borne by consumers, but society at large and by local governments in expensive clean up operations.

3) Many environmental costs of extraction and production are excluded from the cost of the end product since they are not a financial cost to producers, but are borne by society as a whole. These include emissions to air and water, as well as solid waste disposal and material and energy consumption that are not carried out on a full-cost basis. The result is that the benefits of recycling, in terms of avoided resource consumption and emissions etc., are similarly under-priced and this tends to subsidise prices of virgin materials relative to recycled ones, thereby discouraging recycling.

2.4 Full Cost Accounting Demonstrates the Case for Increased Recycling

The economic / environmental benefits of recycling have been clearly demonstrated to outweigh substantially the costs of recovery.

The Independent Assessment of Kerbside Recycling in Australia (Nolan-ITU et al 2001), for example, performed an integrated economic and environmental cost benefit assessment, using an environmental economics approach based on lifecycle assessment (LCA) to address some of the environmental externalities. Despite the fact that kerbside recycling is a relatively expensive form of recovery mechanism for containers (see Section 3.3 below), it found that the net environmental benefits (in dollar terms, based on "conservative valuation data") outweighed net financial costs of the kerbside system by 2.6 : 1 ($68 vs. $26 per household).

The study used a functional unit of the average quantity (kg) of recyclables placed out on a household's kerbside each week in Melbourne. As such the study included paper / cardboard as well as container materials and so is cited here as an indication not a definitive assessment for containers alone (while the environmental benefits per kg are higher on average for containers than for paper, the net kerbside costs are also higher due to high relative collection and sorting costs of containers).

A key finding was that recycling credits from avoided product (the use of recycled material to avoid production of new materials) dominates the environmental benefits of recycling such that **"recycling yields are the single most important factor in the environmental performance of the system"**.

Similar outcomes were found in the Independent Review of CDL in NSW (ISF 2001), which found that **the environmental cost of disposing an average container to landfill instead of recycling it is 8-9 cents per container.** According to a net benefits approach an optimal solution would be one where the marginal benefit from recycling one container matches the marginal costs on a whole of society basis. In other words it is worth spending up to 8-9 cents above the cost of landfill to recycle each container, and recovery should be increased up until the point where marginal costs reach this level in order to maximize economic utility.

As can be seen from Section 3.3, the costs associated with a deposit system, or even kerbside, are nowhere near this level[12]. In fact costs could rise many times over before they would outweigh

[12] The costs presented in Section 3.3 are *average* costs. However, the fact that it is possible to raise recovery from ~40% (kerbside + public place + C&I levels) to ~80% (deposit + kerbside levels) at comparable average costs underlines the fact that marginal costs of a deposit system at our present recovery levels are well below marginal

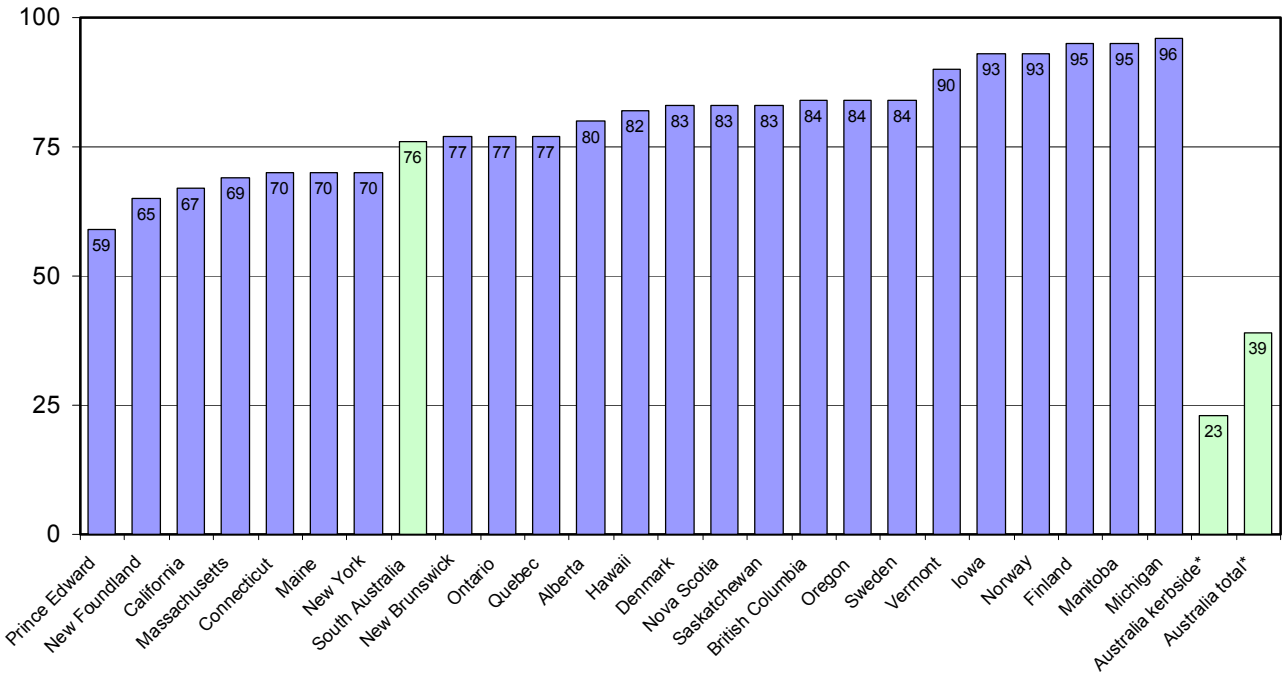
the benefits of recycling. **With such a large level of differential between marginal benefits and costs, Australian recycling is clearly well below optimum levels.**

This is accentuated by the fact that many deposit systems in South Australia and overseas can demonstrate recovery levels more than twice those presently achieved in Australia as a whole (see Fig 1 below) at comparable or lower financial costs per unit or tonne. This implies that very serious efforts should be taken to increase Australia's container recovery rates and that the introduction of container deposits should be considered immediately to prevent further continued unnecessary economic and environmental costs.

2.5 Container Recycling Rates: Australia vs. One-way Deposit Systems

Australia's container recovery rates – total and those collected through kerbside – are shown in the graph below and compared with the recovery rates of one-way deposit systems operating in South Australia and internationally.

Fig 1: Comparison of Deposit System Collection Rates for One-way Containers (%)



Notes:

- Australian total recycling rate includes South Australia figures and so is higher than it would otherwise be.
- Deposit figures based on data collected from system operators (2002 or more recent if available)
- Australian kerbside and total figures based on NPC Gap Analysis data[13] for container materials, boosted by reducing consumption figures to reflect containers only (using Revive estimates) and maintaining recycling figures (to reflect that most packaging recycling for these materials is of containers).

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benefits. On the other hand, marginal costs of kerbside could be expected to rise rapidly as recovery rates increase from current levels due to the fact that it is not suited for the approx. 50% of beverages consumed away from home.

[13] Martin Stewardship & Management Strategies and New Resource Solutions 2005, "National Packaging Covenant Gap Analysis", National Packaging Covenant Industry Association

It is sometimes noted that Australia's total packaging recycling rates are not far short of those in Europe (48% in Australia[14] vs. 55% recycling and 68% recovery in Europe[15]). However this is a somewhat artificial argument since rates vary enormously from one European country to another with low recycling rates in, for example, Spain, Ireland, Portugal and the UK averaging down very high rates achieved in Germany, Austria, Belgium and Scandinavia[16]. The obvious question is whether Australia is content with a below average rate, or does it aim to achieve best practice in environmental outcomes and economic efficiency?

Moreover the comparison is not a valid one since Europe's recycling and recovery rates exclude the recovery of reusable packaging, which for instance forms a high proportion of beverage container packaging (e.g. >50% of all beer containers and >30% of all soft drink containers consumed in Western Europe[17]). The very high collection rates (e.g. 97 to 99.8%[18]) achieved for these containers is effectively ignored, which downgrades Europe's true level of resource capture and makes the overall comparison misleading.

Finally Australia's total packaging recycling rates are propped up by the fact that Australia achieves one of the highest rates of paper and cardboard packaging recovery in the world as a result of its well-developed kerbside system. Such materials are well suited to kerbside since there is little public place consumption and away-from-home consumption is highly concentrated. Paper and Cardboard packaging represents 49% of the weight of packaging produced, but 72% of the weight of packaging recycled[19]. Australia's rates for aluminium, plastics, steel and glass however are far poorer: they represent 51% of packaging production but just 28% of recovery.

Just because paper/card rates are high does not mean that Australia should be content with severely sub-optimal rates for other materials, particularly when total environmental costs of the latter are disproportionately high.

2.6 Adoption of Deposits Accelerating as Part of Complimentary Suite of Approaches

Container deposits are an effective, efficient and proven mechanism for recycling containers. Indeed they are the method of choice for the beverage industry when high recovery rates are unambiguously in their commercial interest – such as for the return of refillable containers, or when high targets are mandated (e.g. Sweden) or driven by tax incentives (e.g. Norway).

Deposits are used widely around the world, and are part of the growing trend towards producer responsibility and product stewardship. Internationally, the introduction of deposit systems for one-way containers has accelerated in recent years (deposits have been introduced in Finland, Canada, Norway, Israel, Denmark, Germany, Estonia and Hawaii in the last 10 years) as broader recycling and sustainability benefits are accounted for in addition to the benefits of decreased litter.

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[14] National Packaging Covenant – 15 July 2005 to 30 June 2010
[15] EU packaging data 2003 - http://europa.eu.int/comm/environment/waste/packaging_index.htm; accessed 22 February 2006
[16] For example see Nolan-ITU 2002, "Recycling – How Does Australia Compare?" (sponsored by Visy Recycling)
[17] Ecolas-PIRA 2005, "Study on the Implementation of Directive 94/62/EC on Packaging and Packaging Waste and Options to Strengthen Prevention and Re-use of Packaging"
[18] Ecolas-PIRA 2005, "Study on the Implementation of Directive 94/62/EC on Packaging and Packaging Waste and Options to Strengthen Prevention and Re-use of Packaging"
[19] Martin Stewardship & Management Strategies and New Resource Solutions 2005, "National Packaging Covenant Gap Analysis", National Packaging Covenant Industry Association

Deposits deal only with containers and are generally used for beverage containers - the bulk of the rigid container stream, the most likely to be consumed away-from-home and those with by far the highest turnover rate - though they are not necessarily limited to these. However the criticism that deposits deals with a narrow range of waste is somewhat disingenuous: while it may be a small percentage of the overall waste stream, it is a significant part of packaging waste (approx. 35-40% with the vast bulk of the remainder "Packaging & Industrial Paper") and is a very sizeable stream in absolute terms. It is also an important stream in terms of lifecycle environmental impacts, and in terms of financial value, the majority of which is currently wasted. Finally, as discussed below deposits have no demonstrated negative impacts on other collection schemes such as kerbside or on the collection of other materials but, conversely, helps to support the financials of kerbside collection.

Kerbside recycling itself typically deals only with rigid containers and paper / cardboard, and more recently (in many councils) garden waste, and so also deals with just a relatively small part of the overall municipal waste stream. More importantly, it should not be surprising that different schemes and approaches are required for different waste streams to optimize outcomes. Even within packaging alone, different approaches are required to reach optimum outcomes depending on material, packaging type and place of consumption.

Container deposits work well as part of a suite of systems to address a broader range of waste. Moreover it is becoming clear that such systems can be the catalyst and provide ongoing support for the formation of additional collection infrastructure for other important waste streams - underwriting part of the infrastructure costs and providing a platform for other EPR schemes (see Section 6.2 below)

Dramatic increases in recovery and hence the "supply" of recycled materials is unlikely to have negative impacts on material prices. Strong international markets exist for container materials (glass, aluminium, steel and plastics) and in many cases domestic recyclers cannot get enough (glass[20], whose recovery rate has fallen over the past few years, and PET are examples). Indeed higher recovery rates have economic flow-on benefits by opening up opportunities for further expansion of the local reprocessing industry.

2.7 Real Progress on Container Recovery Ignored by Covenant

The setting of binding recycling targets as part of NPC II is a useful means to start to compensate for the externalities described above so as to boost recycling levels, but is only a first step. Even by 2010, assuming targets are met, container recycling rates would still be far below those achieved under deposit systems. Moreover if we are serious about reaching optimum levels, targets will have to rise much further to ensure improved whole-of-society net benefits.

The NPC II packaging recycling targets, while still suboptimal, are nevertheless ambitious for current collection systems. It is widely recognized that there is limited scope for significant improvement in recycling rates from kerbside and public place alone without the support of MBIs such as deposits. Kerbside does not address the >50% of containers now estimated to be consumed away-from-home; meanwhile public place recycling activities, despite significant efforts, have been hampered by contamination problems and have failed to generate significant volumes. Without effective consumer incentives they are unlikely to do so.

[20] Though the high cost of transport relative to glass material value means that reprocessing needs to be encouraged to occur locally.

A voluntary industry-led approach and the entrenched anti-CDL philosophy of some Covenant signatories has meant that there has been an unwillingness to consider deposits or higher targets, and this in turn has meant that the Covenant has unwittingly held back container recycling rates.

There is evidence now that some major players are starting to take a lead in advocating approaches which internalize the costs of recycling and reach high enough recycling rates to counter the externalization of the real costs of not recycling. An example is Diageo's support for WA's planned introduction of container deposits, and their call for a standardised nation-wide deposit system. Nevertheless a voluntary approach (as opposed to a prescriptive one) is likely only to work if backed up by government measures (and if necessary supporting legislation) to introduce deposits and other suitable MBIs that address externalities, align industry and societal interests, and provide a level playing field with no "free riders".

3. Merits of a Deposit System

3.1 Effective Means of Addressing Externalities

Deposits are a form of MBI, and an example of effective EPR / product stewardship, that go a considerable way to address externalities and significantly increases recovery rates. A deposit is added to the purchase price (which can be viewed to represent the costs associated with externalities generated by the container's production). This deposit is returned to consumers who recycle since the act of recycling significantly offsets these externalities (the redeemed deposit represents the material value of the container *plus* the environmental benefits of recycling and avoided virgin material production).

Recyclers are refunded the deposit, and only those choosing not to recycle (or choosing to recycle outside the deposit system infrastructure) bear the cost of the deposit. In this way the price signal not only influences purchase decisions but also recycling behaviour, which in turn has a significant impact on reducing total lifecycle impacts and the externalities incurred. Deposits therefore form a simple, elegant solution that address the externalities to a considerable degree, and also provide a clear incentive to consumers to act in the broad public interest by recycling their containers.

Deposits also provide the means to fund the system. System infrastructure and operation is financed by the unredeemed deposits and sale of the additional material collected. Any shortfall, if applicable[21], is funded by product manufacturers and importers and either absorbed or passed on to consumers. As a result the costs of the system are internalized (in contrast to present financing of the kerbside system), and no external government funding is required.

Such systems are a highly targeted and effective approach for the high impact, high value container stream to ensure maximum environmental benefit via high grade recycling (as opposed to downcycling or energy recovery for instance). As such they should be viewed not as a solution to all the problems of municipal waste, but as an effective and useful adjunct to other

[21] A new system if sensibly designed and incorporating a reasonable level of automation should actually run at a surplus such that no additional funding is necessary.

broader measures including for instance landfill levies that have a broad positive effect but are of limited use in reaching optimal recovery for specific waste streams.

3.2 High Recycling Rates

As noted above deposit systems achieve very high recycling rates – up to 95% or more depending on factors such as the deposit value, and the convenience and density of return locations. The main reason for this dramatic outperformance of kerbside-only systems (or kerbside plus public place but with no incentive) is the system's success in addressing away-from-home consumption. Consumers are afforded a direct financial benefit if they retain containers they consume away-from-home in order to reclaim the deposit value later. Alternatively, if consumers choose to discard their containers others will likely take the opportunity to collect and redeem them.

Deposits provide both the *incentive to recycle* and the *means to fund a convenient collection infrastructure* (through the unredeemed deposits and revenue generated from the sale of the additional material collected) and represent the most effective solution to the problem of away-from-home recycling.

The key drivers of deposit system recovery rates are the deposit value[22] and the convenience of redemption (for modern technology-based approaches to the latter see Section 4). As the real value of any deposit erodes over time with inflation, so does its value as an incentive. For lower deposit value systems - where deposits are close to the threshold of still being an effective incentive - recovery rates tend to creep downwards as inflation erodes the incentive until the deposit is raised to keep up (just as the costs of operating any form of collection system, e.g. kerbside, will increase with inflation over time). On the other hand systems with higher deposit values generally show remarkable resilience in retaining high rates over time, even as the real value of deposits reduces with inflation. Even in South Australia, which at 5 cents has a low deposit value by international standards, recovery rates have remained around 80% for well over a decade.

In contrast, there is evidence that recovery rates of mature kerbside systems are beginning to decrease, even as access to kerbside has grown. In the US, where kerbside collection started roughly a decade before Australia, recovery rates of glass, aluminium and PET have all fallen in the last 5-6 years as consumption continues to rise[23]. In Australia, similar trends are starting to be seen in glass for instance whose recovery fell from 44%[24] in 1997 to just 30-35%[25] in 2003.

3.3 Cost-Effective

Container deposit systems are cost-effective, and can easily be designed to run more cost-effectively than kerbside systems. The only major study to explicitly compare the effectiveness and costs of recycling containers through kerbside and deposit systems is the US study by

[22] CM Consulting 2003, Evaluating the Relationship Between Refund Values and Beverage Container Recovery, Toronto
[23] Container Recycling Institute, 2003
[24] ACI Glass, 2000
[25] Martin Stewardship & Management Strategies and New Resource Solutions 2005, "National Packaging Covenant Gap Analysis", National Packaging Covenant Industry Association

Businesses and Environmentalists Allied for Recycling (BEAR) in 2002[26] (Note: most studies compare only kerbside costs per tonne of all kerbside materials, but this fails to take into account that paper/cardboard props up kerbside economics since the prices per unit volume are far higher than non-compacted containers and it is volume that determines the major collection and transport costs of kerbside). This study was jointly funded and approved by key stakeholders in the supply chain (including Coca-Cola) as well as recyclers and environmental NGOs, and was conducted by a collection of the US' top waste management consultancy firms including R W Beck, Franklin Associates, Sound Resource Management and the Tellus Institute. It is therefore widely regarded as being unbiased.

The study not only found that container deposit systems achieved the highest levels of recovery, but that they can be significantly less costly than kerbside systems. Table 1 below summarises these cost findings:

Recovery Program	Costs net of material sales (US cents / container)	Costs net of material sales and unredeemed deposits (US cents / container)
Kerbside	1.72	1.72
Traditional Deposit System – Manual (Return-to-retail; Manual handling)	2.67	1.26
Traditional Deposit System - RVM[27] (Return-to-retail; RVM handling)	1.13	(0.28)
California Redemption System (Return-to-depot; no brand sorting)	0.55	(0.42)

Table 1: Comparison of Recovery Program Costs (BEAR 2002)

As can be seen from the table above, even before inclusion of unredeemed deposits as a revenue stream, net costs of automated return-to-retail deposit systems (using RVMs) are just 66% of kerbside costs. California's return-to-depot model in which brand sorting is not required is even more cost-effective – costing a mere 32% of kerbside systems per container recycled.

The only US deposit model that is more expensive to operate than kerbside is the traditional, return-to-retail model with manual handling and full brand sorting. Moreover, even this has lower net costs than kerbside once unredeemed deposits are included as system revenues.

When unredeemed deposits are included, both RVM-based return-to-retail systems and California's return-to-depot model (the only return-to-depot model in the US) **operate at a net surplus**. This is of course something of immense significance to all levels of government in Australia, and particularly local governments, who presently struggle with the large and escalating net costs of kerbside and have no clear ability or resources to address away-from-home recycling. A copy of the BEAR report Executive Summary is therefore included as an Appendix to this submission.

Perhaps even more significantly and as discussed below (Section 4), the emerging use of RVMs in stand-alone centres provides the opportunity to combine best-practice return-to-depot models

[26] Businesses and Environmentalists Allied for Recycling (BEAR) 2002, "Understanding Beverage Container Recycling: A Value Chain Assessment prepared for the Multi-Stakeholder Recovery Project"

[27] RVMs (Reverse Vending Machines) – which operate like container vending machines in reverse - automate the process of container redemption, sorting and compaction and improve system efficiencies and costs (see Section 4 below).

with automation and generate even greater cost efficiencies than those reported in the BEAR report.

Note the figures above are average costs, and it is important to again point out the fact that deposit systems simultaneously generate far higher recovery rates – in the US, deposit states average 72% recovery rates for containers, while non-deposit states average 41%. At the recycling rates achieved by deposits, marginal costs of non-deposit systems would therefore be expected to be far higher again, because of the increasing difficulty of raising rates given kerbside's focus on at-home consumption.

Revive's internal modeling, and modeling conducted together with external industry experts, for Australia demonstrates equivalent savings (30-60% depending on system design) in collection costs per tonne (or per unit) as compared with kerbside.

From the above it should be clear that the issue with container deposits is not an overall economic or even a financial one, but rather an allocational one – who pays? It is the shift in real or potential cost burden that appears to be the source of controversy and opposition from some sections of industry. However by adoption of efficient system design and use of proven technologies to implement systems that can operate at a surplus, this obstacle too should be able to be addressed more than adequately (see Sections 4 and 5).

3.4 Deposits Complement and Subsidise Kerbside Systems

Importantly, deposit systems are both well suited and <u>needed</u> to operate alongside existing kerbside systems. Deposits complement and subsidise the kerbside system by a) addressing its key weakness – away-from-home recycling, and b) reducing its net costs. A further benefit is the reduction in glass contamination of the paper recycling stream as glass containers are reduced in the commingled collection. These points are addressed in more depth below since there appears to be confusion about the two systems' compatibility among some regulatory bodies in Australia. This is despite the fact that deposits are widely supported by those with the closest knowledge and involvement in kerbside operation – i.e. the large majority of local governments who recognize the expected benefits in lowering kerbside costs and reducing litter collection costs, and the recycling industry including those active in alternative waste treatment (AWT) who see deposits as a means to generate additional revenue from containers present in their in-feed, while minimizing contamination (particularly from glass) in the organic streams.

In reality there is no evidence that deposits will negatively impact kerbside (rather the opposite is true), and such perceptions are based on a misunderstanding of how such systems actually work. In fact kerbside is only ever going to be part of the solution since it addresses only materials consumed at home. An additional system and infrastructure is needed to address the high proportion of containers (e.g. estimated >50%) consumed away-from-home. This itself is explicitly recognized in NPC II. Container deposits are proven to be by far the most-efficient and cost-effective means to address away-from-home recycling. They do so, as discussed above, by providing incentives for consumers to recycle their containers and funding for the necessary infrastructure.

It is true that deposit system infrastructure will attract a significant portion of containers away from kerbside. However – and these are the important points – the total resulting recycling rate is over 3 times kerbside alone (see Fig 1 above), and the provision of the deposit value to kerbside operators (a standard design option) along with the reduction in kerbside collection volumes

actually provides significant financial support to the kerbside system and reduces net kerbside costs.

Overall costs of kerbside (collection, sorting and landfill) significantly outweigh overall revenues (material revenue), with the balance (put at $295 million for 2002/03 by the "Boomerang Alliance" of environmental NGOs and local government associations, and at $374 million for 2005/06[28]) borne by local government. Generally a reduction in volumes, therefore, will reduce overall net costs since the reductions in collection and sorting costs outweigh the reductions in material revenues (for example, lower volumes per household means more household collections per truck; reduced containers means higher packing densities and so more weight per truck; while lower volumes means less labour required to sort).

Moreover if the deposit system design allows for the deposits of containers put out at kerbside to be redeemed by kerbside operators (typically MRFs) – as most deposit systems do - then even the revenue losses would be more than offset by new deposit incomes.

It is sometimes noted that containers represent a higher proportion of the total kerbside stream by value ($) than by weight (kg) and that deposits therefore can undermine the viability of kerbside by diverting its most valuable component. This not only ignores the deposit income to kerbside operators but neglects the fact that containers make up an even higher proportion of the total kerbside stream by volume (m^3), and hence have a disproportionate contribution to collection costs (which as mentioned above are significantly greater than material value).

The following outlines the main impacts on kerbside operations and indicates whether the effect is financially positive (+) or negative (-) for kerbside operations:

Revenue effects
- Reduced material sale revenue (-)
- Additional deposit redemption revenue (+) } (+)

Cost effects
- Reduced collection costs (both recyclables and garbage) (+)
- Reduced landfill costs (+) } (+)

Since total container volumes through kerbside will conservatively fall by only 55-60% (from 23%[29] of containers produced to ~10%[30]), but revenues per container will rise by >260% (at a 5 cent deposit) and up to 530%[31] (at a 10 cent deposit), **total revenues would be expected to rise significantly**.

Detailed modeling of these effects, undertaken in the Independent Review of CDL in NSW (ISF 2001), found that the net effects on kerbside costs (including litter savings of $4.5m) in NSW would be a net reduction of between $38 million and $50 million depending on deposit model and value. A copy of the appropriate section of the Independent Review of CDL in NSW is provided as an appendix to this submission. These figures are consistent with Revive's internal modeling which

[28] Boomerang Alliance 2008 "Container Deposits: The common sense approach towards a zero waste society" (based on NEPM Used Packaging Data 2005-06)
[29] This is the present % of containers consumed that are presently recycled via kerbside
[30] In South Australia the proportion of deposit containers being placed in kerbside sits at approximately 10%, despite the fact that deposits were established well before kerbside. The introduction in other states with an already well-established kerbside system is widely regarded to result in less diversion than in South Australia, and the Independent Review of CDL in NSW (ISF 2001) put the figure at approx 13% for a 5 cent deposit and return-to-depot model.
[31] The Material Recovery Facility would no longer receive material value (approximately 1.9 cents per container at today's high prices, averaged across all material types), but instead receives the deposit value of each container (e.g. 5 or 10 cents per container) and possibly an additional handling fee.

found that net national kerbside savings, excluding savings in litter and public place garbage collection, would be >$100m.

Overall the financial benefits to kerbside are not only large, lessening the severe financial pressure presently placed on local government, but deposits also act to protect and stabilize kerbside in times when international material prices cycle low (as they did 8-10 years ago) by providing a stable deposit income stream.

As mentioned above there are other major benefits in terms of reducing contamination of paper in the remaining kerbside stream – a key concern of the Publishers National Environment Bureau (PNEB), the industry association dealing with the recycling of newspapers and magazines (glass breakage in the kerbside system not only lowers paper recovery rates and quality but has meant that glass recycling rates have dropped significantly over the last 8-10 years).

The fact that container deposits are supported by the large majority of local governments and most of the recycling industry – those who have the most direct understanding of and direct interest in kerbside costs – is a good indication of the true picture. Likewise kerbside operates well in all those jurisdictions which operate CDL and kerbside in parallel – including South Australia, Canada and California amongst others.

In the US, a Congressional report found not only that deposits and kerbside recycling are compatible but that deposit states have a wider presence and reach of kerbside systems than non-deposit states.[32]

Finally it is important to point out that container deposits are also entirely consistent with trends towards alternative waste treatment, and are supported by its major proponents as a means to reduce glass contamination in the organic fraction and as a source of additional (deposit) revenue.

3.5 Deposits Provide Detailed and Robust Data Collection

Existing packaging production and recycling data is relatively poor. In particular there are gaps in production figures by material type, imported figures by material type, in recovery figures and in breakdown of material volumes by packaging type. Packaging producers / importers should be encouraged to report total tonnes of packaging produced and sold domestically by packaging type and material, and brand owners / importers total volumes of packaging purchased by packaging type and material. If necessary this can be done in confidence and aggregated before public release. Likewise state and local governments should adopt consistent data gathering and reporting by material and packaging type. Total aggregated recycling or recovery rates are largely meaningless when environmental impacts and values of different wastes vary so markedly.

Much of the data for costs of collection and sorting is in the form of 'costs per household'. This, in and of itself, tends to enforce the existing externality in which it is ratepayers and not consumers that bear such costs, and is biased towards kerbside systems making it harder to compare with alternatives such as container deposits. At the very least such costs should be explicitly reported per tonne also, and ideally a breakdown of costs per material type should be conducted to compare with specific collection systems such as container deposits and to begin allocating costs to producers in proportion to their financial and environmental costs.

[32] Environment and Natural Resources Policy Division 1993 "Bottle Bills and Curbside Recycling: Are They Compatible?"

However the lack of precise data should not be used as a reason to avoid action until better data is available. While there are still gaps in production and recovery data, the margins for error are not nearly large enough to alter the conclusion that rates are severely sub-optimal and new approaches are required. Indeed the Australian recovery rates used as the basis for Fig. 1 above are based on the NPC Industry Association's own report, and this data excludes much imported product from production figures, meaning that actual recovery rates would be expected to be lower rather than higher.

Moreover, alternative approaches such as deposits will provide the additional benefit of significantly improved data collection. Material and financial audits are a central component of deposit system coordination (for collection of deposits from producers and for refunds to consumers). As a result, deposit systems provide precise production and recovery volumes to industry and governments by material (units and weights) for all containers covered by deposits, including for those that flow through the kerbside system.

4. Facilitating Technology That Transforms Deposit Economics

4.1 Reverse Vending Machines Reduce Costs

Reverse Vending Machines (RVMs) have been used by retailers to lower costs in return-to-retail deposit system models for over 30 years. In that time they have come a long way in terms of their capabilities and the convenience they offer consumers, and they continue to develop.

RVMs accept recyclers' containers, determine whether or not they are covered by a deposit, sort and compact the containers and then issue consumers with a receipt which details the deposit value due to them for refund at the retailer.

Fig 2. A Reverse Vending Machine

RVMs provide a convenient, attractive interface for consumers to redeem containers and they replace labour requirements by automating redemption, sorting and auditing.

In addition, they reduce system operator costs by providing high purity material streams that attract high prices from the commodity markets and by compacting at the point of collection, which substantially lowers transport costs. This is evidenced by the fact that industry-run system operators in Europe offer rewards to retailers that choose to automate with RVMs.[33]

[33] E.g. in Denmark a one-off subsidy is paid to retailers who purchase RVMs; in Norway, Sweden and Finland the handling fee per unit paid to retailers is higher to reflect the added value of automation to the system operators.

Tomra Systems is the leading international manufacturer of RVMs and associated technologies including system operating systems and software, providing solutions right through recycling chain – from system design and development, to system coordination, logistics and data administration. In addition Tomra runs its own collection centre operations in a number of markets including Michigan and California.

Tomra has over 50,000 RVMs installed in over 50 markets worldwide which collect over 26 billion containers annually. This represents almost twice Australia's total annual consumption of containers.

4.2 Recent Technology Developments Expand Flexibility, Convenience and Efficiencies

Recent developments in automated, stand-alone collection centres provide significant opportunities for Australia. They also provide an opportunity for brand owners to design and voluntarily implement deposit systems with negligible net financial cost to them, without the need for government legislation.

These centres - known as Automated Collection & Recycling Centres (ARCs) - substantially improve the operational efficiency of deposit systems and reduce their costs by combining the logistical efficiencies of return-to-depot models with the use of reverse vending machines (RVMs).

Latest developments allow them to be used in self-contained, out-of retail locations as part of return-to-depot models and to accept the full range of container materials. As a result ARCs can be positioned in convenient, high traffic locations such as shopping centre and supermarket car parks as an alternative to manual collection yards which are typically dirty and remote and therefore less appealing to consumers. Consumers simply return their containers as part of their normal shopping trip. No extra travel or time is required and the centres can operate round the clock.

Fig 3. Automated Collection and Recycling Centres in Europe, the USA and Japan

ARCs such as these are being rapidly adopted in North America, Europe, Japan and beyond. In some cases, e.g. Tesco which is rolling out 100 ARCs at its UK stores, supermarkets are investing in and operating the centres as a means of attracting customer traffic to its stores and generating customer loyalty (e.g. in combination with loyalty cards). However ARCs can also be run independently without any need for operational responsibility from retailers, while still providing retailers with the benefits of increased customer flow-through (via redemption of ARC dockets). In addition ARCs offer enhanced reputation as well as promotional opportunities, both on the centres and on the dockets themselves (see below).

Fig 2. A RVM refund docket showing opportunities for retailer and brand promotions

Like RVMs, ARCs automatically interface with consumers, sort containers by material and colour, and compact them to reduce storage and transport volumes. Automation provides major cost reductions along with consumer convenience and flexibility in terms of locations and usage times. Sorting and compaction at the point of collection provides very high purity streams (and

hence the highest material value) and significant transport cost reductions. Finally automatic auditing by brand allows all material types to be sorted together, eliminating the need for additional costly sorting by brand.

Such systems make return-to-depot operations (such as South Australia's) far more cost-effective while simultaneously creating the consumer convenience of return-to-retail models without imposition on retailers.

Such facilities also automate data gathering and can provide data not only on unit volumes by material, deposit and non-deposit containers, but if desired, can provide data by brand and product. This in turn can be useful for key stakeholders in tailoring programs to increase cost-effective recovery. As new containers are introduced they can be instantaneously added to the deposit container database and automatically accepted at the collection centres. Additionally, and in sharp contrast to kerbside where problem containers (e.g. PET bottles with PVC labels) can contaminate entire batches, the facilities can automatically isolate containers that cause problems in downstream recycling operations.

A system based on this type of infrastructure will work well at an individual state level, but would realize most efficiency in a national system agreed by all state governments. Revive Recycling's in-house modeling indicates that such a system could be implemented nationally without significant cost to industry and could operate at a surplus. Moreover the modeling demonstrates that a deposit system that is substantially automated in this way can provide other major economic, social and environmental benefits of the following order of magnitude:

- Joint system (kerbside+deposit) recycling rates for containers of approx. 80% resulting in increased economic/environmental benefits of up to $400-500 million per year[34]
- *Additional* material collected with a value of $100-130 million per year
- Financial benefits to kerbside operations of $100-130 million per year
- ~3000 jobs created with corresponding $100-150 million in salaries per year

Further, a comprehensive national deposit system could, by itself, realize the majority of the additional recovery needed to meet NPC II 2010 material-specific recovery targets.

Revive is happy to share these models in confidence with the Senate Committee on request.

In addition there are further unquantified benefits, which include:

- Further cost savings for local government in
    - Reduced litter collection costs (estimated in the tens of millions of dollars annually nationwide)
    - Reduced public place waste collection costs
- Increased public awareness of the value of recycling
- An infrastructure platform for the collection and recycling of other high impact waste streams presently landfilled (see Section 6.2)
- Precise data on collections by material type, units, weights, brand and even product
- Ability to instantly update container database for new or problem containers

[34] Based on increase in container recycling rates from 39% to 80% and net environmental benefits per container of 8 cents (ISF 2001)

5. Industry Concerns and How They Can Be Addressed

Despite the fact that there are very major net societal benefits from introducing deposits, there is also nevertheless potential for significant transfer costs amongst stakeholders. Local governments would be net beneficiaries. Manufacturers / brand owners have the potential to be net losers since they would bear the net costs of the system. This is one of the major reasons that parts of the beverage industry and packaging manufacturers oppose deposit systems.

Overall, based on discussions with industry players, there are three core reasons for this opposition to deposits:

- concerns over costs – size and allocation
- possible distortion of competition
- potential for onerous legislation

Sensible system design, especially if combined with the new technology developments described above, can effectively deal with all these concerns and offer industry a low-cost method to solve this issue once and for all:

Costs – an automated return-to-depot model can be operated at a surplus – funded by unredeemed deposits and additional material revenue. Even in a worst case scenario, contributions would be significantly below those required to reach NPC II targets through a "business as usual" (kerbside + expanded public place recycling) approach, and recovery rates would be far higher.

Unfair Competition – many early deposit systems, particularly in the US, focused on beer and soft drinks and so had the effect of penalizing these products relative to newer products such as new age and mixed drinks. In most deposit jurisdictions this has been addressed by expanding deposit coverage, and a new system can avoid such issues by adopting comprehensive coverage of beverages.

Legislation – Industry have had an opportunity to develop and introduce their own voluntary deposit system; instead, the first Packaging Covenant explicitly excluded container deposits and some question whether the voluntary Covenants are being used simply to stall against more effective legislation. In reality there is no reason why a deposit system is inconsistent with the Covenant, particularly since the second Covenant recognizes the need for significant progress in away-from-home recycling and opens up the possibility of alternative systems alongside kerbside. Moreover, deposit legislation need not be a burden – the most effective form would set the system targets and parameters and then leave it to industry to design the most efficient system.

In addition to the above concerns of beverage and packaging industry players, retailers are generally opposed to standard return-to-retail deposit models - that incur additional financial and operational responsibilities on them. However return-to-depot models avoid any onus on retailers and automated versions using ARCs can actually provide significant promotional opportunities, and financial and reputational benefits, without any operational responsibility.

6. Container Deposits Place Within Broader Resource Recovery Strategies

6.1 Range of Waste Management Tools

Deposits' role in complementing and supporting existing kerbside operations have been discussed above in Section 3.4. However a comprehensive approach to waste management reaches far beyond kerbside and will include the use of various different systems and approaches including varying forms of MBIs, EPR approaches and legislation, with the best combination likely to be different for different classes of waste.

These approaches are generally complementary with for example specific targeted EPR schemes (such as container deposits or product take-back) best suited for homogenous high value or high impact material streams with clearly identifiable producers; broad MBIs suited to wastes with similar or lesser value / impact and no identifiable producers (such as green waste); and coarse instruments such as landfill levies to help reduce overall volumes of waste and act as a safety net for remaining low value waste streams (such as the majority of Construction & Demolition [C&D] waste).

In the case of containers, landfill levies are insufficient, and more targeted EPR approaches, such as deposits, are required both to fund infrastructure and influence consumer disposal behaviour. Greater regulation of landfill and higher charges has had very limited impact on container recycling because collection mechanisms and infrastructure simply do not exist to significantly increase rates.

Education is clearly an important part of the mix in terms of engaging consumers and particularly in communicating new systems or approaches for widespread adoption. However in terms of changing consumer behaviour it is also limited (as demonstrated by reduced glass recycling rates and the gap in away-from-home recycling), and requires economic incentives / market signals to be effective.

6.2 Container Deposits as a Catalyst for the Widespread Introduction of Resource Recovery Centres

Waste management infrastructure has for some time been focused on recycling of paper and packaging, and on environmentally acceptable disposal of other household wastes. More recently significant efforts have been made to begin addressing recovery and productive use of green waste. However the recovery of the balance of household waste remains unaddressed, and material flow analysis shows that there is a significant gap in existing infrastructure and services. This gap prevents the recovery of valuable resources and their return to the productive economy and limits the capture of high-impact and/or hazardous materials that have significant disposal consequences.

Examples of such waste include batteries, mobile phones, computers and other e-waste, brown and white goods, tyres, clothing and fabrics, light building materials, smoke detectors, used oil and household chemicals. Many of these items are best addressed through a combination of EPR and MBIs. However a lack of suitable collection infrastructure is a major impediment to wider resource recovery and industry efforts to participate via EPR schemes.

Drive-through and other resource recovery centres (e.g. as drawn up by the former Western Sydney Waste Board, and as currently under consideration by Auckland Regional Council) provide a consumer-friendly and convenient option for councils to ensure better use of these resources while reducing existing collection and disposal costs.

Container deposits support such efforts by providing much of the necessary infrastructure, and income streams to help underwrite operations. Already in South Australia scrap metal and car batteries are widely collected at existing container deposit depots and efforts are underway, with the backing of Zero Waste SA, to expand these activities to a wide range of other materials as above. In Canada's bottle depots similar systems exist for paint, scrap metal, lead-acid batteries and other hazardous wastes, as well as other recyclables[35].

NSW and WA should be congratulated for advancing EPR initiatives and other states need to be encouraged to promote such measures also, with backing for national systems and infrastructure. Container deposits provide a platform for other EPR initiatives and effective recovery of a wide range of wastes. They provide a cost-effective recovery network that can be mobilized by government and industries that are in many cases looking to take a proactive stance in relation to responsibility for their products after the consumption stage of their lifecycle, but are presently limited by a lack of collection infrastructure.

7. Summary and Recommendations

There is a clear need to improve the levels of recovery of a wide range of materials up to optimal utility levels from a whole-of-society benefit basis. In the case of containers, efficient, proven systems have been in operation for many years that demonstrate recovery levels of at least twice those presently achieved in Australia.

These systems are not only more cost-effective than kerbside (leaving aside who pays for them), but subsidise and support kerbside operations and complement them by addressing away-from-home recycling. Moreover they are more economically efficient - consumers pay for system costs, rather than ratepayers, and they do so in direct relation to their disposal behaviour; and deposits achieve markedly higher recovery rates at marginal costs well below marginal environmental (economic) benefits. Finally, it is not always understood that such systems incur no costs to government (other than a minor supervisory role).

Recent developments in technology only add to system efficiencies and provide an ideal model not only to modernize South Australia's deposit system but to implement a national system.

There is a lot of misinformation generated around the introduction of deposits by various vested interests. One of the more high-profile examples in Australia is the supposed negative effect on kerbside. In reality container deposits provide strong support for existing kerbside operations and can work in synergy with proposed, much needed resource recovery centres for a wide range of other wastes that can then form the basis of other EPR / product stewardship schemes. As such they can play a vital part in optimizing overall waste management outcomes.

[35] See for example http://www.rrfb.com/pages/programs/beverageOverview.cfm

The potential economic benefits of introducing container deposits are significant and can be summarized in round numbers as follows (these numbers assume a deposit coverage of 14-16 billion containers; a reduced coverage will result in smaller, but still substantial, net benefits):

Potential range of economic benefits:

	Environmental benefits created (vs. status quo)	$400-500 million[36]
	Net kerbside system cost reductions	$100-130 million
less	Net additional cost of system operation and infrastructure p.a.[37] (net of material sales; paid for by consumers not redeeming through deposit system and/or brand owners)	$140-170 million[38][39]
	Annual Net Benefits	**$360-490 million**

Additional benefits:

- Litter collection cost reductions
- Visual amenity benefits due to reduced litter
- New jobs from collection infrastructure and economic flow-on effects
- New downstream domestic processing investments (the opening up of plants closed due to lack of material supply as well as new plants) + economic flow-on effects
- Establishment of infrastructure that can be employed (via product stewardship/EPR schemes and MBIs) for a range of other waste streams

Other costs:

- Redesign and printing of labels
- Government administration / oversight of deposit system

The above overview confirms long-held community beliefs in the overall benefits of container deposits. With such benefits immediately available it is no longer tenable that Australia continues endlessly waiting for small incremental improvements via existing approaches. Instead government intervention is needed to create the environment for a more optimal solution to this current waste of resources and Senator Fielding is therefore to be congratulated in putting forward his "Drink Container Recycling Bill 2008".

Revive Recycling therefore makes the following recommendations for consideration by the Senate Standing Committee on Environment, Communications and the Arts:

1) *Further increases in targets required for optimum economic utility*
   Targets should reflect that optimal levels of recycling are significantly higher than current NPC II targets, and the fact that proven systems exist to reach these. State and federal governments should announce that further significant rises in targets will occur, and that these are likely to continue to rise as resource costs increase and system costs decrease. In particular higher binding targets (e.g. 70-80%) such as those proposed in Senator Fielding's Bill should be announced for materials in which rigid containers dominate (glass,

[36] Additional 42% of containers recycled, reducing environmental costs by 8 cents per container (ISF 2001)
[37] Includes industry system coordination costs
[38] Modeled costs based on: amortised collection infrastructure and operation + coordinator costs – material sales value
[39] Note that average material sale prices from a deposit system are 10-30% higher than from kerbside MRFs due to their negligible contamination rates (Source: private correspondence with super-collectors in South Australia; Recyclers of South Australia)

PET, HDPE, Aluminium, Steel, LPB) and for which effective post-consumption recovery systems are already proven.

2) *Investigate technology options that can transform system economics and outcomes*

The integration of RVMs in self-contained Automated Collection and Recycling Centres (ARCs) provides an ideal solution to Australian market conditions, improving efficiencies, lowering costs and providing the convenience and attractiveness of return-to-retail systems but without imposition on retailers. Revive would like to request the opportunity to make a presentation on these technology options as part of the Senate Committee hearings.

3) *Introduce a national deposit system as soon as is practically possible*

Revive recommends the introduction of a national deposit system as soon as is practically possible. Following the EPHC investigation of such a system, a decision could be taken to introduce a national system in late 2009, which would go some way to ensure that the recovery targets set under NPC II are met by 2010.

4) *Work with WA to develop a best-practice deposit model for early national introduction*

The WA government should be encouraged to proceed with its plans for a deposit system using an efficient model that can be readily applied for early national implementation following the EPHC's investigation of a national system. A national deposit system design, and its legislative underpinning, can then use WA as a model and draw both on the work done to date by the WA government and its stakeholder advisory group, and the bill proposed by Senator Fielding.

5) *Leave industry to optimize deposit system operations within government-set parameters*

Whatever form of system is introduced, Revive's recommendation would be that overall system parameters and design are set by government, while industry is given the flexibility to manage and operate the system. Government should set key objectives and system outline (including targets and penalties) based on an understanding of the economic efficiencies of high levels of recycling, while leaving operations to industry in such a way as to enable the most efficient system to be set up to reach such targets (including encouraging the use of effective technology solutions). Revive stands ready, along with its partner Tomra Systems, to work with all stakehoders to assist with the design and operation of a system.

6) *Support the international and Australian trend towards product stewardship / EPR for other waste streams*

Governments should support the adoption of additional product stewardship / EPR approaches for other waste streams (as already started in NSW and WA) in combination with appropriate MBIs. In addition governments should recognize container deposits as a catalyst and foundation for a widespread collection infrastructure, and work with local government to facilitate the establishment of integrated "resource recovery centres" which allow industry to run EPR schemes effectively. Such a network, combined with 'catch-all' landfill levies that make the market work efficiently in relation to the pricing and adoption of AWTs for the balance of municipal waste, offer the prospect of very significant diversion of municipal waste and corresponding economic, environmental and social benefits.

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