

Costs and benefits of a Container Deposit Scheme for New Zealand

Review of the Packaging Forum's 2016 Cost Benefit Analysis (CBA) of a
Container Deposit Scheme (CDS) for New Zealand

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Introduction

This document reviews the January 2016 cost benefit analysis¹ (CBA) for a New Zealand Container Deposit Scheme (CDS), issued by the Packaging Forum in response to the model² for a CDS developed by Envision New Zealand in 2015. It explains:

- Why costs in the PF report are considered too high
- How important CDS benefits have been undervalued or excluded from their CBA
- The different approaches taken by the Packaging Forum and Envision

Conclusions

The Packaging Forum represents beverage industry interests that are openly opposed to CDS. Their report's claim that a CDS would cost the country an estimated \$74.8 m per year is found in this review to be considerably inflated and has been adjusted to \$7.7 million. It is noteworthy that this is within a similar range to the 'system costs' of \$10.9 million outlined in the Envision report³, (a cost to the beverage industry of less than one cent per container).

It is in fact the recycling schemes heavily promoted by the Packaging and Glass Packaging Forums (using significant public funding) that are too costly for their negligible recycling outcomes.

The impasse between different approaches to evaluating CDS can only be addressed by government taking an independent view and eliciting the advice of all stakeholders in order to achieve the best outcome for recycling beverage containers in New Zealand.

Recommendation

The recommendation of this report is that The Minister for the Environment, calls together a multi-stakeholder group made up of representatives of the MfE, local government, environmental groups, recyclers, academia and industry to:

1. Evaluate the feasibility of a CDS for New Zealand
2. Investigate the cost-effectiveness of recycling programmes promoted by Industry groups that have received large amounts of public funding with little public or wider sector input and scrutiny

Background

In November 2015, Envision released "The Incentive to Recycle, The Case for a Container Deposit System for New Zealand". Soon after, The Packaging Forum commissioned a report "Proposed Container Deposit System for New Zealand: Cost Benefit Analysis" by Covec, which was

¹ Covec (2016) Proposed Container Deposit System for New Zealand: Cost Benefit Analysis

² Envision (2015) The incentive to Recycle, The case for a Container Deposit System for New Zealand

completed in January 2016. The two reports have different objectives but like apples and oranges they are difficult to compare.

The Envision report developed a model for a mandatory CDS for NZ. It estimated revenues and costs for the system. As such it is essentially a profit and loss report for a CDS system. It concludes that a mandatory CDS would cost the beverage industry about \$0.05 cents per container⁴. The Covec report (hereinafter called the PF Report) takes a cost benefit analysis (CBA) approach, which attempts to calculate the costs and benefits of a CDS for the whole of society and concludes a CDS would cost the nation as a whole \$74.8 million per year.

Both reports discuss the social and environmental benefits of a CDS. The Envision report does not put monetary values on these benefits, because its aim was to assess the income and expenses of a CDS using a 'product stewardship' approach (where costs are transferred from the wider community to the producer and consumer of the product). Instead it puts these in relevant terms i.e. extra tonnes and volumes of materials recovered, potential additional jobs created, reduction in plastic in the marine environment etc. and discusses these benefits.

The PF report puts monetary values on some benefits but not on others and concludes that a CDS would cost \$74.8 million per year. However, some of the non-monetised benefits are important when deciding on the overall merits of a CDS.

The different approaches makes it difficult to compare the results of the two reports. Therefore, on the surface, the conclusions in the PF report make CDS appear expensive.

Comments on the Packaging Forum's Report

1. Incorrect data

The following data from the Packaging Forum report is inaccurate:

- The South Australian CDS has been operating since 1977, not 1997.
- California and Connecticut redemption rates are incorrect (Table 5 Page 9). For the past 5 years the overall redemption rate in California has ranged from 81% to 84%, not 61%, as the table shows. Connecticut redemption rates are overstated. More information on US redemption rates can be found on the Container Recycling Institute website⁵.
- Victoria, Australia's beverage container return rate is stated as 81% (table 4 page 7). This figure was quoted by the Victoria Environment Minister in a January 7th 2015 article in *The Age*⁶ entitled 'Lisa Neville against Cash for Containers Scheme'. When 'Sustainability Victoria' employees were contacted, they were unable to identify a source for the 81% figure. A search of Victorian Government documents found only one reference to 81%. This was for steel (including packaging steel) as a proportion of metal recovered for processing (by weight) in Victoria (2012-14 and 2012-13)⁷. We know of no major jurisdictions internationally where return rates of over 40-50% are achieved without a CDS.

⁴ The usual method for assessing the viability of a CDS is to establish the cost of the system per beverage container (the amount beverage producers will need to pay for each container they sell to ensure the CDS is viable). The Envision report estimates a system cost for a New Zealand CDS of less than one cent per container.

⁵ <http://www.bottlebill.org/legislation/usa/allstatestable.htm>

⁶ <http://www.theage.com.au/victoria/lisa-neville-against-cashforcontainers-recycling-scheme-in-victoria-20150106-12j14t.html#ixzz47qeivmZSv>

⁷ [Figure 16, Page 21, Victorian Recycling Industries Annual Survey 3013-14 \(quoted source was International Merchandise Trade, Australian Bureau of Statistics 2013-14\)](#)

- Table 5 on page 9 showing US redemption rates, cites the National Conference of State Legislatures (NCSL) website as a source,⁸. However, the page referred to does not show redemption rates.

2. Suggests CDS should be seen as an alternative to kerbside recycling

The PF report assumes that “in the absence of introducing a CDS, recycling would continue to happen much as it does currently, through locally-organised kerbside collection of recyclables organised or funded by councils”(page 2). CDS is portrayed as an alternative or additional way of collecting material for recycling. However, if a CDS collects 80% or more of the containers, kerbside recycling programmes would instead become the alternative, complimentary system of collection.

Kerbside recycling schemes are predominantly funded by councils. One of the advantages of CDS is that it significantly reduces those council costs.

Importantly, council services (kerbside recycling and litter management) do not collect beverages consumed away from home. CDS addresses this failure and works in tandem with kerbside recycling to achieve high recovery rates and reduced council costs.

Disposal of beverage containers is a negative market externality and a market failure. The market failure lies to a large extent with the ability of a business to externalise costs associated with their product. If the producer does not have to account for the full costs of their product then the price of the product is not a true representation of the costs of production. In addition, there is no incentive to improve product development to reduce the (externalised) costs.

CDS is the most efficient mechanism to place the product costs back on the producers, driving increased efficiency which will in turn reduce the whole of life costs of production. The producers are the only ones able to influence costs through improvements in efficiency and ensure the true cost of their product is reflected in the product price.

3. Overstates New Zealand’s glass recycling rates

The PF report claims 73% of glass is ‘recycled’. Using Packaging Forum provided data, the report claims that 155,156 tonnes (73%) of the 214,156 tonnes of glass bottles produced or imported into New Zealand⁹ are recycled. However only 108,000 tonnes of cullet from glass bottles was sent to OI in 2015¹⁰. The balance was either stockpiled, landfilled¹¹ or down-cycled into low value uses such as for use in roads, drainage, and building slabs¹².

Based on the tonnage of cullet (from glass bottles) that is made into new bottles, the true recycling rate is 50%. However, New Zealand’s glass bottle production figures may be higher than those supplied by the Packaging Forum¹³, in which case the true recycling rate would be lower than 50%.

Councils are currently paying considerable amounts to landfill, stockpile or pay road makers to take it away for inclusion in roading. These costs (further examples of negative externalities) have not been included in the PF CBA, and are therefore not being considered in relation to the net product value and product price of the beverage or container.

⁸ <http://www.ncsl.org/research/environment-and-natural-resources/state-beverage-container-laws.aspx>

⁹ This is likely to be understated as some glass bottle importers will not be disclosing their quantities.

¹⁰ Cullet tonnage provided by OI

¹¹ [Mountain Scene, \(May 2016\) Glass-farce-its-going-to-landfill](#)

¹² Small quantities are used for blasting sand, filtration medium, golf green & sports field maintenance and road marking.

¹³ The Packaging forum only represents 80% of producers.

4. Overstates CDS collection infrastructure costs

The report cites annual collection costs for a CDS of \$71 million based on a mix of Return Depots, RVMs (Reverse Vending Machines), and MRFs (Material Handling Facilities). This assumes the infrastructure for a CDS will need to be developed from scratch and does not account for the current existence of recycling centres and transfer stations which can operate as buy-back depots for only a marginal increase in operating costs.

In addition, the costs of infrastructure and operational costs are largely built into the costs of a CDS system and are covered by the 3 cents handling fee proposed by Envision with a final net cost to beverage producers of one cent or less per container.

It is likely that entrepreneurs will invest in collection depots, as the income from the handling fee will provide them with a viable return on investment. Apart from possible start-up grants from central or local government to establish or refit collection centres to accommodate CDS, little or no additional public funding for new infrastructure or operating collection centres will be required.

Note: Although the Envision report proposed a three cent handling fee, an increase to 4 cents if required, would remain within the one cent per container cost to the beverage industry.

5. Understates savings to local authorities from CDS

The PF reports estimated collection costs of \$71 million per year which are offset by \$10 million savings to councils through reduced kerbside collection costs. The evidence shows, these estimated savings are too low.

A report Commissioned by the Local Government and Shires Associations of NSW¹⁴, to “investigate recent claims that councils would be worse off under a container deposit scheme (CDS)”, found that under a CDS, local government in NSW could save between \$23 and \$62 million per year and between \$69 and \$193 million across Australia (depending on what proportion of the MRF gate fees reductions were passed on to councils).

The report stated, “These findings are contrary to recently raised concerns, that local government would be worse off under a CDS. All indications show that both MRFs and councils would be better off under a CDS”.

Table 1 Possible annual reduction in recycling costs across Australia under a CDS

Gate fee reduction scenario	Saving, lower limit (\$)	Saving, upper limit (\$)
Councils receive 100% of net gain	\$122	\$183
Councils receive 71% of net gain	\$92	\$137
Councils receive 50% of net gain	\$69	\$107

Table 1. above shows three different scenarios for annual reduction in recycling costs across Australia and concludes that, “under a CDS, local government in NSW could save between \$23 and \$62 million per year and between \$69 and \$193 million across Australia”.

Using a figure (\$126) midway between the lower and upper saving limits for Australia and applying it to New Zealand’s current population of 4.6 million, New Zealand local Authorities could potentially save \$27 million per annum.

¹⁴ The Impacts (cost/benefits) of the introduction of a Container Deposit/refund System (CDS) on Kerbside Recycling and Councils, prepared by Mike Ritchie and Associates for the Local Government and Shires Associations of NSW.

This is not too far from the Envision report (page 42) which projected (using a different methodology) councils could anticipate a reduction in kerbside costs of \$19.26 per household amounting to \$32.3 million per year. Councils can apply these funds to waste minimization initiatives or to reduce rates – either way a benefit to the whole of society.

6. Puts a cost of \$88 million on people's time to recycle

The Report estimates household total participation costs of \$88 million per year, based on the time it would take for people (including children, non-profits and the homeless) to redeem their containers (based on 4 seconds per container plus one minute for a return trip to recycle those containers)¹⁵.

Although the PF report deducts \$55 million paid out for deposits thus reducing total household participation costs to \$33 million, it does not seem to allow for any other offsetting benefits such as the educational benefits associated with e.g. youth collection initiatives, the societal benefits from the exercise gained collecting and delivering containers to a depot, or the individual benefits from community action or interpersonal interaction that arises through the act of participating in recycling. These aspects although difficult to monetize are real and should be valued in a full CBA.

Some community groups with a moral dilemma accepting grants and funding from gambling outlets (such as Lotto, Pub Charity etc), support CDS as an alternative source of funding. It's difficult to place a monetary value on the ability for these groups to maintain their integrity through participation in CDS.

Household total participation costs are perhaps the most difficult aspect of a cost benefit analysis (CBA) for the lay person to understand. Most people find it an alien concept that the time they or their children take to do something they do willingly, should be considered a cost.

Regardless, we know the public are willing to pay the 10 cent deposit in CDS locations:

- There is no evidence that beverage sales go down or that beverage prices go up in jurisdictions with CDS (as per the Massachusetts example mentioned earlier).
- In various surveys, the public are consistently and overwhelmingly in favour of CDS¹⁶ as a way to tackle beverage container waste. Examples include Australia, 88%; Western Australia, 94%; and British Columbia, 96%. These results suggest that the public voluntarily participate in a CDS either to receive the refund or because they want to do the right thing - or both. Children, unwaged people and volunteer groups in particular would not see their time as a cost.

People choose to do many things willingly at their own time-cost including volunteering for a charity, coaching children's sports and participating in beach or estuary clean-ups, to name a few. Economists claim these activities should be considered a cost on society because by spending time on them, they are not able to do something else. In other words there is an opportunity cost of these activities.

In the PF report, \$33 million in costs is attributed to this opportunity cost of people's time (after deductions), and yet, using a similar logic, the costs of people's time to purchase the product should be factored in to the CBA. However, they are not. Nor are the costs to the health care system from an unhealthy product. Neither are the time costs of participating in kerbside recycling schemes or taking materials to Transfer Stations as many prefer to do.

¹⁵ Based on an average of 40 containers each trip.

¹⁶ For examples, see page 14 of the *Incentive to Recycle* report <http://www.envision-nz.com/news/2015/11/16/incentive-to-recycle-the-case-for-a-container-deposit-system-in-nz>

The CBA used in the PF report supposes that the costs of disposal are, unequivocally, external public costs that only commence at the time of disposal - not at the time of production. This assumption then fails to include disposal costs in the same analysis as production costs and benefits where it should be.

7. Makes unredeemed containers a cost

The Packaging Forum's report (page 9 of the summary) adds \$55 million to the public's costs for unredeemed containers. The PF report states that these funds might be retained by the beverage industry, or paid to government or local government.

This is another example that highlights the difference between the approach taken internationally for determining the costs of a CDS and that typically taken by interests opposed to CDS. In the Envision model, unredeemed deposits are used by the Managing Agency to offset the costs of operating the CDS¹⁷.

Regardless, because New Zealand's lowest currency denomination is 10 cents, it is not possible to add one cent to the price of a drink. In this event, the beverage producer or retailer would have to absorb the net 'system cost' of one cent or less per container, not the wider public. This is the way product stewardship is supposed to work.

It is normal for governments to levy a small and widely distributed cost to achieve a focused outcome. For example, folate in bread and fluoride in drinking water are examples of small costs absorbed by product producers to provide a *perceived* public benefit. Other examples include a toll to fund a bridge or motorway and targeted rates by local authorities. Even a raffle has similarities to a bottle deposit as you do not have to pay participation costs (you do not have to buy the raffle ticket) although if you buy a drink you can get your deposit back.

Unredeemed containers are simply a cost that people willingly forgo (because they are too lazy or do not think the refund is high enough to bother returning the bottle). There would, however, be a case to allow a sum (cost to the CDS) for beach clean-up and landfill and litter collection costs for the small percentage of bottles that are not redeemed via the CDS.

8. Understates savings from litter clean-up

The PF report states that beverage litter reduced 45% in Northern Territories after they introduced CDS. It suggests this would bring a 6.7% reduction in litter clean-up costs for New Zealand. However, beverage containers are much bulkier than other types of litter and represent as much as 40% of litter volumes.

Using Auckland Council's (2011) litter clean-up costs of \$5 million per year or \$3.13 per person, and applying this nationally, New Zealand's litter costs come to \$14.6 million. Beverage container proportion of these costs (assuming 40% of the litter) would be \$5.8 million. A CDS recovery rate of 85% could, therefore, reduce beverage litter costs by \$4.9 million per annum.

These public costs do not include costs incurred by other public bodies such as DOC, hospitals, schools, universities, and airports. Neither do they include litter clean-up costs incurred by groups such as Keep New Zealand Beautiful, the Packaging Forum, Glass Packaging Forum, Sustainable Coastlines, and land and coast care groups, most of whom receive funding from government and private sources. Using a modest assumption that these public bodies spend 10% of local authority costs brings the total savings in national litter costs to \$4,999,018: close enough to \$5 million per year.

¹⁷ This is why the beverage industry will only be required to pay less than a cent per container instead of the full 3 cent handling fee which is paid to return centres.

In addition, the value of time spent by thousands of volunteer hours for anti-litter and beach, harbor, and estuary clean-up programmes each year should be recognised as costs of the current system in the same manner that estimates of household total participation costs were included for the time taken the public to recycle containers. At least part of these costs could be deducted from 'participation costs' because a CDS would remove the greater proportion of the material these volunteers spend their time collecting.

9. Costs of public space recycling bins

Public Space Recycling bins are expensive and have been completely ineffective at significantly reducing litter from beverages consumed away from home, and that ends up in streets, waterways, and the marine environment. CDS targets these sources including from construction sites where large quantities of beverage containers are dumped daily into skip bins.

To ensure an accurate CBA, the costs of public space recycling need to be added to the costs of the current system and largely deducted from the costs of a CDS.

10. Understates true disposal costs

The PF report claims that the current landfill levy is sufficient to address the market failure of externalised costs of landfill (leachate, odour, air emissions). It estimates landfill savings of only \$3.4 million. New Zealand's Landfill Levy is possibly the lowest in the world. In South Australia it is over \$70 per tonne. In NSW it is over \$120 p/t and much higher in European countries. Although landfill afterlife responsibility is up to 100 years or more in parts of Australia, in New Zealand it tends to be in the order of 30 years. However, emissions to land, air and water will continue for perhaps even hundreds of years. These ongoing costs will revert to the wider community after 30 years and are not fully reflected in today's landfill charges.

Additionally even when compacted in landfill, beverage containers have a high volume to weight ratio¹⁸. This means that for every tonne landfilled, at least 4 cubic metres of space is lost and even higher if the compaction is not adequate. Envision estimates landfill owners will give up 180,000 m³ of space for 45,000 tonnes of containers. This is much more than for many other categories of waste.

The true cost of disposal to landfill should be reviewed. However, assuming a modestly estimated 'true cost' of \$200/tonne, 45,000 tonnes of recyclable material diverted from landfill would deliver savings of \$9 million each year. Landfill asset values would theoretically increase by a similar amount because the space has not been used, bringing the total positive impact of a CDS to \$18 million per year.

11. Proposes high costs to industry

The PF report estimates total CDS operating and communication costs to industry of \$84 million per year or 3.6 cents per beverage container. The Envision report estimates these industry costs to be \$10.9 million or \$0.005 cents per container (based on operating and communication costs of \$71.6 million, less retained income from unredeemed deposits, sale of recycled materials and bank interest of \$52.7 million).

In estimating industry costs, Envision has used the internationally recognised methodology for evaluating CDS system costs. The handling fee in the Envision report is 3 cents per container. If in practice it was 3.6 cents (as proposed in the PF report) or even 4 cents, the net cost to industry would still be no more than one cent per container.

¹⁸ Estimated in the Envision report (page 19) at 4 cubic metres to the tonne.

12. Omits mention of the Waste Minimisation Act and its definition of product stewardship

There is no mention of the Waste Minimisation Act 2008. This is an important omission as a key focus of the Act is product stewardship. The Ministry for the Environment (MfE) describe product stewardship as the following:

In a product stewardship scheme some or all of the environmental costs from a product (e.g. inefficient resource use or disposal costs) are included in the product's price. The consumer pays for product stewardship in the price of the product they choose to buy. Without product stewardship, the costs of the environmental impact from a product are carried by society (e.g., rate and taxpayers) and the environment rather than by the consumer or producer.¹⁹

The cost for a CDS of less than one cent per container would be absorbed by the beverage industry or retailers and almost certainly not passed on in beverage prices.

In 2006, the Parliamentary Commissioner for the Environment noted that, when seeking to manage contentious resource management and environmental issues, "... [the weight of evidence suggests that, where significant shifts in public behaviour are needed, voluntary measures are not enough.²⁰"The failure of the blanket voluntary approach by government is underscored by the Ministry for the Environment 2014 statement that 'voluntary accredited product stewardship schemes have diverted only around 1.4% of waste from levied landfills²¹'.

13. Excludes analysis of the Packaging Forum's recycling schemes for fair comparison

The Packaging Forum operate the Public Space Recycling and Soft Plastics Recycling schemes, both of which have had millions of dollars of public funding. Like a CDS, these programmes rely on the public's time to drop-off materials. The Packaging Forum promotes public space recycling as an alternative to CDS for beverage containers consumed away from home.

It is notable that the PF report does not compare the Packaging Forum's existing schemes with CDS, using the same CBA methodology. There is a strong similarity between these schemes and CDS, i.e. the behaviour and activity is essentially the same with people dropping off beverage containers (or soft plastic) at a designated collection location.

This also applies to the Glass Packaging Forum's work. According to the Ministry for the Environment's website, only 7,403 tonnes of the 165,178 tonnes of glass recycled between 2011 and 2012 was due to projects from The Glass Packaging Forum's scheme.

There is a compelling case for the Ministry for the Environment to carry out an independent CBA on the insignificant recovery rates achieved by publicly funded schemes set up industry bodies.

14. Compares South Australia's audited recycling rates with New Zealand's 'recovery' rates which are not the same

South Australia requires Beverage Producers to provide their production figures to the EPA. The government compares these with CDS container returns to provide highly accurate recycling

¹⁹ <http://www.mfe.govt.nz/waste/product-stewardship/about-product-stewardship>

²⁰ [Parliamentary Commissioner for the Environment. \(2006\). Changing Behaviour: Economic instruments in the management of waste. http://www.pce.parliament.nz/work_programme/reports_by_subject#472](http://www.pce.parliament.nz/work_programme/reports_by_subject#472)

²¹ <https://www.mfe.govt.nz/sites/default/files/media/About/environment-bim-final.pdf>

tonnages. In New Zealand, we rely on industry who cite commercial confidentiality as the reason their data is not publicly available.

Under a CDS, companies should be required to divulge accurate sales figures as in all CDS schemes around the world.

15. Offers no solution to glass stockpiles in provincial regions

The Packaging Forum does not offer a solution to the problem of glass being too expensive to ship back to Auckland from outlying regions. A CDS is the only system that would fully fund glass back to Auckland from all over NZ as the handling fee paid to recyclers could easily be adjusted to cover the extra transport costs. The overall system cost to the beverage industry to achieve this would still be less than 1 cent per container. Under a CDS, ratepayers would no longer be paying to have glass collected, transported, and included in roading material²².

If the intent of the PF CBA was to provide a broad 'whole of life' cost/benefit analysis, these reduced costs and increased benefits to councils, recyclers and OI would have been included.

16. Understates savings to householders of waste collection costs

The report estimates waste collection at \$61 per tonne. However many householders in New Zealand pay by volume for their refuse collections which results in much higher cost. The Envision report cites potential savings of between \$27 and \$40 million to ratepayers in refuse collection costs through a CDS.

17. Understates increased recycling volumes under a CDS

The PF report estimates that a CDS would increase recycling and reduce waste by 34,020 tonnes. The Envision report (using comparative South Australian data) estimates that an additional 45,800 tonnes of beverage containers would be recycled under a CDS.

18. Puts little or no economic value on other CDS benefits

The PF report either ignores or puts no economic value on a range of other key benefits that are acknowledged in jurisdictions with CDS and in other CBAs.

- *The value of societal wellbeing from less litter and a cleaner environment*
Research by the Victorian Government²³, showed that “the majority of respondents during the qualitative research made the link between recycling and its potential environmental benefits, for example, saving trees by recycling paper or saving energy by recycling cans or bottles. This was further supported during quantitative research”.
- *CO2 reduction benefits from the reuse of more recycled materials in the manufacture of new bottles* For example using recycled aluminium saves 95% of the energy needed to produce aluminium from raw materials, and for glass 30+% less energy is required.
- *Savings in resources used when recycled materials are used to manufacture new bottles*
When glass is dumped into landfill, roading or stockpiles, instead of putting it back into new bottles, more resources need to be extracted and more pollution is created.
- *Benefits of increased public engagement* with other environmental messages which are reported in locations with CDS and evidenced in South Australia.

²² Queenstown example

²³ Kerbside Recycling in Metropolitan Melbourne, Social Research Report, Victorian Government (Sustainability Victoria) and the Metropolitan Waste Management group, (2010)

- *Social and economic benefits* of having around 200 new businesses operating return depots around the country, especially in the regions
- *Economic benefits from over 2,000 new jobs spread around the country*
This includes reduced unemployment benefit pay-outs and avoided social costs due to reduced crime and other unemployment related issues.
- *Social benefits*
The benefits of CDS tend to accrue more to lower income people, who are more likely to redeem bottles to earn the extra income and to secure the new jobs that become available in the recycling industry. New jobs increase the overall wellbeing of society and this is well recognized by social service organisations and people working in the justice system.
- *The public's willingness to pay for reducing plastic in the marine environment*
Beverage containers in the marine environment is an issue of high public concern (additional to general concerns about litter). These containers are currently not captured via kerbside collections because they are drunk away from home. Some attempt should be made to value this environmental cost and willingness to pay.

PF report - adjusted costs and benefits

Based on the above research and evaluation, the final cost to New Zealand of \$74.8 million per year arrived at in the PF report is adjusted as below:

Estimated Net Impact of a CDS (\$ million)		
	PF Report	Adjusted
Costs:		
Recycling collection	\$60.8	\$57.7
Transport and processing	\$1.1	\$1.1
Overheads	\$2.3	\$9
Household (participation) costs	\$32.6	\$0
Allowance for annual increase in recycling rates	<u>\$0</u>	<u>\$9.8</u>
Total costs	<u>\$96.8</u>	<u>\$77.6</u>
Benefits:		
Value of materials	\$10.1	\$18.8
Unredeemed deposits	\$5.5	\$5.5
Litter clean-up savings	\$0.9	\$5
Reduced costs of waste collection	\$2.1	\$27
Avoided landfill costs	<u>\$3.4</u>	<u>\$13.6</u>
Total benefits	<u>\$22</u>	<u>\$69.9</u>
Net Costs/Benefits	\$74.8m	\$7.7m

Notes:

- Some items have been left as stated in the PF report due to the limitations of this review but merit further analysis.

- Apart from the additional line ‘allowance for increase in recycling rates’, only costs and benefits outlined in the PF report have been included for this comparison. If all of the benefits outlined earlier in this document were included, the final cost would be considerably less than \$7.7m.

Conclusions

After adjusting the values of the Packaging Forum’s CDS costs and benefits to reflect the research and evaluation undertaken for this review, the total estimated cost of a CDS reduces from \$74.7 million to \$7.7 per year. This is within a similar range to the net costs of \$10.9 million per year concluded in the 2015 Envision report.

If there is a need for more capacity in the system to cover costs of getting glass back to Auckland from distant regions of New Zealand, the handling fee could be increased to as high as four cents. This would still keep the cost to the beverage industry per container at around one cent.

One cent (or less) is a small price for beverage companies to pay to ensure their products are more effectively recycled and to bring other benefits for councils, businesses, the unemployed and charities.

The Packaging Forum’s report is out of step with the government’s definition of product stewardship which aims to put the costs of recycling products on to producers and/or consumers. The costs of CDS, (like marketing, transportation, or health and safety) should be seen as a cost of doing business rather than a public cost. By placing the costs back on the producer, they can be incorporated into the net value of the product, driving innovation and efficiencies to reduce the cost; and ensuring the price of the product reflects its net value. *Citizens should not be required to pay for the disposal, recycling, or clean-up of products they do not purchase.*

Where the market can deliver a good result in the public realm, it is best to leave the market to do so. However when there is a market failure resulting in an environmental and social cost, then it is appropriate to introduce regulation that mandates the desired behaviours, addresses the market failure, and reduces the cost to the environment and society.

In the case of beverage containers, the costs and harms due to low recycling rates are significant. The equivalent of a rugby field eight stories high of compacted beverage containers enters landfill or the litter stream each year. By loose volume it is at least 4 times this amount. Many containers end up in the marine environment (see Appendix Two) causing irreparable harm at all levels of the water column.

When evaluating the costs of a CDS from a wider societal perspective²⁴, all costs and benefits should be considered and valued, including those of production, marketing and sales. Deciding what these benefits are and their values cannot be left to vested interests that are openly opposed to CDS.

Industry funded CBAs have not stopped Northern Territories, NSW or, most recently Queensland, from deciding to implement a CDS. On balance, these regulators have identified that CDS is the most cost effective system for their communities.

The Packaging Forum’s highly promoted programmes (such as the Public Space and Soft Plastic recycling schemes) have failed to reach even modest targets. These programmes need public scrutiny to account for the significant amounts of public funding they have received for negligible results when compared with the potential of CDS.

Large corporations have spent millions opposing CDSs all over the world, consistently claiming the costs would be too great²⁵. However, these companies are also accustomed to operating in CDS

²⁴ There are concerns amongst some economists as to the suitability of CBAs to evaluate complex projects like CDS

jurisdictions and know the costs of participation are minor and will have little or no effect on their businesses. Because they cannot argue against CDS on the basis of commercial impacts, they produce reports which inflate costs and undervalue the benefits of CDS to imply large costs to society. Similar studies produced by industry have been successful at stopping CDSs being introduced. In spite of this, more countries and states are looking to CDSs to increase their stubbornly low recycling rates and reduce litter and waste costs.

For the reasons outlined above, the impasse between different approaches to evaluating CDSs can only be addressed by Government taking an independent view and eliciting the advice of all stakeholders in order to achieve the best outcome for recycling beverage containers in New Zealand.

Recommendation

The key recommendation of this report is that ,

The Minister for the Environment, calls together a multi-stakeholder group made up of representatives of the MfE, local government, environmental groups, recyclers, academia and industry to:

- 1. Evaluate the feasibility of a CDS for New Zealand**
- 2. Investigate the cost-effectiveness of recycling programmes promoted by Industry groups that have received large amounts of public funding with little public or wider sector input or scrutiny**

²⁵ For example, opponents of extending Massachusetts CDS to include water bottles in 2010, predicted it would cost \$116 million per year and increase the cost of each beverage by approximately five cents (above the refundable deposit). Research by the Massachusetts Government²⁵ found *“the presence of a bottle deposit law does not have a discernible effect on the retail price of beverages. Beverages surveyed often cost more, not less, in states without a BDL (Bottle Deposit Law) than in states with a BDL”*.

Appendix One

Limitations of Cost Benefit Analysis for large complex projects such a CDS

The PF report claims important Government decisions should be accompanied by a 'formal' Cost Benefit Analysis (CBA). It should be noted that the CBA was not commissioned by Government which when it evaluates CDS, should develop a brief requiring all benefits to be valued and ensure that a wider range of interests have input into the design of that brief.

Regardless, concerns by international economists and academics about the use of such simplified CBAs to review the cost effectiveness of complex multifaceted concepts such as CDS should be mentioned. These include the following:

- The use of selected 'client-provided' data that can dramatically skew results.
- The status of economic values that are assigned to assets conceived as incommensurable with money.
- The amount of subjectivity involved when identifying, quantifying, and estimating different costs and benefits.

The articles listed below outline some of the concerns about CBA:

- The Myth of Cost Benefit Analysis, Denise Caruso²⁶
- Cost Benefit Analysis: Philosophical Issues, Sven Ove Hansson, The New Palgrave Dictionary of Economics, Online Edition, 201027
- Arguments Against the Cost Benefit Analysis, N. Plowman²⁸
- The Problem with Cost-Benefit Analysis, Christopher Tunnel, Arup²⁹

Appendix Two

There are numerous, urgent and potentially irreversible consequences of marine pollution:

- After assessing the potential for ingestion of plastics particles by open oceans filter feeders it was found that "plankton abundance was approximately five time higher than of plastic but the mass of plastic was approximately six time that of plankton" (Moore, Moore, Leecaster, & Weisberg, 2001).
- "While undoubtedly still an eyesore, plastic debris today is having significant harmful effects on marine biota. Albatross, fulmars, shearwaters and petrels mistake floating plastics for food, and many individuals of these species are affected; in fact, 44% of all seabird species are known to ingest plastic. Sea turtles ingest plastic bags, fishing line and other plastics, as do 26 species of cetaceans. In all, 267 species of marine organisms worldwide are known to have been affected by plastic debris, a number that will increase as smaller organisms are assessed" (Moore, 2008).
- "Approximately 35% of the fish studied had ingested plastic, averaging 2.1 pieces per fish. Additional studies are needed to determine the residence time of ingested plastics and their effects on fish health and the food chain implications" (Boerger, Lattin, Moore, & Moore, 2010).

²⁶ <http://www.strategy-business.com/article/08103?gko=13cc3>

²⁷ http://www.dictionaryofeconomics.com/article?id=pde2010_C000618

²⁸ <http://www.brighthubpm.com/project-planning/58627-arguments-against-the-cost-benefit-analysis/>

²⁹ <http://thoughts.arup.com/post/details/291/the-problem-with-cost-benefit-analysis>

- “All of the marine organism groups are at an eminent risk of interacting with microplastics according to the available literature” (Ivar do Sul & Costa, 2014).
- “Plastic can take up to 450 years to break down even in the harsh ocean environment. However, it has been estimated that 80% of plastic finding its way into the oceans now is emanating from land-based sources” (Townend, 2010).
- “Eighty of 135 (59%) species with studies reported in the literature between 1962 and 2012 had ingested plastic, and, within those studies, on average 29% of individuals had plastic in their gut”
- “The best research currently available estimates that there are over 150 million tonnes of plastics in the ocean today. In a business-as-usual scenario, the ocean is expected to contain 1 tonne of plastic for every 3 tonnes of fish by 2025, and by 2050, more plastics than fish (by weight)” (Ellen MacArthur Foundation & World Economic Forum, 2016).
- “Plastic litter accounts for 50–80% of waste items stranded on beaches, floating on the ocean surface and lodged in the seabed. Organic pollutants can be absorbed onto plastic particles from sea water, attached to their surfaces or included in the plastic matrix as additives. Such chemicals may be transported to remote regions by buoyant plastics and ocean currents. We have estimated mass fluxes of polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs), and perfluorooctanoic acid (PFOA) to the Arctic via the main ocean currents and compared them to those in the dissolved state and in air” (Zarfl & Matthies, 2010).
- “Plastic debris has significant environmental and economic impacts in marine systems” (Ryan et al., 2009).
- “Marine debris (marine litter) is one of the most pervasive and solvable pollution problems plaguing the world’s oceans and waterways” (Sheavly & Register, 2007).
- Micro-plastics also transport invasive species across marine territories.

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