Submission by

to the

Ministry for the Environment

on

Te panoni i te hangarua
Transforming Recycling consultation

Container Return Scheme
Improvements to household kerbside recycling
Separation of business food waste

May 2022

About the Glass Packaging Forum

The Glass Packaging Forum (GPF) is an industry funded voluntary product stewardship scheme, accredited by the Ministry for the Environment. Every year we report to the Ministry and the Minister on the GPF's performance.

The GPF and its members are committed to increasing recovery and improving the outcomes of all container glass. Currently the main mechanism for this is providing funding for projects that share these aims. Funding is awarded based on the impact of the project on glass outcomes.

More recently we have also invested in independent reports exploring what regulated product stewardship could look like for glass, as we believe that system change is needed to achieve more than incremental improvement.

Our members are committed to circular solutions both through their membership of the GPF and through their own sustainability initiatives. Two of our largest members having a long-standing involvement in New Zealand's biggest refill scheme, ABC Swappa Crate.

The GPF is committed to improving recycling rates and is working toward a glass capture rate of 82% by 2024.

As part of the GPF's commitment to being a Ministry for the Environment Accredited Product Stewardship Scheme (voluntary), significant effort is invested annually to improve glass data and improve outcomes for the 258,748 tonnes of glass released to market (GPF Accreditation Report 2021).

Our views on transforming recycling

The Glass Packaging Forum (GPF) welcomes and fully supports the Ministry for the Environment's aspirations for transforming recycling in Aotearoa New Zealand.

We believe system change must be informed by robust data, with input from industry, communities and behaviour change experts.

The GPF is opposed to the inclusion of glass within a container return scheme. We firmly believe it's the wrong solution for increasing glass recycling, where there are already established and successful recycling services and infrastructure.

According to preliminary findings from Grant Thornton in work commissioned by the GPF:

"Glass collection rates are already high compared to other materials, delivered through an almost national kerbside recycling collection network. This results in a highly convenient collection network with low cost of participation for consumers. The CRS puts this high collection rate at risk by reducing the convenience of glass collection (glass kerbside being at risk under many Councils if glass is included in a CRS).

Most Councils now operate glass-separate recycling, with colour-separation at source. This is industry-accepted best practice to recover the best quality of glass, minimise contamination and keep glass at its highest use and value. Moving to a CRS with mixed glass collection reduces the value of the glass collected and would increase the glass loss in processing and require much to be down-cycled - reducing the circularity of glass.

Collection solutions are required for hospitality and public spaces, as these areas are not services widely provided through the current network. Consumption of glass bottles at hospitality venues is the much larger value at stake - this represents the largest opportunity to improve the collection network, and necessary to reach 90% collection. The CRS does not directly solve this area of glass consumption and any market-based solutions that arise afterwards would be slow to form and likely not provide a national solution."

We believe that through the enhancement of existing legislation (The Waste Minimisation Act 2008) that better glass recovery and recycling rates may be achieved through a system which supports kerbside collections and works alongside a CRS for other materials.

This approach would deliver an easy to understand, single glass collection system which would boost recycling figures by capturing all types of glass containers (not just beverage) in one stream – all through an existing local authority collection infrastructure enhanced by the new complementary glass system and consistent regulations. This would be more cost effective, increase the quality of the recycled material, help create a truly circular economy and reduce the burden on consumers in contrast to a CRS with high levels of deposits, which would essentially be funded by consumers.

A proposal to move glass away from household collections is not just the wrong solution for glass recycling and the glass industry but does not recognise the societal change of home working, or the financial pressures placed on household budgets as a result of the pandemic.

Most glass beverage bottles are consumed at the home and, with more people working from home coupled with the rapidly rising cost of living, we question why Government would consider forcing consumers to pay a deposit which can only be paid back at a retail locations, and incentivising travel, when we already have a convenient system in place at the kerbside for the majority of New Zealanders.

Container glass currently has a 75% recovery rate (GPF Accreditation report 2021). The GPF supports the proposed CRS recovery target of 85% in the first three years in principal, whether that is through a CRS, or an alternative regulated scheme for container glass. The biggest challenge for a CRS would be to ensure that the quality of glass collected is at the very least maintained, and more ideally improved, so that the recycling rate is also increased.

This has been one of the major goals of the GPF, and the reason we have had such a strong focus in our funding grants and advocacy relationships for glass separate kerbside collection, colour separated at source. The proposed CRS appears to be a collection of mixed glass from a hybrid model. For that reason, we support Proposal 5, option three, but would like to see a separate regulated scheme for glass to run alongside a CRS.

We fully support Proposal 5, option three: glass collected separately at kerbside

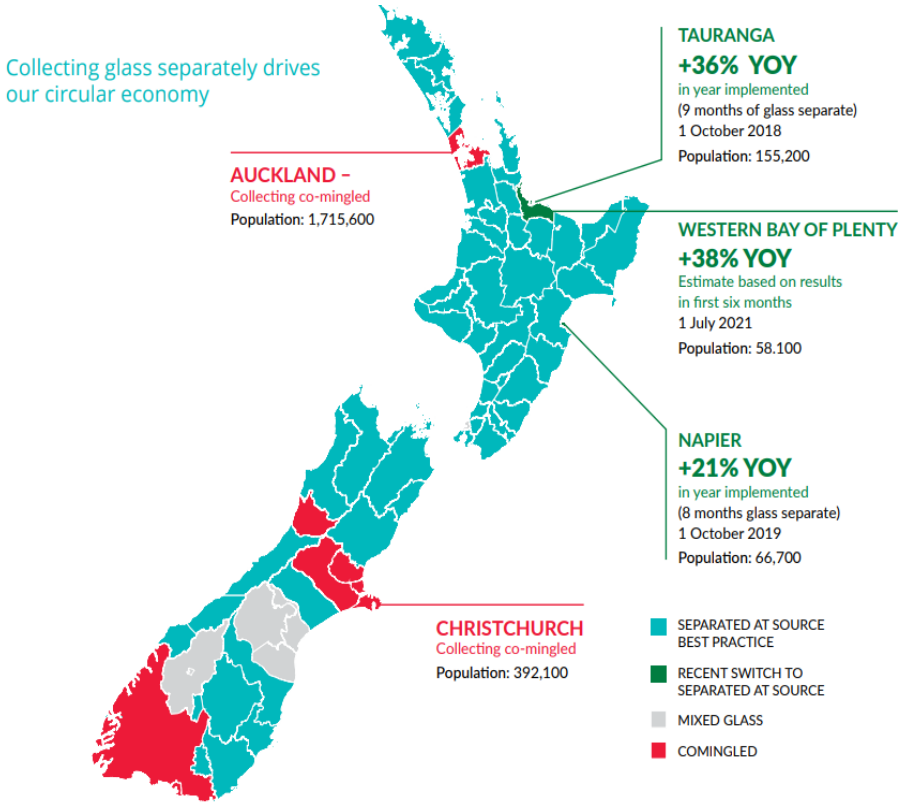
The GPF has long advocated for glass being collected separately at kerbside and colour-separated at source as this has been proven to be best practice in terms of improving both recovery rates and the quality and quantity of glass available for recycling.

As noted in the consultation document, it also improves the recyclability of other materials due to reduced contamination i.e. glass contaminates fibre and vice versa

For container glass, improving recovery and recycling rates can be best achieved by improving the existing kerbside collection systems and infrastructure. This is something the GPF has supported through grants for plant and infrastructure.

Examples of the benefits of switching to glass separate collections are noted in our latest accreditation report with Tauranga City Council seeing a 36% increase, Western Bay of Plenty District Council seeing a 38% increase and Napier City Council seeing a 21% increase in recovery volumes. The switch to glass separate collections in Tauranga and Western Bay of Plenty were assisted by GPF funding.

The most effective route to increasing glass recycling is a combination of a regulated product stewardship system, clear communications, harmonised local authority kerbside bolstered by supporting collection methods (e.g. drop off points, bottle banks, community recycling network) and increased recycling targets.



Council collection methods, GPF accreditation report

Best practice glass separate collection is supported by the vast majority of councils but isn't currently available to 46% of New Zealanders. Two of the largest councils accounting for 41% of the population are still offering a co-mingled collection service only. These two contracts influence over 80,000 tonnes of glass per year

This is low hanging fruit in the quest to improve the glass recovery and recycling rate and could be achieved at a fraction of the cost of the proposed CRS.

These co-mingled collections are a major barrier to higher recovery and higher recycling rates due to contamination and loss during the sorting process of co-mingled collections. Glass separate collections have been proven to increase recovery and recycling rates.

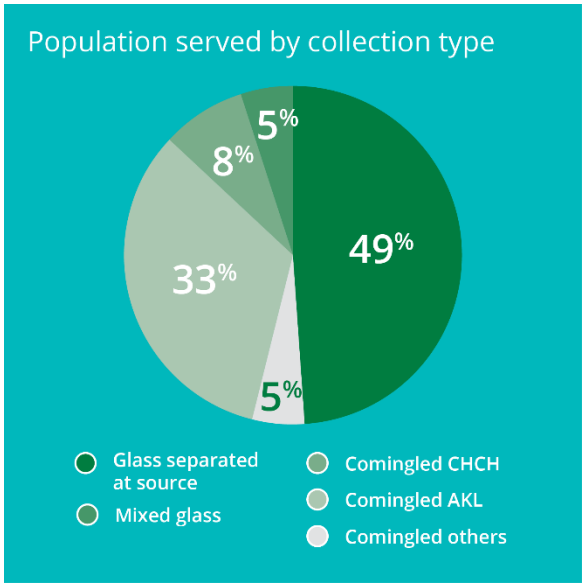
Any regulation regarding separate kerbside collections of any recyclable material, but particularly glass, must ensure circular outcomes are considered the highest priority, with alternative uses only able to be considered for glass that is not recyclable. Christchurch for example, collects glass in its recycling bin, but continues to send it to be used in aggregate. They recently rejected a proposal that would have made their container glass available for recycling.

How do we define contamination?

The GPF views co-mingled recycling collections as a legacy from the 20th Century rather than a sustainable resource recovery model to deal with modern day challenges.

To maximise use of cullet, the glass recycling plant needs to receive it colour-sorted, i.e. green, brown and clear (flint). When glass is compacted on collection (to achieve transport efficiency), it breaks, resulting in different colours of glass being mixed together. Glass is also mixed with contaminants and in other recyclable materials, such as paper. Small fragments of glass (known as fines) can become embedded in paper, reducing the value and usability of paper that can be recycled in New Zealand.

The GPF estimates that 50% of glass collected through the Auckland Council commingled collection is not suitable for glass manufacturing due to colour contamination and contamination by other materials.



Percentage of Population served by collection method

Shifting to a glass separate collection system is something we believe can and should be implemented sooner than the proposed timeline of 2025. This is due to it having proven positive impacts and being simple to implement because of the already extensive infrastructure and transport systems in place in New Zealand.

Quality must be considered alongside quantity of material recovered

Container glass is a highly recyclable material but collecting it within a Container Return Scheme collection system compromises the quality of glass available for recycling.

Glass must be colour separated at source. This avoids loss in the system that occurs when it's sorted after consolidation. It also means a higher percentage of recycled glass can be used in the furnace to manufacture new glass, due to minimising cross-colour contamination.

The majority of glass collected by CRS systems is mixed colours. For this reason, any gains made in the recovery rate are unlikely to be reflected in the recycling rate.

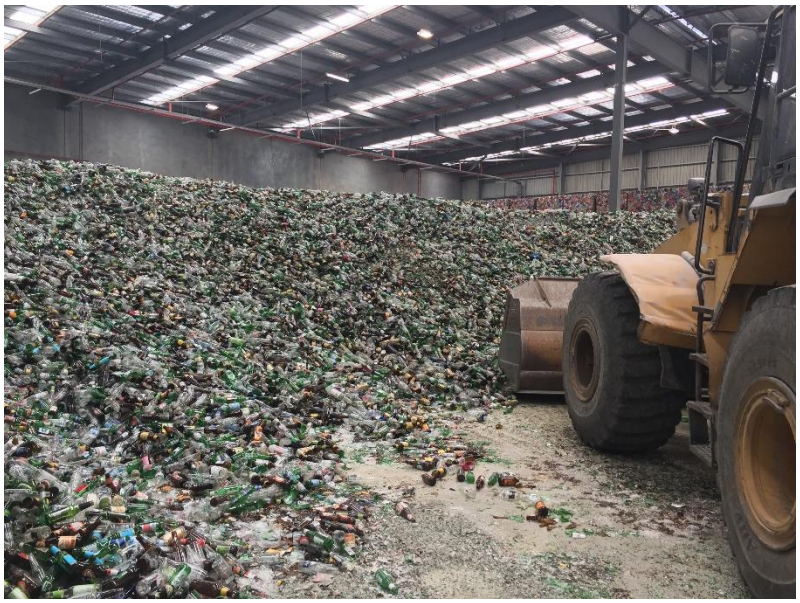
In the most recent international example, England and Northern Ireland found this loss of quality would outweigh any benefit from including it in a CRS (Department for Environment Food & Rural Affairs, 2022).

A recent Valpak report for the British market highlighted a direct link between the quality of glass collected and carbon impacts, (Reconomy Group company, Valpak, 2021). It found a "consistent kerbside scheme is better for the environment than a deposit return scheme, delivering at least 11% more carbon savings (over 2 million tonnes of CO_2 by 2035)".

While this report was in a British context it's possible to draw similar conclusions for New Zealand. This is because, as noted by Valpak, glass collected through reverse vending machines is less suitable for recycling. As a result, the carbon savings from using high rates of recycled material to make new glass containers is less achievable than if high-quality, colour-sorted glass was available.

As far as we are aware, no such analysis has been done for container glass in New Zealand.

The quality of glass currently collected from local authority collections is high due to investment in infrastructure and sorting facilities to better sort glass into colour streams, and more local authorities moving from co-mingled to separate collections for glass. We are therefore at a point where kerbside collections provide a high quantity and quality of glass for bottle-to-bottle-recycling.



Mixed Glass collected via the Queensland Containers for Change scheme

We support regulated product stewardship for all container glass that works alongside a CRS for other materials

The GPF is strongly in favour of beverage glass being excluded from the container return scheme (CRS). But that doesn't mean it should be excluded from industry funded regulated product stewardship. We support a regulated product stewardship scheme for all container glass.

Such a scheme would:

- Be fully industry funded and not for profit
- Include all container glass (not just beverage containers)
- Address the entire glass lifecycle
- Leverage, enhance and expand existing kerbside infrastructure and collection systems as its main collection mechanism
- Keep glass recycling simple for consumers by capturing all container glass in one stream
- Work alongside any CRS for other materials, potentially sharing governance and other resources
- Have the same targets as the proposed CRS

Our members have been keen to engage with government on the co-design of such as system and explore how it could operate alongside a CRS. We formally requested this of the Minister in March 2021, however this offer was not taken up.

Consequently, prior to the release of the Transforming Recycling consultation document, we appointed independent consultants Grant Thornton to design and cost a regulated model to extract the maximum value from glass packaging and further develop the glass circular economy.

The expected outcomes of this report are:

- Understanding of costs associated with meeting the cost of an evolved glass product stewardship scheme
- Opportunities to move beyond the 82% glass capture rate by 2024.
- Efficiency in the nationwide recovery and end use of glass packaging.
- The evolution of the existing scheme into a fully funded industry solution that may be consulted upon and considered for a regulatory approach
- A solution that has the potential to be further developed and provides for the collection and processing of glass packaging in scope. We require that the Report gives reference to MfE's regulated stewardship framework guideline.

Their report is due mid-June, but the following high-level findings have been presented:

- Glass recycling rates can be much higher, but a CRS does not address many of the root causes between collection and recycling rates. Improving glass recycling should be an aim of the future state model and the CRS assumes no additional recycling of glass (only increased recovery).

- Variable fees need to be cognisant of lifecycle assessment for that material and furthermore the assessment includes consideration of the ultimate origin (including emissions and issues with modern slavery in the mining and shipping) and destination of the material (length of transport loops as it is recycled and eventually downcycled).
- Recovery rates of 90% are unlikely to be realised without a nationwide solution for hospitality collection. Hospitality represents approximately 10-15% of volume and is therefore critical to stepping beyond 85% recovery. Market solutions for this may occur under the current CRS design, but likely won't happen fast enough, or with sufficient national coverage to realise such a high recovery rate.

We request that the full report be considered alongside submissions when considering the final CRS design.

Recovery and recycling rates

While a CRS is likely to increase recovery rates there has been little to suggest it would increase recycling rates for beverage glass – especially given the Ministry's consultation document recommending a mixed collection model using reverse vending machines (RVMs) that don't colour-sort glass.

This co-mingled approach to collecting glass, which leads to lower quality glass and more loss in the system was the primary reason for England and Northern Ireland excluding glass from their proposed DRS.

A New Zealand regulated scheme for all glass, leveraging existing kerbside infrastructure, using best practice separated-at-source collection methodology can increase recycling rates. This is because it would:

- Increase the quality and quantity of glass available for recycling
- Invest in the collection network and infrastructure which would increase access to kerbside collection and drop off facilities
- Invest in citizen education and behaviour change initiatives

Internationally, an independent report conducted for British Glass (Reconomy Group company, Valpak, 2021) found a kerbside scheme will achieve a collection rate of close to 90% for all glass as opposed to 85% for beverage glass in a DRS. As far as we are aware, no such modelling has been carried out when considering what material should be included in the proposed CRS.

The GPF is strongly opposed to the inclusion of reverse vending machines (RVMs) as a mechanism for the collection of glass as this move will be detrimental to improving both the quality and quantity of recyclable glass collected.

Additionally, the CRS focus on beverage glass excludes and places at risk nearly 40,000 tonnes of non-beverage glass (GS1/IRI data included in the GPF accreditation report 2021).

Prioritising circular outcomes

Regardless of whether container glass is collected via a CRS, another regulated scheme, or mandatory glass separate kerbside collections, prioritising circular outcomes must be baked in to the regulation. Any scheme or collection must endeavour to collect glass in such a way as to maximise

recycling, minimise contamination and loss in processing, and only consider alternative uses as a last resort.

Overseas experience

Internationally, there is strong evidence for container glass being recovered in a regulated scheme operating alongside a CRS. In Norway glass is recovered through a kerbside system and achieves a recovery rate of over 90%.

England and Northern Ireland have recently decided glass will be excluded from their deposit return scheme (DRS) (Department for Environment Food & Rural Affairs, 2022). The key reason, as previously noted, is collecting mixed glass lowers the quality of material available for recycling and increases the need for costly optical sorting.

The GPF has the same concern for a CRS in New Zealand due to the recommended collection model using reverse vending machines. This would be a retrograde step which would not adhere to proven best practice collection methodology for increasing the recyclability of glass.

Should RVM's be part of the network, the GPF believes the scheme management organisation will be economically driven to reduce the cost burden of moving small tonnage of glass from multiple locations, with efficiency being achieved through compaction and crushing. This would certainly result in poorer quality glass.

Like Norway before them, England and Northern Ireland will be placing glass in an extended producer responsibility (EPR) model instead, which will operate alongside their DRS, where producers pay the cost of managing the glass and must meet recovery targets.

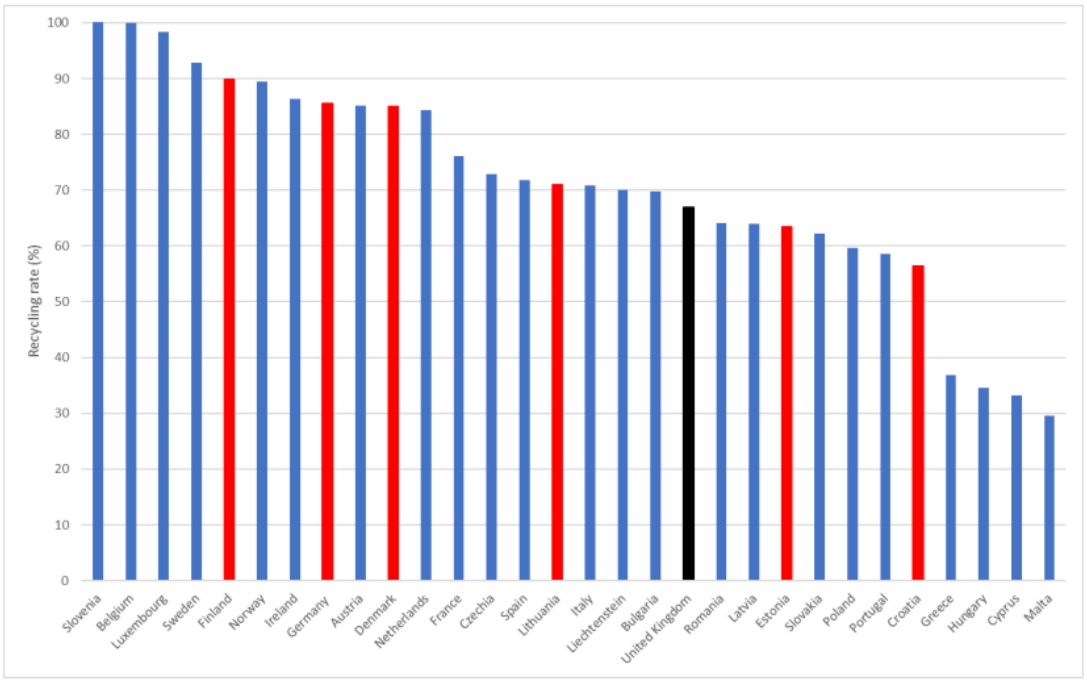
Wales is set to progress with a DRS which includes glass. However, this is after considerations which included advances in digital DRS technology solutions that could allow bottle returns via existing kerbside collection infrastructure. The Valpak report (Reconomy Group company, Valpak, 2021) finds that the nine counties where the Government Blueprint is established are recovering more than 90% of glass. If this technology were to be available in New Zealand in the future, both the mechanism of a consumer incentive and a recovery method that delivered quality glass would be served.

Slovakia's DRS, operational from January this year, includes PET bottles and cans only; other packaging falls under extended producer responsibility obligations where producers are responsible for end of life costs. (Plastics and Packaging Laws in Slovakia | CMS Expert Guide, n.d.). Malta's soon to launch scheme is excluding wine and spirit bottles (Martin, 2022), which we note are commonly consumed at home or in hospitality settings and therefore most suited to kerbside and commercial collection.

Furthermore, as noted in the New Zealand Institute of Economic Research's report on a proposed CRS (New Zealand Institute of Economic Research, 2020) European experience indicates in most countries with a mandated CRS, such schemes were introduced when no kerbside collection schemes existed. It is therefore vital to look at more recent examples, such as England and Northern Ireland, for international experience when designing a scheme for New Zealand.

A report by Oakdene Hollins et al (2019) found that the top four European countries with the highest recycling rates for glass do not include it in a DRS, but have an EPR in place instead. Of the top ten, only three include glass in a DRS.

Figure 3: The glass packaging recycling rate across Europe



Source: Eurostat. Key: Red = MS operates a DRS for one-way glass; Blue = MS does not operate a DRS for one-way glass

Oakdene Hollins 2019

Across the Tasman, CRS's have found favour to address the woeful recycling rates resulting from the widespread use of co-mingled recycling collections. Such a problem in New Zealand could just as easily be rectified with the harmonisation of kerbside collections.

We strongly urge the Ministry to thoroughly evaluate the Grant Thornton report on an alternative scheme for glass when it is released in June, before making a decision on the inclusion of glass in the proposed CRS.

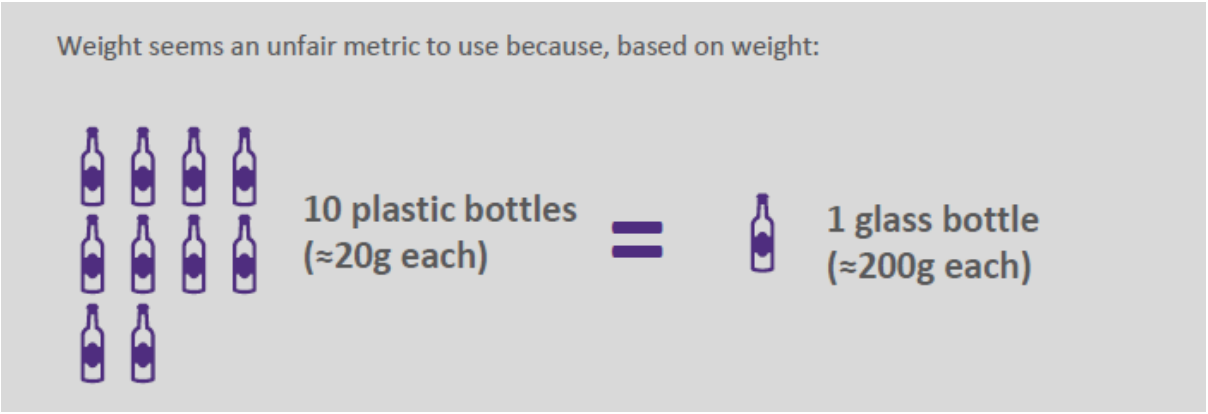
Litter impacts and the cost benefit analysis

MfE cites litter from beverage containers as one of the primary drivers for a CRS (Introduction P11; Why do we need a CRS p24), however the analysis if fundamentally flawed.

A peer review by Grant Thornton of the litter factor in the Sapere Cost Benefit Analysis (see appendix 2) highlights the following issues:

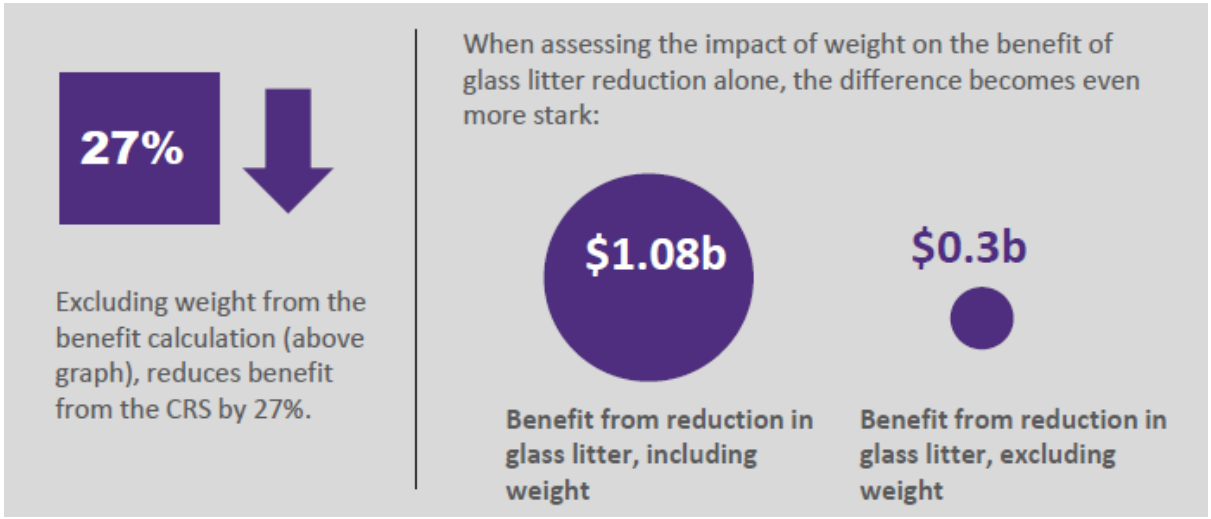
- Litter quantity is referenced in the Sapere report, but is not an independently audited total.
- Despite having no impact on the remainder of the report, and not being a validated figure, the 190,000T total is used to quantify the impact of a CRS. This seems misleading in the context of the Sapere report and should be omitted to prevent possible confusion about the potential impacts of a CRS.

- Glass's over-representation in the calculation is evidenced by the fact that despite constituting 26% of litter by weight, glass constitutes only 5.7% of litter by volume.



Excluding weight from the benefit calculation (above graph), reduces benefit from the CRS by 27%.

When assessing the impact of weight on the benefit of glass litter reduction alone, the difference becomes even more stark: $1.08b benefit from reduction in glass litter including weight. $0.3b benefit from reduction in glass litter, excluding weight.



Another review, by the New Zealand Institute of Economic Research (see appendix 1), found that the Sapere analysis estimate of 60,000 tonnes of beverage litter is weak and the derivation of the estimate is not clearly explained.

A risk of overestimating litter is creating a false baseline on which to measure future scheme performance. This in turn will impact decisions on changes in the deposit amount, as an example.

It additionally found that the use of willingness to pay estimates that are more than 10 years old and connecting them to weight has led to the overstating of litter benefits. More recent willingness to pay research by The Packaging Forum shows willingness to pay $31.18 for a 14.5% reduction in litter. This is in line with a recent Australian study by the Centre for International Economics which estimated willingness to pay $23 to $32 for a 20% reduction in letter.

The NZIER alternative estimate of welfare gain is 458M to $665M, rather than the $2,348M stated in the CBA.

Consequently, they estimate the welfare gain from reduced litter to be overstated in the CBA by a factor of 3.5 to 5.

Additionally, a peer review of the CRS Cost Benefit Analysis by the New Zealand Institute of Economic Research (NZIER & Henson, 2022), see appendix 3, found:

"The benefit of avoided litter has the largest value of the benefits attributed to the container return scheme (CRS) and is responsible for the CRS having a positive cost benefit ratio. However, the estimated value of avoided litter is based on old willingness to pay surveys and then applied to beverage containers using a combination of number of items, volume and weight.

A recent Australian study estimated the willingness to pay for a 20 percent reduction in the share of sites with litter at about $23 to $32 per household per year, less than half of the values in the PwC and University of Leeds studies quoted in the CRS cost benefit analysis (CBA).

Neither of the willingness to pay studies quoted in the CRS CBA include questions about the weight of litter. The PwC study specifically states in its conclusion that the estimated willingness to pay values cannot be reliably linked to litter weight."

We recommend the CBA be updated using the KNZB National Litter Audit 2022 (to be released in October) based on units and volume.

We further request that the Ministry update the regulatory impact statement to reflect the findings of these CBA peer reviews and/or using more accurate and verified data.

Deposit rate

While the GPF believes glass should be excluded from the proposed CRS, we have no position on the inclusion of other materials.

We believe a 10c deposit should be applied rather than 20c. We recommend the deposit should be GST inclusive.

This is because:

- of the additional inflationary impact of a 20c deposit over a 10c deposit.
- 20c is out of step with the 10c deposit in Australia. This could lead to the issue of arbitrage, where packaging is shipped across state and international borders for the highest return rate. This is common in Europe, and has been a consideration in harmonising the deposit across Australia. With a higher deposit rate, New Zealand could be targeted for this activity by operators from Australia and the Pacific.
- The risk of other fraudulent practices are also incentivised by a higher deposit rate, such as the manufacture of counterfeit containers, as noted by the OECD (OECD Publishing 2015).
- Complexities and additional costs are introduced for businesses who operate cross-Tasman with differing deposit rates.
- Introduction of a 10c deposit in Queensland saw a corresponding 6.5% decline in non-alcoholic beverage sales, according to research by KPMG (2020). This has been acknowledged in the government's Interim Regulatory Impact Statement. We are concerned a 20c deposit will cause be an even bigger economic impact on New Zealand businesses, leading to loss of jobs and reduced excise take in the case of alcoholic beverages.
- According to research by Horizon, carried out for The Packaging Forum in March 2022, while 38% of respondents would find a 10c deposit acceptable, only 13% that would find a 20c deposit acceptable. 36% would not find any deposit acceptable.

A New Zealand Institute of Economic Research review of the CRS Cost Benefit Analysis (NZIER & Henson, 2022) (see appendix 3) found:

"The Interim Regulatory Impact Statement reports '*Scheme net costs to consumers (accounting for unclaimed deposits) are likely to be NZD 3–5 cents per container (+GST).*

We estimate that the average net scheme cost per container is 8.1 cents (a scheme fee of 4.5 cents and unclaimed deposits of 3.6 cents) plus GST of 3.7 cents (3.0 cents of GST on the deposit and 0.7 cents of GST on the scheme fee).

The net scheme cost for a scheme with a 20 cent deposit is expected to be 20 to 28 percent higher than a scheme with a 10 cent deposit, but the return rate will only be about 8 percent higher."

There is also a social impact to consider in terms of how a 20c deposit will impact already disadvantaged New Zealanders who are not able to easily return their containers and claim their deposit. Reasons for this could range from age to disability and lack of transport.

As glass is primarily consumed in the home, excluding it from a CRS in favour of a regulated, kerbside-based scheme would further reduce the impact of a deposit on those who cannot easily redeem it.

Hospitality

The other setting in which glass is largely consumed is hospitality. The Ministry has acknowledged the proposed CRS would not address recovery from this sector.

The GPF acknowledges that the current kerbside recycling system also doesn't address recovery from hospitality. However, a regulated scheme has the potential to address this as it would create greater financial incentives for commercial operators to collect glass from hospitality.

We are concerned that the proposed CRS will further impact an industry that is struggling to regain its footing after two incredibly challenging years.

Conclusion

The GPF is dedicated to reducing container glass loss to landfill and increasing recycling rates. The GPF and the container glass industry are eager to support a co-design process for a regulated model for glass.

We believe, given the evidence available, this would serve to improve the recovery and recycling of all glass containers through a system which is simpler, more cost effective and can be quickly and easily put in place than including glass in a CRS.

Put simply, including glass in the proposed CRS just to make the scheme viable is contrary to the Government's goal of transitioning to a low-carbon economy.

The GPF maintains that kerbside (one truck to many households) as the main collection methodology, is the better and more equitable recovery model, in terms of cost to the scheme, cost in time and travel to households, quality of material collected and equity of access to those with limited mobility.

We are eager to engage with the Ministry to develop the best solution for improving glass recovery and recycling rates in Aotearoa New Zealand.

Please note there is a list of references used in our submission at the end of our submission, in addition to appendices.

Part 1:
Kaupapa whakahoki ipu
Container Return Scheme

1. **Do you agree with the proposed definition of a beverage?**

   Yes

2. **Do you agree with the proposed definition of an eligible beverage container?**

   Yes

3. **Do you support the proposed refund amount of 20 cents?**

   No

   Comment:

   We believe this is higher than the CRS working group recommended and would lead to higher inflationary pressure than a 10c deposit.

   A report from KPMG (2020) shows that non-alcoholic beverage sales were approximately 6.5% lower as a result of the 6.7% price increase after the introduction of the Queensland CDS. We would expect a higher deposit of 20c to result in a higher corresponding economic impact on New Zealand businesses, leading to job losses and a reduction in excise on alcoholic beverages.

   A 20c deposit is inconsistent with schemes in Australia, which creates complexities for brands operating cross-Tasman and creates a real risk of arbitrage, where containers are shipped by commercial contractors to where the highest deposit is offered and other forms of fraud, such as counterfeit containers.

   A review of the CRS Cost Benefit Analysis (NZIER & Henson, 2022), see appendix 3*, found "The net scheme cost for a scheme with a 20 cent deposit is expected to be 20 to 28 percent higher than a scheme with a 10 cent deposit, but the return rate will only be about 8 percent higher."*

   It should also be noted that the level of the deposit will not be the only factor which will influence consumers to use the scheme, such as ease of access to return points.

   We are extremely concerned about the significant upfront costs of deposits being placed on multipacks which has the potential to achieve perverse environmental outcomes such as switching to a less recyclable packaging, poorer portion control and market distortion.

   Please see our introductory remarks for more on deposit rate.

4. **How would you like to receive your refunds for containers? Please answer all that are relevant and select your preference.**

Access to all options

The GPF believes any refund system must be as simple and easily accessible as possible, for all users, and not create any unnecessary barriers to redemption regardless of access to technology or literacy levels. We have serious concerns over how a CRS will impact disadvantaged, elderly or disabled New Zealanders who don't have easy access to transport for returning their containers and claiming their deposits back.

5. **Do you support the inclusion of variable scheme fees to incentivise more recyclable packaging and, in the future, reusable packaging?**

No

While we agree with eco-modulation in principle, to reflect the actual end-of-life management costs, we are concerned about the term "plus environmental costs."

The characterisation of glass in the consultation document is that it is "harder to recycle" due to limited onshore markets, while aluminium is given as an example of a material that would attract a lower fee, despite relying entirely on offshore markets.

Glass is 100% recyclable and infinitely recyclable, and has export markets that have not yet been fully explored. Additionally, if considerations are given to upstream impacts, those need to include all environmental impacts of resource extraction and production as well as the downstream impacts of end market use, regardless of whether that is onshore or offshore.

Aluminium for example has significant environmental impacts caused by extraction and processing, as well as recycling. These are not limited to carbon impacts.

While it might seem desirable to reduce New Zealand's carbon emissions by favouring materials where recycling emissions happen offshore, climate change knows no boundaries. There is likely to be a moment in the near future, as happened with plastic under the China Sword, where this is no longer acceptable and overseas markets for aluminium will be reduced as other countries seek to reduce their own carbon emissions.

This is one of the reasons we support cradle-to-cradle lifecycle analysis of all environmental impacts of all packaging types in a New Zealand context, including single trip vs reusable where appropriate. Businesses are keen to fully understand these impacts to assist in making the right choices for their products.

See the key early findings of Grant Thornton in our introductory comments for further commentary on this topic.

6. **Do you agree with the proposed broad scope of beverage container material types to be included in the NZ CRS?**

No.

The GPF has long advocated for glass being excluded from a CRS as it already has a high recovery rate (75%) for all containers, not just beverages, and a collection and transport infrastructure with three decades of investment.

CRS schemes largely rely on collecting mixed-colour glass, which is often crushed for transport. This results in more loss in the system and glass of lower recyclability than the source separated

collections carried out by most New Zealand councils. This is the reason that glass has been excluded from the English and Northern Ireland DRS.

According to a report by Oakdene Hollis (2019), the top four European countries with the highest glass recycling rates do not include it in a DRS, and only three of the top ten operate a DRS that includes glass.

Additionally, like milk, beverages in glass are largely consumed in the home, particularly wine and spirits. We believe this is likely to be the reason wine and spirit bottles have been excluded from Malta's DRS (Martin, 2022).

Slovakia has also excluded glass beverage containers from its recently launched DRS (*Plastics and Packaging Laws in Slovakia | CMS Expert Guide*, n.d.).

In England, Northern Ireland and Slovakia, glass beverage containers will be and are respectively subject to alternative producer funded systems which will operate in addition to a DRS.

Please see our introduction for more detail and references regarding this.

As we have advocated for some time, we believe at least one other option for regulated stewardship for all container glass should be thoroughly examined before deciding on including beverage glass in a CRS.

The GPF has engaged independent consultants Grant Thornton to develop an alternative glass scheme that would meet the regulated stewardship framework an extract the maximum value from glass packaging to support the circular economy.

This extensive piece of work has been underway since prior to the announcement of this consultation. The report is due to be released in late June. We request that the report be considered as part of the consultation process upon its delivery.

Please see our introductory remarks for more information on the expected outcomes of this report.

7. If you do not agree with the proposed broad scope (refer to Question 6), please select all container material types that you think should be included in the scheme.

Glass should be excluded.

The GPF has no position on the inclusion of other materials in the proposed CRS.

8. Do you support a process where alternative beverage container packaging types could be considered on case-by-case basis for inclusion within the NZ CRS?

Yes.

But for new material or new mixed material combinations only.

9. Do you agree with the proposal to exempt fresh milk in all packaging types from the NZ CRS?

No

We are concerned about the basis on which fresh milk has been exempted – that it is a food staple, is largely consumed at home and that it has a higher recycling rate than other plastic beverage containers.

- We agree that as a food staple, including fresh milk will have a significant cost and inflationary effect – however this equally applies to other beverages included, including plant-based milks, which many households consider to be a food staple, either for dietary requirements or environmental considerations. Excluding fresh milk, but including plant-based milks, creates a competitive advantage to the dairy industry.
- We have not seen any evidence that milk bottles have a higher recovery rate than other plastic bottles. However, glass has a high recovery rate of 75% (GPF Accreditation report 2021).
- Like milk, many other beverages are largely consumed at home, particularly wine and spirits, the majority of which are in glass bottles.
- Logically, the reasoning given for excluding milk would also exclude glass beverage containers, particularly those largely consumed at home.

10. Do you support the Ministry investigating how to target the commercial recovery of fresh milk beverage containers through other means?

Yes

We agree there may be another product stewardship solution for these containers. Packaging should be dealt with in terms of what material it is made of and not what food or beverage it contains. We support regulated stewardship which is well designed, evidence based and optimises existing infrastructure. A robust co-design process for fresh milk beverage containers may ultimately result in a stand-alone scheme, or one combined with other materials.

11. Do you support the Ministry investigating the option of declaring fresh milk beverage containers made out of plastic (eg, plastic milk bottles and liquid paperboard containers) a priority product and thereby including them within another product-stewardship scheme?

No.

This solution is comparable to that put forward to the Minister for the Environment in March 2021 for container glass. If glass is included in the proposed CRS, we would question why the regulated stewardship process would be different for fresh milk beverage containers. Please see our answer to Q10 for our preferred scheme design process.

12. We are proposing that beverage containers that are intended for refilling and have an established return/refillables scheme would be exempt from the NZ CRS at this stage. Do you agree?

Yes.

The GPF supports the expansion of refillable solutions in New Zealand but believes the existing barriers will not be addressed by a CRS due to lack of government knowledge on the existing barriers to expanding refillables. The majority of bottles are released to market through a very centralised model due to proximity to the glass furnace and key supply routes.

13. Should there be a requirement for the proposed NZ CRS to support the New Zealand refillables market (eg, a refillable target)?

No.

A CRS cannot have targets for processes outside of its direct influence.

14. Do you have any suggestions on how the Government could promote and incentivise the uptake of refillable beverage containers and other refillable containers more broadly?

The GPF has recently published Refillable Glass Containers in Aotearoa New Zealand (Glass Packaging Forum, 2022b). It outlines some of the challenges and possible solutions to expanding the refillables market in New Zealand. Some of the challenges include:

- The impact of transport, and uncertainty of the carbon impact in a New Zealand context
- Lack of a New Zealand context cradle-to-cradle life cycle analysis for single trip vs reusables
- The capital investment barrier to entry for new refillable schemes
- The export focus of some glass packaged goods
- Industry resistance to standardisation of packaging
- Quality control issues

Some of the solutions include:

- Industry collaboration on standardisation
- Subscription swap models
- Use of technology to make refillable systems more efficient
- Expansion of "fill your own" models for beverages
- Opportunities for vertically integrated businesses or those with a high level of control over their supply chain.

In work by Grant Thornton, commissioned by the GPF, shows there is wide agreement that refillables have wide support.

"In our consultations with industry leaders – both beverage producers and waste management agencies – local collection and reuse, or the existing swappa crate model was one of the most mentioned examples of good practice that many would like to see return. There is an inherent understanding of this model, and it requires little education or explanation. It also has a strong alignment with local enterprise and social enterprise, the opportunity to provide good, meaningful work in communities across the nation."

Additionally they posit that contemporary technologies such as digital tokens and the internet of things have the potential to create better refillables networks.

"The IoT is increasingly a reality - you can use your smart fridge to buy groceries as an example. Other points in the chain of custody, such as POS machines, vending machines and refillable stations could be connected to make refilling as easy as PayWave has made payments and removing the need for cash handling.

"A major issue is the wide network of places where wash and refill used to occur are no longer. It will require investment to rebuild that infrastructure into the existing materials management network that we have in New Zealand."

As noted by Blumhardt (2020) establishing a baseline for our country on what environmental impacts are created by single-trip glass containers as opposed to refillable glass containers is vital to informed decision making. Government could fund a cradle-to-cradle lifecycle analysis in the New Zealand context for all environmental impacts and onshore circularity of refillables vs

single trip containers (all packaging types). This would allow businesses and consumers to make the most informed decisions.

15. **Are there any other beverage packaging types or products that should be considered for exemption?**

    Yes

    Glass should be excluded until an alternative, regulated stewardship model which optimises current infrastructure investment has been thoroughly investigated. Internationally there is precedence for this, such as in Norway where a CRS without glass achieves a 90% recovery rate while glass is collected through kerbside collections with a 93% recovery rate.

    England and Ireland will also be operating a DRS which excludes glass due to concerns over the collecting of mixed glass lowering the quality of material available for recycling and increasing the need for costly optical sorting. Concerns over the weight of handling the glass and the potential increase in handling costs and complex equipment were also factors in the decision. Slovakia has also excluded glass beverage containers from their DRS (*Plastics and Packaging Laws in Slovakia | CMS Expert Guide*, n.d.). Like Norway before them, they will be placing glass in an extended producer responsibility (EPR) model instead, where producers pay the cost of managing the glass and must meet recovery targets. Malta has excluded some glass beverage containers – wine and spirits bottles - from its DRS based on material use (Martin, 2022).

    Please refer to our introduction and answer to question 6 for more detail and references.

16. **Do you agree that the size of eligible beverage containers would be 3 litres and smaller?**

    Yes

    The majority of relevant containers would be under 3L.

17. **Do you think that consumers should be encouraged to put lids back on their containers (if possible) before they return them for recycling under the scheme?**

    No

    In the case of glass this would require extra sorting and present a higher risk of contamination at beneficiation. However, other avenues for collecting and recycling lids should be explored.

18. **Do you agree that the scheme should provide alternative means to capture and recycle beverage container lids that cannot be put back on the container? If so, how should they be collected?**

    Yes

    The GPF is in favour of capturing and recycling as much recyclable material as possible.

19. **Do you agree that a NZ CRS should use a 'mixed-return model' with a high degree of mandated retail participation to ensure consumers have easy access to container return/refund points, as well as the opportunity for voluntary participation in the network by interested parties?**

    No.

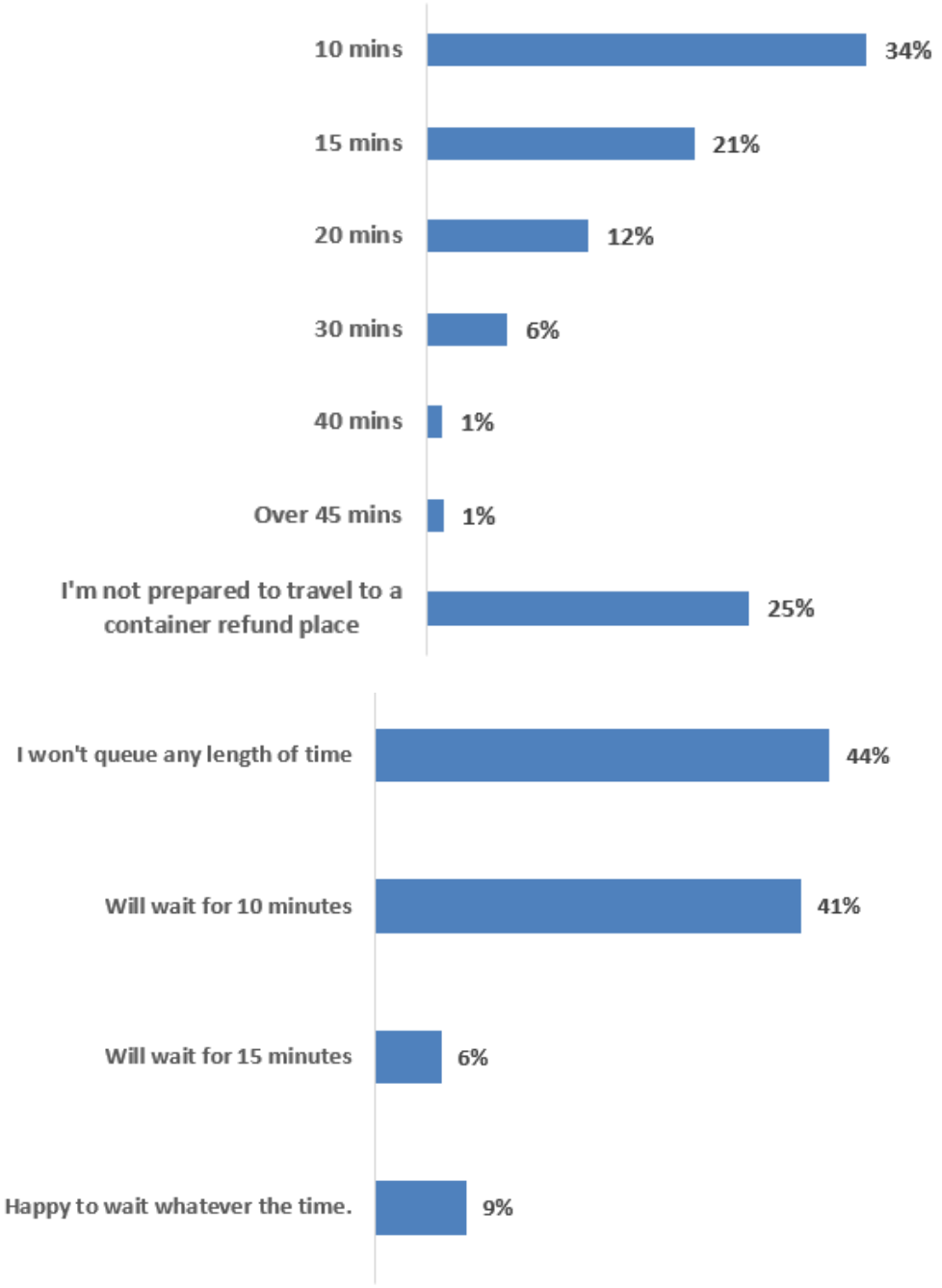
We are concerned about the pressure caused by creating a new collection network with a heavy cost and space burden on retail, when we have existing networks that could be easily optimised. Of particular concern is the large size of reverse vending machines with large footprints that could also cause congestion and safety hazards at retail outlets. There would also be additional security requirements for small retailers to safeguard returned product which would be an unfair burden to an industry that is often the victim of crime.

We support a diverse network of many return point operators run by community groups and private businesses, alongside an existing and standardised kerbside collection and MRF networks. In an open and competitive collection network, all operators are contracted to the Managing Agency, which is then responsible for awarding tenders in a transparent process. This maximises returns for community organisations, and enables a wide diversity of collection point types that suit different communities and consumers.

According to research carried out by Horizon for The Packaging Forum in April 2022, 41% of people are not prepared to travel 15 minutes or more for a refund, while 25% are not willing to travel at all.

Additionally, 44% are not prepared to queue for any length of time at all when dropping off their containers.

It's critical these factors are taken into account when considering the return network, or we believe there is an increased risk of failing to meet targets.



20. Where would you find it easiest to return eligible beverage containers? Please select all that are relevant and rank these from most preferred.

Other

The GPF supports the optimisation and expansion of existing collection networks for all container glass, not the creation of new networks for beverage glass only. Evolving the existing collection services and network could be achieved at a fraction of the cost of the proposed CRS.

We do not support the use of Reverse Vending Machines for glass, due to their limited capacity and reliance on mixed, crushed glass to be efficient. Mixed-crushed glass will lead to lower levels of glass recycling than current source separated kerbside collections.

21. **Retailers that sell beverages are proposed to be regulated as part of the network (mandatory return-to-retail requirements). Should a minimum store size threshold apply? And, if yes, what size of retailer (shop floor) should be subject to mandatory return-to-retail requirements?**

    No

    Please see responses to Q19 and Q20.

22. **Do you think the shop-floor-size requirements for retailers required to take back beverage containers (mandatory return-to-retail) should differ between rural and urban locations? If yes, what lower size threshold should be applied to rural retailers for them to be required to take back containers?**

    No

    Please see responses to Q19 and Q20.

23. **Do you agree that there should be other exemptions for retailer participation? (For example, if there is another return site nearby or for health and safety or food safety reasons).**

    Yes.

    The CRS should not impact the core function of any business. The health and safety and food safety impacts of all sites should be considered.

24. **Do you agree with the proposed 'deposit financial model' for a NZ CRS?**

    No.

    Our members support a refund model over a deposit model. The refund model ensures the scheme is responsible managing significant funds over time that otherwise belong to the "payers" of the scheme. This ensures the intent of improving recovery can be carried out. Additionally, throughout the industry, 90-day payment terms are common, leaving a significant liquidity gap, particularly for smaller companies, unless beverage companies are invoiced in arrears.

25. **Do you agree that a NZ CRS would be a not-for-profit, industry-led scheme?**

    Yes.

    We agree if a CRS were to be implemented it should be overseen by not-for-profit product stewardship organisation. We agree operationally it should be industry-led with governance by a wider stakeholder group.

26. **Do you agree with the recovery targets for a NZ CRS of 85 per cent by year 3, and 90 per cent by year 5?**

    No

We support aspirational targets, but are concerned that there is a low reliable level of baseline data for many materials. Validating a baseline through regulated data collection is vital before setting targets.

We believe that the 85 per cent recovery rate by year 3 and a 90 per cent recovery rate by year 5 are ambitious targets, particularly when New Zealand consumers are not involved to date in a scheme and awareness is low.

We would be further concerned that the target is simply recovery, which based on the data presented is often reflected as recycled rather than recovered. Recovery targets must be accompanied by recycling. Experience in Canada is that a collection target does not increase the recycling rate.

Most important is acknowledging that a circular outcome for a recycled material, often described as "bottle to bottle" in the document will vary by material. This is extremely important because for highly recyclable and exported materials like aluminium, it is almost impossible to measure a can as collected being reproduced as a can.

Further consideration must be given in the calculated methodology to onshore processing, either to base material (e.g., plastic granules) or oil. In the case of glass melt rate (glass to furnace) should also be part of this consideration.

The time periods also need to be validated as it is unclear what is the baseline and therefore specifically agreeing to the time periods is impractical.

27. If the scheme does not meet its recovery targets, do you agree that the scheme design (including the deposit level) should be reviewed and possibly increased?

Yes

If any scheme does not reach its 3-year target, we would support a review of the entire system, not just the deposit rate, be carried out. In particular network accessibility, barriers to scheme access and behaviour change as well as other system elements.

Please see our introductory remarks on litter. We do not believe that given the current data available, this should be a measure of success for a CRS.

Work by Grant Thornton commissioned by the GPF suggests the following options:

Once established a non-performing CRS would be hard to wind back, both in investment and social inertia. This should be considered up-front before establishing the CRS. Options include:

1. Additional investment in collection infrastructure and community awareness.

If it were found that the main reason the scheme was not meeting recovery targets was the convenience of the collection points and/or community awareness, then additional funding the improve these areas would be the lightest touch intervention. However, the funding shortfall to meet a fixed target could be found to be substantial and so this should be considered alongside options 2 and 3 below.

2. Revisiting the model design, constraints or performance criteria.

This option could be a small tweak of target(s) or number of collection points, or a bigger redesign of the model or governance. We encourage small tweaks at the earliest point that a gap

becomes evident, however larger changes to the delivery model might result in another period of lower recovery rates as the change is implemented and therefore should be avoided.

3. Wait for the scheme to gain more momentum in the community (social change).

While many residents support a CRS, in theory, when faced with individual decisions, participation may not mirror this support. In effect, the CRS scheme could initially underperform because of the change required for members of the community. While this could be partially addressed through community engagement and awareness, the only effective solution will be the change of societal norms that occurs over time. This is evidenced by the highest recovery rates being realised at the longest-established schemes.

28. **Do you support the implementation of a container return scheme for New Zealand?**

No

We don't support the proposal as it stands. We do not support the inclusion of glass in a CRS. We have no view on other materials. We represent our members on issues related to container glass only. Please refer to The Packaging Forum submission for the views of members who utilise other materials.

29. **If you do not support or are undecided about a CRS, would you support implementation of a scheme if any of the key scheme design criteria were different? (eg, the deposit amount, scope of containers, network design, governance model, scheme financial model, etc). Please explain.**

We support a regulated product stewardship approach for material streams. We support scheme design that supports existing infrastructure and collection methodology and doesn't duplicate services and facilities unnecessarily. We believe more than one model should be explored before deciding on a solution. We have engaged independent consultants Grant Thornton to explore such a model for glass. Their report is due late-June and we request that it be considered as part of this consultation upon its delivery. Please see our answer to question 6 and our introductory comments for more detail on the expected outcomes of this report.

30. **If you have any other comments please write them here.**
Please see Our Views on Transforming Recycling at the beginning of this document

Part 2:
Te whakapiki i te hangarua paeara ā-kāinga Improvements to household kerbside recycling

31. **Do you agree with the proposal that a standard set of materials should be collected for household recycling at kerbside?**

Yes

We agree there should be a standard set of materials as a minimum.

32. Do you agree that councils collecting different material types (in addition to a standard set) might continue to cause public confusion and contamination of recycling?

No

Some councils have solutions for recovering additional materials. In this case they shouldn't be impeded. Innovation and well-designed trials for additional materials should be encouraged.

33. Do you think that national consistency can be achieved through voluntary measures, or is regulation required?

No

We believe regulation is required. We have worked with councils on best practice for glass collection, and while most are receptive and actively looking at how to implement best practice, some do not wish to engage.

34. Please tick below all the items from the proposed list which you agree should be included in the standard set of materials that can be recycled in household kerbside collections.

- ✓ Glass bottles and jars
- ✓ Paper and cardboard
- ✓ Pizza boxes
- ✓ Steel and aluminium tins and cans
- ✓ Plastic bottles 1 (PET) and 2 (HDPE)
- ✓ Plastic containers and trays 1 (PET) and 2 (HDPE)
- ✓ Plastic containers 5 (PP)

35. If you think any of the materials above should be excluded, please explain which ones and why.

None

36. If you think any additional materials should be included, please explain which ones and why.

We support the Soft Plastic Recycling Scheme's answer to this question, please refer to their submission, P16.

37. Do you agree that the standard set of materials should be regularly reviewed and, provided certain conditions are met, new materials added?

Yes

No material should be removed without consultation.

38. What should be considered when determining whether a class of materials should be accepted at kerbside in the future?

We support the first 4 and believe 5 and 6 require a wider conversation.

39. Who should decide how new materials are added to the list?

We suggest that decisions relating to which materials are added (or deleted) must be made by a new independent board which comprises a broad stakeholder base.

The existing Waste Advisory Board does not adequately represent producers and the FMCG supply chain. We have raised similar concerns about the consultation groups which MFE reference in its various consultations, for example the 2021 Waste Strategy where producers and brand owners were not included in the consultation process.

40. Do you agree that, in addition to these kerbside policies, New Zealand should have a network of convenient and easy places where people can recycle items that cannot easily be recycled at kerbside? For example, some items are too large or too small to be collected in kerbside recycling.

Yes

The GPF supports community recycling networks and local council operated recycling centres that offer services which cater for these items. This should be supported by product stewardship, either voluntary or regulated.

Q41-51 not relevant to GPF

52. Do you agree that it is important to understand how well kerbside collections are working?

Yes

53. Do you agree with the proposal that the private sector should also report on their household kerbside collections so that the overall performance of kerbside services in the region can be understood?

Yes – this should be reported to MfE so performance can be monitored, and issues identified. This needs to include collection and diversion data.

54. Do you agree that the information should be published online for transparency?

No

We support publication of transparent data, however, it must be validated. at this stage it would be more appropriate for the information to be collated by a government agency such as MfE and released annually online in report format.

55. Apart from diversion and contamination rates, should any other information be published online?

No

Consumption data should be collected and published on all recyclable material in order to ascertain accurate recovery and diversion rates. This would likely need to be a regulated function. The GPF commissioned a report from Grant Thornton (2021) on glass data, many of their conclusions about optimal data collection would apply to other material schemes. The GPF recognises the cost in time to extract good data and would urge caution that unless a legal requirement is passed, data may be substandard or withheld.

56. Should kerbside recycling services have to achieve a minimum diversion rate (eg, collect at least a specified percentage of recyclable materials in the household waste stream)?

Yes

We agree with the principal of performance measures. However this is complex, as there are many variables. For example waste is usually measured in kilograms and tonnes, and changes in packaging trends could impact this significantly.

Actual outcomes, recycling or otherwise must also be measured, as this will give us a clearer view of the quality of material collected and how much is lost to contamination and processing constraints.

It's vitally important to be measuring the right things at the right points. A report by Grant Thornton (2021) for the Glass Packaging Forum maps possible data collection points that could be applied to all materials.

57. Should the minimum diversion rate be set at 50 per cent for the diversion of dry recyclables and food scraps?

No

More information is required to answer this question.

58. We propose that territorial authorities have until 2030 to achieve the minimum diversion rate, at which time the rate will be reviewed. Do you agree?

No

This should be aligned with the implementation of any CRS and the Plastic Priority Product Scheme and not delayed until 2030. It seems that whilst producers and industry are required to have their schemes in place by 2025, councils are not required to even reach minimum targets by 2025. This is counter to the concept of a New Zealand Inc solution.

59. In addition to minimum standards, should a high-performance target be set for overall collection performance to encourage territorial authorities to achieve international best practice?

Yes

60. Some overseas jurisdictions aim for diversion rates of 70 per cent. Should New Zealand aspire to achieve a 70 per cent target?

No. There are too many variables. Waste composition varies from council to council and as yet there is not benchmark for which to set targets. Better baseline data is required.

61. What should the consequences be for territorial authorities that do not meet minimum performance standards? For example, withholding levy payments or paying a fine.

Public reporting of failures. It is also unfair to assume all local authorities have the same pressures put upon them, which may impact performance. Areas such as the Coromandel, Northland and Central Otago (and others) have seasonal pressures placed on them which are many times greater than those of the residential population. This is clearly observed in glass, but likely applies across all materials.

62. Should either glass or paper/cardboard be collected separately at kerbside in order to improve the quality of these materials and increase the amount recycled?

Glass should be collected separately and separated at source to increase quality and quantity and reduce contamination.

63. If glass or paper/cardboard is to be collected separately, should implementation:

Begin immediately as we already know this approach works to reduce contamination and increase recycling rates.

64. Should all councils offer household kerbside recycling services?

No – Chatham Islands would not be economically justifiable.

Kerbside should however be offered and be supported by community recycling centres by all other Councils.

The vast majority of councils already do offer this service.

65. Should these services be offered at a minimum to all population centres of more than 1000 people?

No.

A threshold of 1,000 is too broad to mandate the provision of such a costly service. Other factors, such as population density and travel distances need to be factored in when setting a threshold.

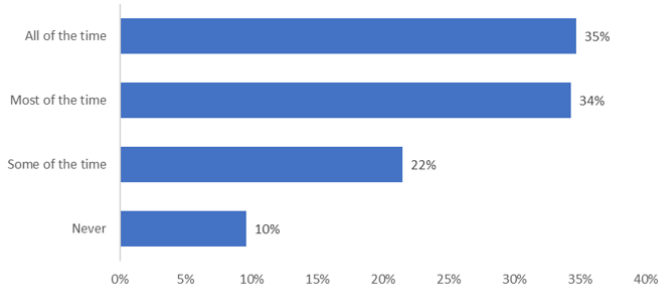
66. Do you agree that councils without any council-funded kerbside recycling collections should implement these collections within two years of their next Waste Management and Minimisation Plan?

Yes

67. What research, technical support or behaviour change initiatives are needed to support the implementation of this programme of work?

Nationwide behaviour change initiatives should be based on robust research into barriers and triggers and supported by credible data. Research should be designed and carried out by reputable research agencies. Research design and results should be independently peer reviewed.

According to Horizon research, 69% of people check the labels on packaging before putting it into recycling bin all of the time or most of the time.



We support a standardised on-pack labelling regime that aligns with the standardisation of kerbside recycling, supported by an awareness and education programme. Such a programme should reinforce information about the labelling regime and educate about how to present recyclables (e.g. clean dry and empty, lids on or off etc).

Part 3:
Te whakawehe i ngā para kai āpakihi
Separation of business food waste

Questions 68-73 not relevant to the GPF

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Appendix 1

Review of Litter Data Presented in "A Container Return System for New Zealand" for the Packaging Forum

New Zealand Institute of Economic Research (NZIER)

MEMO

To	Rob Langford, CEO of The Packaging Forum
From	Bonnie Wang, Mike Hensen and Todd Krieble
Date	17 May 2022
Subject	Review of litter data for proposed container deposit scheme

Purpose

This note is a brief review of the litter data presented in the report "A Container Return System for New Zealand" by Sapere in February 2022. This report is a cost benefit analysis (CBA) of a contain returns scheme (CRS). We refer to this report as the CRS CBA in the rest of this note.

Key findings

The evidence base for the estimated volume of beverage container litter of 69,000 tonnes is weak and the derivation of the estimate is not clearly explained. However, the CRS CBA argues that the volume of litter is not critical to the estimated benefit of the litter reduction achieved by the CRS. This is because the benefits of the CRS are based on the willingness to pay for a percentage reduction in the volume of litter.

The value of the litter reduction in the CRS CBA uses old willingness to pay estimates and also includes weight as one of the measures of beverage container litter. However more recent studies of willingness to pay have much lower values than those used in the Sapere CBA. Willingness to pay studies are based on the apparent concentration of litter and which are measured by the number of items and volume of litter containers rather than their weight. After adjusting for these factors, we estimate that the CRS CBA overstates the value of reduced litter from the CRS by a factor of 3 5 to 5.

The CRS CBA ignores the effect of the spatial distribution of litter distribution on both the willingness to pay to reduce litter and the most cost-effective solutions for reducing litter volumes. The Keep New Zealand Beautiful audit of litter completed in 2019 shows high inter and intra-regional spatial variance in the number and volume of items per 1000 m^2. This is critical to selecting the most cost-effective solutions.

Measurement of litter – by items, volume or weight

The explanation of the estimate of beverage container litter of 69,000 tonnes on page 6 of the CRS CBA is incomplete and attempts to link two very different studies – a litter collection exercise in 2016 which reportedly collected 190,000 tonnes of litter in 2016 and the KNZB litter audit of 2019 which samples a selection of sites that covered approximately 471,000 m^2.

We have not been able to find any independent report or analysis of the 2016 collection of 190.000 tonnes of litter. The only primary reference that we have been able to find to the 2016 collection is:

In 2016, over 190,000 tonnes of litter was collected from the streets of New Zealand by approximately 86,000 KNZB volunteers.[1].

The KNZB 2019 audit litter collection volumes are measured in hundreds of kilograms[2] rather than thousands of tonnes and the methodology does not provide any description of how the sites chosen for the 2019 audit could be used as a sample of the sites covered in the 2016 collection or how the 2019 results could be scaled up and compared with the 2016 litter collection target.

Better information on the volume, weight and density of loose litter items is needed when auditing litter. The choice of measures brings various results. For example, the average volume per item of "paper fast food packaging" is 0.21 litres, whereas the average weight per item of the same category is 0.018 kg (WasteNotConsulting, 2015a). According to the Litter Intelligence statistics, although the density of plastic litter is the largest among all selected litter categories (71% of all), this item's weight (36%) is less than glass and ceramic (46%). Table 2 lists the difference between the measurement of item count and weight by selected material types.

Table 1 Comparison of item and weight measures

Share of litter

Type	Items	Weight
Plastic	70.7%	35.72%
Glass and Ceramic	14.32%	46.74%
Foamed Plastic	8.96%	2.93%
Metal	3.18%	8.91%
Paper and cardboard	1.48%	0.85%
Fabric and Textiles	1.36%	4.85%

Source: Litter Intelligence (https://insights.litterintelligence.org/)

We also provide a sensitivity test to check the robustness and 'stability' of the percentage of litter by beverage container types out of the total container. The current results from Sapere's analysis indicate that 19% of total containers are glass, 26% are plastic, 12% are LPB, and 34% are metal (aluminium). We consider the effect of alterations to the conversion factor (i.e. assumed number of beverage containers per tonne) by using conversion factors from the Australian report to calculate the litter percentage (PwC and WCS, 2011). Sapere mentioned that adjusting assumptions around containers per tonne has little impact on the outcomes. However, we found the results can be sensitive. Besides, given the limited available data and unclear explanation of how Sapere estimated variables such as litter weight, there might be an improving space for the final adjustment. Table 3 compares the percentage of the litter of total containers under different assumptions from Sapere and PWC.

1 KNZB 2019 page 17

2 See KNZB Appendix 2 Table 5 pages 254 to 256, The total weight collected was 293.6 kilograms

Table 2 Litter % of total containers

[insert caption subheading]

[insert heading]	Sapere	PwC and WCS (2011)
Glass	19%	24%
Plastic	26%	27%
LPB	12%	29%
Metal	34%	38%

Source: NZIER

Overestimated willingness to pay to reduce litter

One of the main benefits quoted in the CRS CBA is the willingness to pay to avoid litter which the CRS CBA claims are weight-based:

> *The approach to calculating the welfare gain is very similar to that used for estimates of the benefits of additional recycling, utilising willingness-to-pay data and averaging across two separate sources. Like the benefit estimates associated with additional recycling, litter benefits are weight-based.*[3]

However, neither of the willingness to pay studies quoted in the CRS CBA include questions about the weight of litter, and the PwC study specifically states in its conclusion that the estimated willingness to pay values cannot be reliably linked to litter weight.

> *One of the observations arising out of this research is that linkage between litter reduction, in terms of tonnes of waste packaging litter collected, and consequent visual aesthetics are not well understood. The values estimated in this survey are based on people's willingness to pay for a noticeable improvement and a significant improvement in aesthetics due to litter reduction.* [4]

The willingness to pay studies quoted in the CRS CBA are more than 10 years old. A recent Australian study [5] by the Centre For International Economics (CIE) estimated the willingness to pay for a 20 per cent reduction in the share of sites with litter at about $23 to $32 per household per year. Research commissioned by the Packaging Forum[6] indicates on average New Zealanders are willing to pay $31.18 per year for a 14.5 percent reduction in litter.

The CRS CBA estimates the net present value of the 'Welfare gain from reduced litter' at $2,348 million which is about 64 per cent of the estimated total benefits of $3,667 million[7]. Our alternative estimate of welfare gain from reduced litter is about $458 million to $665 million, around 20 percent to 28 percent of the CRS CBA estimate due to the following two adjustments:

- Use of the CIE February 2022 and Horizons Research values for willingness to pay for litter reduction instead of the PwC 2010 and Wardman 2011 values. The average CIE

[3] CRS CBA, page 23.

[4] 'Estimating consumers' willingness to pay for improvements to packaging and beverage container waste management, June 2010, Environment Protection and Heritage Council, PricewaterhouseCoopers' page v,

[5] 'Willingness to pay for reduced litter and illegal dumping, Stated preference research, Prepared for New South Wales Environment Protection Authority, Sustainability Victoria, and Queensland Department of Environment and Science, 8 February 2022, THE CENTRE FOR INTERNATIONAL ECONOMICS' Page 54, Table 5.6.

[6] 'Horizon Research: Recycling Scheme Proposals April 2022 Survey Prepared for The Packaging Forum', Page7.

[7] CRS CBA, page 22 Table 15.

values are about 28 percent of the average willingness to pay values used by the CRS CBA while the average Horizons Research values are about 38 percent of the average willingness to pay values used by the CRS CBA.

- Exclusion of container share of litter by weight from the estimated willingness to pay to reduce litter as the willingness to pay surveys do not ask respondents about weight.

Spatial distribution of litter

The Keep New Zealand Beautiful (KNZB) conducted a national litter audit in 2019 (KNZB, 2019) to collect high-quality data to inform government policy decision-making. The survey estimates the spatial distribution of litter at the regional level, where Auckland contributes the most (202 items per 1000 m2) across all surveyed regions. The most frequent categories are cigarette butts and vaping in the Auckland region and are primarily seen in retail, industrial, and car park sites.

WasteNotConsulting (2018) also researched the national litter survey at the regional level. Their findings also suggested that the density of litter varied between urban areas. Auckland has 53.1 litter items per 1000 m2, accounting for 22% of all litter field counts. Among these items, 40% came from non-packaging litter, followed by drinking-related packaging (23%). By contrast, Blenheim takes up the least litter items (15 items per 1000 m2 and 6% of all field counts) but shows the same packaging sources, i.e. non-packaging litter and drinking packaging. Besides, most litter spreads concentrate around the urban motorway and industrial areas (together 37% of all sites) and shopping centres (14% of all sites).

Understanding the spatial distribution of litter is essential to taking action to reduce them with appropriate tools and investments. Sapere's report focuses on the cost and benefits analysis of the CRS in terms of five litter items, whereas it does not investigate at a more satisfactory resolution. As mentioned above, they estimate the tonnes of litter by an average method, which will lead to a bias in the results as the difference in each estimated metric is enormous, not to mention at the regional level.

With litter mainly distributed along urban motorway corridors, the intra-regional distribution is also essential. The ultimate solutions could be highly targeted at reduced management costs overall to achieve a similar benefit level.

Besides, the KNZB 2019 NLA report (KNZB, 2019) finds that litter spreads across the urban area mainly on industrial sites, highways, and railways. Table 4 sets out the percentage of litter by average volume and weight in these sites.

Table 3 Distribution of litter across sites

Litter per 1000m^2 measured by volume and weight

Site type	Volume		Weight	
	Litres	Share of total	Kg	Share of total
Industrial	13%	13.66	15%	1.27
Highways	42%	43.67	27%	2.29
Railways	24%	25.21	39%	3.24

Source: KNZB 2019 NLA

The sites with the highest concentration of litter per 1000 m^2 are highways by volume and railways by weight. Understanding the spatial distribution of litter is important in identifying the least cost solution for litter reduction.

References

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WasteNotConsulting (2015). Small Litter Survey – 2014/2015. WasteNotConsulting (WNC)

WasteNotConsulting (2015a). Branded Litter Survey – 2014/2015. WasteNotConsulting (WNC)

WasteNotConsulting (2018). The Packaging Forum's National Litter Survey – Litter Field Count 2017/2018. WasteNotConsulting (WNC)

Appendix 2

Litter Analysis Review for the Packaging Forum

Grant Thornton

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Packaging Forum

Litter Analysis Review

12 May 2022

Contents

Rob Langford
CEO
The Packaging Form
PO Box 58110
Botany
Auckland 2163

Private and Confidential

12 May 2022

Dear Rob

We are delighted to present to you our final report for the review of the litter factor used in the cost benefit analysis produced by Sapere and published in the MfE Consultation on Recycling.

Please contact me on 021 623 944 if you have any queries in respect of this report.

Yours sincerely

Michael Worth

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Grant Thornton

1 Summary and objectives

1.1 Background

The Packaging Forum sought **validation of the value of Litter Factor** used to estimate the benefit calculated in the Cost Benefit Analysis developed by Sapere (the **Sapere CBA**). The Sapere CBA hinges on a benefit claimed for the avoidance of litter of $2.3b and, hence, is material to the ongoing sector discussion and consultation.

The Packaging Forum has questioned this calculation, and an initial "back of the envelope" calculation by them using comparator information from a 2019 report by Keep NZ Beautiful (the **KNZB report**) resulted in a very different factor. The alignment of the value with the welfare benefit claimed in the Sapere CBA was, thus, critical to understand.

1.2 Key observations

We have detailed our findings in Section 2 of the report and can summarise them in five key observations.

1. The data in KNZB report is based on a comprehensive study and, therefore, useful. While it has not been independently audited, the comparator studies we assessed were more limited in their methodology.
2. The KNZB report states that 190,000 tonnes of litter were collected by their volunteers in 2016. This is only mentioned in a single sentence in their entire report, providing no verification or depth of explanation. The Sapere CBA, however, commits greater analysis of this number to illustrate the problem presented by litter in New Zealand. The reliance on use of this number in their cost benefit analysis, should be noted.
3. The relevance of the Sapere analysis (2.) is also unclear to us as it is disconnected from the calculation of the benefits of reduction in litter. The calculation is based on a reduction of litter in percentage points (and the willingness to pay for each percentage point reduction) rather than the absolute volume of litter.
4. The willingness to pay studies used in the Sapere CBA are both sourced from overseas and older than 10 years. While we have not assessed either study, the socio-economic relevance of these reports to New Zealand was unclear to us.
5. The Sapere CBA uses a simple average of weight, volume, and count to determine the impact of beverage containers to the disutility of litter. If visual presence is viewed to be the biggest disutility of litter, then the use of weight might unfairly over-emphasise the impact of glass as litter.

1.3 Scope

This work was to be done in two parts.

1. Validating if the value for the Litter Factor in the Sapere CBA aligned with the KNZB report and if not, the impact on the Sapere CBA.
2. Should the Litter Factor be materially different, a more fundamental analysis of the litter factor was to be commenced by completing a comparative analysis, if possible, with the other major litter surveys including Litter Less Recycle More LLRM, Be a tidy Kiwi BATK, Sustainable Coast Lines as examples.

1.4 Out of Scope

This engagement did not include:

- Implementation of any recommendations
- Any activities that are not specifically identified in the Scope section above.

1.5 Inherent limitations

We note that our working is not exhaustive and is intended to be indicative only of the accuracy of the calculations used in the Sapere CBA.

Additionally, we note that the Sapere CBA has significant components of their analysis that are described in general terms, meaning that there is a “black box” problem with their analysis that makes reviewing its accuracy difficult. We have attempted to reflect this in both this report and the accompanying model.

2 Findings

2.1 The Sapere CBA reference to 45,000 and 69,000 tonnes of beverage container waste appears illustrative only, is difficult to verify, and is potentially distracting

The Sapere CBA states a metric that 69,000 tonnes of litter collected in New Zealand is represented by beverage containers. There are two parts to the methodology they have been applied to arrive at this number. The first relates to a representation of total litter in New Zealand (which we address here in 2.1) and the second relates to a proportional estimate of beverage containers (we have explained the process to validate this estimate in 2.3).

For the representation of total litter in New Zealand, the Sapere CBA cites the KNZB report which refers to a 2016 litter collection activity conducted by KNZB. The reference to this activity is in the form of a single statement which says that in “2016, over 190,000 tonnes of litter was collected from the streets of New Zealand by approximately 86,000 KNZB volunteers.” There is no further information provided on this activity.

To represent the amount of total litter made up from beverage containers, the Sapere CBA further cites two metrics in the KNZB report:

1. beverage containers make up ~24% of total litter when an average of weight, count, and volume of litter is used to estimate the apportionment; and
2. beverage containers make up ~36% of total litter when only weight is used to estimate the apportionment.

The validation of these measures is discussed in 2.3.

The Sapere CBA applies these two measures to calculate that beverage containers represent either 45,000 tonnes or 69,000 tonnes of total litter in New Zealand. At the end of the same paragraph, the Sapere CBA also states that the “actual tonnes of litter have little impact on the benefits and costs modelled, as the benefit calculation for litter reduction is based on the percentage reduction in litter expected”.

We note two observations on this matter:

1. The weight of litter collected in 2016 averages to ~6.0 kg of litter collected per volunteer if we assume that they all worked on each of the 366 days in 2016. While we do not have an opinion on the feasibility of achieving this, there is no supporting data to validate this.
2. The statement in the Sapere CBA at the end of the paragraph negates the need for the analysis that precedes it. Additionally, the quantum of litter in beverage containers that has been stated, while seemingly large, is irrelevant as it does not underpin their analysis of the benefit value. In this context, it is our view that these values have the potential to distract from the relevant observations and findings of the Sapere CBA.

2.2 Our research suggests the KNZB 2019 litter audit is the best available source of data for the cost benefit analysis

We conducted a review of several litter audits available online, and have summarised our findings in the table below:

Report	Source / commissioned by	Year	Items per 1000m2 found	Notes
Litter intelligence data dashboard	Sustainable Coastlines	Constantly updated	320	The litter figure mentioned is only for beaches, and a wider variety of survey areas are not considered in this reporting.
National Litter Survey	Produced by WasteNot Consulting, commissioned by The Packaging Forum	2014/15	32	Analysed 300 transects of eight urban areas – thus not providing a holistic picture of nationwide litter. Additionally, it ignores “small litter”, which the other reports often include.
National Litter Survey	Produced by WasteNot Consulting, commissioned by The Packaging Forum	2017/2018	30.5	Similar to the above, the focus on urban areas and exclusion of “small litter” makes it difficult to compare to the other reports.
Branded Litter Audit	Produced by WasteNot Consulting, commissioned by The Packaging Forum	2014/2015	?	This audit determines the relative number and classification of packaging items bearing different brands. As such, it does not produce a per square meter item count for comparison purposes.
Branded Litter Audit	Produced by WasteNot Consulting, commissioned by The Packaging Forum	2018	?	As above
Litter Summary Report	Be a Tidy Kiwi	2015-2018	?	No item per square meter figure provided, and the report only applies to litter in Auckland.
National Litter Audit	Keep New Zealand Beautiful, independently commissioned, but sponsored by the Ministry for the Environment via the Waste Minimisation Fund	2019	118	None

The Keep New Zealand Beautiful 2019 National Litter Audit assesses a large number of varied sites and is comprehensive in its appraisal of the quantity of litter present in sites reviewed. It is an independently conducted audit that has a national focus and provides a detailed description of the nature of litter encountered in their audit. Based on the available sources we have researched, this litter audit is the best available source of data.

2.3 The Sapere CBA aligns with the data provided in the KNZB report but..

Based on the findings of the 2019 litter audit stated in the KNZB report, our own calculation of the percentage of litter from beverage containers was 23.629%. This aligns with the figure reached in the Sapere CBA. This is significant because **it is this percentage figure, not absolute tonnage of litter**, that drives the calculations in the Sapere CBA.

2.4 However, weight as a metric of disutility unfairly over-represents the impact of glass

The Sapere CBA evenly weights the factors of item count, weight and volume when considering the increased welfare from reduced litter. A detailed description of this methodology is provided in 3.1. It is important to remember that the Sapere CBA uses the metric of "willingness to pay for a reduction in litter" to measure this component of the calculation.

If we were to assume that litter's biggest disutility is its visual presence, then it follows that this is more strongly linked to litter's volume rather than its weight. For example, the weight of an average glass beer bottle is 180g to 200g while the weight of an average plastic bottle of a similar size is around 20g.

We recalculated the estimated benefit value of a reduction in litter, ignoring the impact that weight has on total litter. Our assumption in doing so was that the average person would not perceive nine plastic bottles as of similar impact to community litter as a single glass one. In this context weight would unfairly over-represent the impact of glass and would not reflect the actual perception of litter by the average person.

2.5 Recalculation of benefit shows 27% less welfare gains and demonstrates the potential over-representation of the impact of glass

As detailed in section 3.2, we excluded the impact of weight and then recalculated the benefit value of a reduction in litter. This resulted in a benefit valued at **$1.715 million** over a 30-year period or **27% less** welfare gains from reduction in litter than stated in the Sapere CBA.

We repeated this calculation to assess the value derived from a reduction in glass beverage containers only. A replication of the calculation used in the Sapere CBA ascribes $1.078 million to glass beverage containers. Our recalculation to exclude the impact of weight ascribed a benefit value of **$323 million** to the reduction of litter in the form of glass beverage containers or **70% lower** than the value observed in the replication of the calculation used in the Sapere CBA.

The high degree of sensitivity to the inclusion of weight as a measure suggests that an average across the three measures is too simplistic and would require a deeper investigation into the appropriate measure or mix of measures.

3 Basis of Calculation

3.1 Calculation used in the Sapere CBA

The Sapere CBA uses the welfare gain from reduced litter in evaluating the benefits of a CRS and has determined the value of this gain at around $2,348 million. The Sapere analysis references the KNZB report.

Their calculation is as follows:

$$\text{Welfare Gain} = \left(\frac{\left(\frac{BI}{TI}\right)+\left(\frac{BW}{TW}\right)+\left(\frac{BV}{TV}\right)}{3}\right) * (\text{AR}) * \left(\frac{(HW+LW)}{2}\right)$$

Where:

- BI = Items of litter per 1000m² that are beverage containers – per the KNZB report
- TI = Total items of litter per 1000m² - per the KNZB report
- BW = Weight of litter per 1000m² that is beverage containers – per the KNZB report
- TW = Total weight of litter per 1000m² - per the KNZB report
- BV = Volume (LTR) of litter per 1000m² that is beverage containers – per the KNZB report
- TV = Total volume (LTR) of litter per 1000m² - per the KNZB report
- AR = Average reduction in litter caused by introduction of a container return system per overseas sources ((Bottlebill.org; NSW EPA,2019; Boomerang Alliance, 2020; West, Angel, Kelman, & Lazarro, 2013)
- HW = Willingness to pay for reduction in litter per a University of Leeds study (Wardman, Bristow, Shires, Chintakayala, & Nellthorp, 2011) – adjusted for inflation, income differences and currency.
- LW = Willingness to pay for a reduction in litter per a PWC study in Australia (PWC, 2010) – adjusted for inflation, income differences and currency.

Note that the divisor figures in the equation (3 and 2) are set to average the value, and thus will adjust based on the quantity of figures in the numerator.

3.2 Proportional contribution of beverage containers (including by type) to total litter

We assessed the KNZB report and identified the categories that we believed fit the “beverage container” definition in the Sapere CBA. We have listed these categories in Appendix 1.

We computed the contribution of beverage containers to total litter by item quantity, weight, and volume. These percentages are expressed in the table below:

Unit of measure	**Amount of litter per 1,000 m2**		**Proportional contribution of beverage containers to total litter**
	Beverage containers	*Total litter*	
Items	10.00	118.00	**8.5%**
Weight	0.22	0.62	**36.4%**
Volume	1.91	7.35	**26.0%**

Averaging those three figures, the total percentage of litter that can be attributed to beverage containers is 23.629%.

We repeated this calculation to determine the contribution of **glass** beverage containers only to total litter. These percentages are expressed in the table below:

Unit of measure	Amount of litter per 1,000 m2		Proportional contribution of glass beverage containers to total litter
	Beverage containers	Total litter	
Items	0.90	118.00	0.8%
Weight	0.16	0.62	26.1%
Volume	0.42	7.35	5.7%

Again, by averaging those three figures the total percentage of litter that can be attributed to glass beverage containers is 10.849%.

3.3 Modelling the calculation to recalculate a "fair" value of benefit

As mentioned in 3.2, the average figure reached by Sapere is used to approximate the impact of beverage container litter on overall litter quantity. The calculation the evenly weights the three factors driving the average – item quantity, volume, and weight. **In section 2 of this report, we explore the validity of using this as a basis of calculation**. To assess the impact of this averaging, we first need to establish constant values in the equation detailed in section 3.1.

The Sapere CBA states that:

$$AR = 61\%$$

It also states:

$$LW = \$4.08 * LR * HH * 30$$

Where LR = Litter reduction, i.e., =

$$\left(\frac{\left(\frac{BI}{TI}\right) + \left(\frac{BW}{TW}\right) + \left(\frac{BV}{TV}\right)}{3}\right) * (\mathrm{AR})$$

and HH = Participating households in NZ

The amount $4.08 reflects the lower estimate of what the average New Zealand household would be willing to pay per year for a 1% reduction in litter. This number has been sourced from the 2010 PWC report and is referred to in the Sapere CBA. In the above equation determining LW, 30 refers to the number of years being considered by the cost benefit analysis.

The Sapere CBA further states that:

$$HW = \left(\frac{70.38}{10}\right) * LR * HH * 30$$

Sapere also refer to the University of Leeds study to set the value for HW. Sapere assert that per the report, and adjusting for currency, income levels and inflation, the average New Zealand household would be willing to pay $70.38 per year for a 10% reduction in litter. As such:

- Having established constants for the values of LW, HW and AR, we can now adjust the volume, quantity and weight values in the first section of the equation, to assess the impact that changes in the measurement units of litter have on the total benefit identified.
- To do this, we built a spreadsheet model that utilises the assumptions described above, while also adjusting for the discount rate described in the Sapere report, as well as population level, and average household size. We can provide the model alongside this report.

Note that the spreadsheet model described explores the calculation in much more detail compared to the formulas described above. The calculation above is intended as a high-level description of the benefit analysis, as opposed to the model we have generated, which is a specific recreation of that same benefit analysis.

In our calculations, we removed the $\frac{BW}{TW}$ component of the litter composition calculation, to ignore the weight impact of litter on our calculation. As such the revised model calculates as follows:

$$\text{Welfare Gain} = \left(\frac{\left(\frac{BI}{TI}\right) + \left(\frac{BV}{TV}\right)}{2}\right) * (\text{AR}) * \left(\frac{(HW + LW)}{2}\right)$$

The reasoning for this adjustment, as well as the results of our calculation can be read in 2.4 and 2.5 in this report.

4 Appendix 1 – Items in “beverage container” category

Item category	Item description
Glass	Alcoholic sodas/sprit based mixers, all sizes
Glass	Beer, < 750 ml, all colours of glass
Glass	Beer, 750 ml or more, all colours of glass
Glass	Cider/fruit based, etc
Glass	Flav. water/soft drink (carbonated), < 1 litre
Glass	Flav. water/soft drink (carbonated), 1 litre+
Glass	Fruit juice, < 1 litre
Glass	Plain water (carbonated or non-carb.), < 1 litre
Glass	Wine & spirit, all sizes
Metal	Alcoholic sodas & spirit based mixers
Metal	Beer, aluminium drink cans, all types , all sizes
Metal	Bottle caps, lids & pull tabs
Metal	Cider/fruit based, etc.
Metal	Flav. water/soft drink, (carbonated), all sizes
Metal	Flav. water/soft drink, (non-carbonated), all sizes
Paper and cardboard	Cartons, flavoured milk, < 1 litre
Paper and cardboard	Cartons, fruit juice, < 1 litre
Paper and cardboard	Cartons, fruit juice, 1 litre +
Paper and cardboard	Cartons, milk, plain (white), all sizes
Paper and cardboard	Flav. water/fruit/sports drink (non-carb.), < 1 litre
Plastic	Drink package rings, six pack rings, ring carriers
Plastic	Drink pouches
Plastic	Flav. milk, < 1 litre
Plastic	Flav. water/fruit/sports drink (non-carb.), + 1 litre
Plastic	Flav. water/fruit/sports drink (non-carb.), < 1 litre
Plastic	Flav. water/soft drink (carbonated), < 1 litre
Plastic	Flav. water/soft drink (carbonated), 1 litre+
Plastic	Fruit juice, < 1 litre
Plastic	Fruit juice, 1 litre +
Plastic	Plain water (carbonated or non-carb.), < 1 litre
Plastic	Plain water (carbonated or non-carb.), 1 litre +
Plastic	Plastic bottle tops
Plastic	White milk, all sizes
Plastic	Wine cask, bladders

Appendix 3

Container Return Scheme
Who pays and are the benefits credible?

New Zealand Institute of Economic Research

1.1 Container return scheme

Who pays, and are the benefit estimates credible

NZIER report to Brewers Association

04 May 2022

About NZIER

NZIER is a specialist consulting firm that uses applied economic research and analysis to provide a wide range of strategic advice.

We undertake and make freely available economic research aimed at promoting a better understanding of New Zealand's important economic challenges.

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We pride ourselves on our reputation for independence and delivering quality analysis in the right form and at the right time. We ensure quality through teamwork on individual projects, critical review at internal seminars and peer review.

NZIER was established in 1958.

Authorship

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Key points

Cost impact on consumers is underestimated

The RIS reports '*Scheme net costs to consumers (accounting for unclaimed deposits) are likely to be NZD 3–5 cents per container (+GST).*[1]

We estimate that the average net scheme cost per container is 8.1 cents (a scheme fee of 4.5 cents and unclaimed deposits of 3.6 cents) plus GST of 3.7 cents (3.0 cents of GST on the deposit and 0.7 cents of GST on the scheme fee).

The net scheme cost for a scheme with a 20 cent deposit is expected to be 20 to 28 percent higher than a scheme with a 10 cent deposit, but the return rate will only be about 8 percent higher.

Benefits of the scheme are overstated

The benefit of avoided litter has the largest value of the benefits attributed to the container return scheme (CRS) and is responsible for the CRS having a positive cost benefit ratio. However, the estimated value of avoided litter is based on old willingness to pay surveys and then applied to beverage containers using a combination of number of items, volume and weight.

A recent Australian study[2] estimated the willingness to pay for a 20 percent reduction in the share of sites with litter at about $23 to $32 per household per year, less than half of the values in the PwC and University of Leeds studies quoted in the CRS cost benefit analysis (CBA).

Neither of the willingness to pay studies quoted in the CRS CBA include questions about the weight of litter. The PwC study specifically states in its conclusion that the estimated willingness to pay values cannot be reliably linked to litter weight.

Recommendation

Because of the extent of the understated costs, overstated benefits and their distributional impacts, we recommend that you:

- Request officials update the interim RIS after considering submissions and before the scheme proposal is finalised.
- Request a meeting with officials to identify the remaining process and decision points so that you can ensure accurate representation of the magnitude and distribution of costs and benefits
- Share this report with affected stakeholders such as Local Government New Zealand who may otherwise not be aware of the revised impacts.

1 'Interim regulatory impact statement: A beverage container return scheme for Aotearoa New Zealand, Ministry for the Environment, March 2022' page 6.

2 'Willingness to pay for reduced litter and illegal dumping, Stated preference research, Prepared for New South Wales Environment Protection Authority, Sustainability Victoria, and Queensland Department of Environment and Science, 8 February 2022, THE CENTRE FOR INTERNATIONAL ECONOMICS' Page 54, Table 5.6.

Contents

Tables

2 Scope

2.1 Proposal

The government has proposed a container deposit scheme with a short turnaround on consultation. The proposal comes on top of existing kerbside recycling schemes and industry product stewardship plans. You have asked for our comment on the modelling of the total scheme costs and benefits and where they actually fall.

2.2 Our approach

The interim regulatory impact statement (RIS) on a beverage container return scheme provides additional information on the assumed composition of beverage container use and waste streams that were not available when NZIER last reviewed the proposal for the scheme in September 2020. The RIS includes an updated cost benefit analysis and has also been accompanied by an update of the PwC model of the scheme costs.

Our approach in this report is to cover three issues in the analysis of the container return scheme (CRS):

- Who pays: analysis of the incidence of scheme cost?
- Gaps in the argument – material mismatches between the RIS, Sapere cost benefit and PwC cost model, as well as the key omissions.
- Unaddressed weaknesses – points raised in the previous peer review that are not addressed in the updated cost benefit analysis

3 Who pays?

3.1 Key scheme cost elements

The proposed CRS requires beverage consumers to pay a deposit and suppliers to pay a scheme fee on each container purchased/supplied. These fees will both attract GST, which the consumer will pay. In addition, some of the scheme costs will be funded by deposits that are not refunded (because the containers are not returned to a collection point, are sent to a landfill, or are lost as litter.)

The description of the scheme fee paid by the consumer and suppliers varies between the PwC modelling and the RIS and overall understates the additional cost to consumers:

- PwC describes the 'CRS fee' as the deposit, which is refundable, plus a 3 to 5 cent scheme fee.[3] (The scheme fee increases over the scheme's life and reaches 5.9 cents per container by 2032.)
- The RIS reports that gross scheme fee costs have been modelled at 8.8 cents per container and '*Scheme net costs to consumers (accounting for unclaimed deposits) are*

[3] 'Container Return Scheme: Financial modelling report, Ministry for the Environment, March 2022, PwC'. See page 9.

likely to be NZD 3–5 cents per container (+GST),[4] but does not explain how the net cost of 3 to 5 cents is calculated.

The 'headline' that scheme net costs will be 3 to 5 cents plus GST is disingenuous:

- The phrase 'accounting for unclaimed deposits' is ambiguous. Unclaimed deposits and the scheme fee cover the cost of operating the scheme. The PwC modelling indicates that unclaimed deposits average about 80 percent of the scheme fee over the modelling period (2024 to 2032).
- The 'plus GST' on the refundable deposit would be 3 cents per container for a scheme with a 20 cent deposit and 1.5 cents for a scheme with a 10 cent deposit. A more transparent version of the headline would be net scheme costs are likely to be 4.5 to 8 cents per container.
- The PwC modelling report does not disclose a net scheme cost per container. However, the PwC modelling report does disclose the net average cost of the scheme over the first five years and container returns:[5]
  - With a 10 cent deposit of $180m for the return of 1.6 billion containers and a return rate of 70 percent or to $197m with the return of 1.9 billion containers at a return rate of 78 percent. Working back through these numbers implies a net scheme cost per container of 7.8 cents to 8.1 cents
  - With a 20 cent deposit of $180m for the return of 1.6 billion containers and a return rate of 76 percent or to $197m with the return of 1.9 billion containers at a return rate of 84 percent. Working back through these numbers implies a net scheme cost per container of 9.1 cents for either container return rate.

  This analysis of the PwC modelling indicates that the net scheme cost for a scheme with a 20 cent deposit is expected to be 20 to 28 percent higher than a scheme with a 10 cent deposit, but the return rate will only be about 8 percent higher.

Our estimate of the key additional cost elements of the proposed CRS with a 10 cent and 20 cent deposit are listed in Table 1 below and is higher than the estimates described in either the PwC modelling or the RIS because the PwC modelling:

- Assumes the scheme fee cost will be absorbed by the supplier when it is much more likely to be passed on to the customer.
- Does not recognise either uncollected refunds or the GST on the scheme fee as costs to the consumer.

The estimates in Table 1 are calculated from the PwC financial modelling for the first year of the scheme, the average over the modelling period (2024 to 2032), and the last year of the scheme.

[4] 'Interim regulatory impact statement: A beverage container return scheme for Aotearoa New Zealand, Ministry for the Environment, March 2022' page 6.

[5] 'Container Return Scheme: Financial modelling report, Ministry for the Environment, March 2022, PwC' page 9.

Table 1 Additional costs imposed by CRS

Unrefunded deposits, scheme costs and GST[1]

Item	10 cent deposit			20 cent deposit		
	2024	Average	2032	2024	Average	2032
Containers (billion)						
Sold	2.3	2.4	2.5	2.3	2.4	2.5
Refunded	1.6	1.8	1.9	1.7	2.0	2.1
Return rate	70.2%	76.3%	78.0%	75.5%	82.1%	83.9%
Additional costs ($million)						
Unrefunded deposit	68.8	56.7	54.3	113.2	85.8	79.5
Scheme fee	87.9	115.7	134.2	65.9	107.2	129.5
Total	**156.7**	**172.3**	**188.5**	**179.1**	**193.0**	**209.0**
Additional costs (cents per container)						
Unrefunded deposit	3.0	2.4	2.2	4.9	3.6	3.2
Scheme fee	3.8	4.8	5.4	2.9	4.5	5.2
GST on deposit	1.5	1.5	1.5	3.0	3.0	3.0
GST on scheme fee	0.6	0.7	0.8	0.4	0.7	0.8
Total	**8.9**	**9.4**	**9.9**	**11.2**	**11.7**	**12.2**

Note:

1 The PwC modelling assumes the scheme fee (which is set in advance) and unrefunded deposits will match the scheme costs. In practice, this is very unlikely, so the scheme will move between under and over-recovery of costs.

2 Assuming the scheme fee charged to suppliers is passed on to consumers without any retailer margin or rounding of prices.

Source: NZIER

The per container costs for scheme fees and the GST components are expected to be visible to consumers as an increase in the price of beverages over and above the 20 cent deposit. However, the unrefunded deposit may not be recognised by consumers as a price increase at the time of purchase if they expect to collect the deposit refund in every case.

The RIS reports '*Scheme net costs to consumers (accounting for unclaimed deposits) are likely to be NZD 3–5 cents per container (+GST).*[6] Our estimate shown in the bottom five rows of Table 1 is that the average net scheme cost per container is 8.1 cents (a scheme fee of 4.5 cents and unclaimed deposits of 3.6 cents) plus GST of 3.7 cents (3.0 cents of GST on the deposit and 0.7 cents of GST on the scheme fee). Over the modelling period, unclaimed refunds per container decline and the scheme fee increases.

The PwC modelling also includes an estimate of the theoretical price increase for beverages in the scheme's first year, summarised in Table 2. A quick reality check of supermarket prices suggests that the PwC modelling overstates the prices of beverages per container and therefore understates the additional scheme cost as a percentage of beverage prices.

6 'Interim regulatory impact statement: A beverage container return scheme for Aotearoa New Zealand, Ministry for the Environment, March 2022' page 6.

(The reality check was based on a cursory review of online prices for beverages on the websites of Countdown and New World.)

Table 2 PwC beverage price example

Price per unit and per container in $

Product[1]	Unit price ($)	Containers per unit	Price per container ($)	Comment:
Milk	3.50	1	3.50	Not in proposed scheme.
Wine	20.00	1	20.00	Price per container is 10 to 15 percent higher than our survey.
Beer	20.00	6	3.33	Price per container 33 to 133 percent higher than our survey.
Carbonated	10.00	6	1.67	Price per container 10 to 40 percent higher than our survey.

Note:

3 The PwC modelling did not include a price for water which has a much lower per container price than carbonated drinks.

Source: NZIER[7]

The additional costs from the CRS schemes increased costs will lower the amount households spend on beverages, but the allocation of the costs between reduced spending by households and reduced profits for suppliers will vary with each beverage type.

The RIS and PwC modelling assume that the CRS implementation will lead to a one-off 6.5 percent reduction in beverage sales. The 6.5 percent reduction in sales volume following the scheme's implementation is attributed to the experience with schemes in Australia[8]. However, the experience only applies to the first year that the scheme operated in Queensland.[9] This KPMG analysis[10] reports the following elasticities for beverages in Australia:

> *It is estimated that in Australia, when prices increase by 1%, quantity demanded falls by:*
>
> *0.9% overall for sugar-sweetened beverages;*
>
> *0.6% for regular soft drinks;*
>
> *1.01% for low and no-sugar drinks;*
>
> *1.2% for fruit juices; and*
>
> *1.84% for bottled water.*

7 'Container Return Scheme: Financial modelling report, Ministry for the Environment, March 2022, PwC'. See page 18.

8 'A Container Return System for New Zealand, Cost-benefit analysis update, Preston Davies, Ben Barton, February 2022, Sapere'. See page 3.

9 'Container Refund Scheme Price monitoring review, Final Report, January 2020. See page vii.

10 'Making cents: Economic Analysis of Container Deposit/Refund Schemes, November 2020, KPMG.com.au'. See page19.

These elasticities (along with an assumption about the demand elasticity for alcoholic beverages) and an estimate of the price increase perceived by the customer can be used to estimate the change in volume sold. (To be completed in the next draft.)

Table 3 Beverage container size distribution

Packaging size distribution for NZ supermarket beverage sales

Container size (ml)	Share	Container size (ml)	Share
50 to 149	0.81%	50 to 149	1.82
150 to 249	1.01%		
250 to 349	48.28%	250 to 349	48.28
350 to 499	10.51%	350 to 999	28.48
500 to 749	10.71%		
750 to 999	7.27%		
1,000 to 1,999	15.35%	1,000 to 3,999	21.41
2,000 to 2,999	5.25%		
3,000 to 3,999	0.81%		

Source: NZIER[11]

Almost half of the beverages sold in supermarkets are sold in containers with a capacity of 250 to 350 ml, and almost 80 percent of the beverages are sold in containers with a capacity of less than 1 litre. Combining the data on the distribution of container sizes with information in the RIS on the number of beverage containers by material yields the following estimate of the size of containers by material.

[11] Calculated from measurement of the relative heights of the bars in 'Figure 4: New Zealand supermarket beverage container packaging size distribution (2020/21)'. See Interim Regulatory Impact Statement page 55.

Table 4 Estimated number of beverage containers sold in 2021

Millions of containers material and capacity

Container size (ml)	Share	Plastic	Liquid paperboard	Metal	Glass
Total		**587.5**	**167.9**	**820.1**	**994.9**
50 to 149	0.81%	4.7	1.4	6.6	8.0
150 to 249	1.01%	5.9	1.7	8.3	10.0
250 to 349	48.28%	283.7	81.1	396.0	480.4
350 to 499	10.51%	61.7	17.6	86.2	104.5
500 to 749	10.71%	62.9	18.0	87.8	106.5
750 to 999	7.27%	42.7	12.2	59.6	72.4
1,000 to 1,999	15.35%	90.2	25.8	125.9	152.8
2,000 to 2,999	5.25%	30.9	8.8	43.1	52.3
3,000 to 3,999	0.81%	4.7	1.4	6.6	8.0

Source: NZIER[12]

The CRS proposes a uniform per container charge that is not a good match for the different rates of recycling for different container materials, different pricing of beverages using the same container materials, or the weight-based measures of the benefits of avoiding litter.

The lack of information in the RIS about the variation in container type and use raises doubts about the assessment of the effectiveness and efficiency of the considered in the RIS. The RIS proposes that scheme fees be eco-modulated13 but does not detail how the fees for different materials would be varied to reflect the difference in their recycling costs.

Data from the National Litter Audit[14] provides an indication of the variation in the weight of containers by container size and beverage. This data suggests:

- Glass packaging is about three times the weight of similar capacity plastic packaging and more than ten times the weight of metal packaging.
- Plastic packaging weights per unit of capacity decrease as the capacity increases.

12 Calculated from measurement of the relative heights of the bars in 'Figure 4: New Zealand supermarket beverage container packaging size distribution (2020/21)'. See Interim Regulatory Impact Statement page 55.

13 See RIS paragraph 260 page 76.

14 National Litter Audit, September 2019, PUBLISHED BY: Keep New Zealand Beautiful, APPENDIX 2 Table 5 – Data Collection Form.

Table 5 Indicative container weights

Estimated from Litter Audit item and weight data

Container description	Items	Weight (kg)	Weight per container (kg)
Glass			
Beer, < 750ml,	333	58.7	0.176
Beer, >=750ml	2	1.1	0.527
Metal			
Alcoholic sodas	145	1.7	0.012
Beer, all sizes	482	6.9	0.014
Carbonated, all sizes	196	2.7	0.014
Non-carbonated, all sizes	21	0.3	0.016
Plastic			
Non-carbonated <1 litre	6	0.3	0.045
Carbonated <1 litre	31	1.9	0.062
Fruit Juice <1 litre	7	0.2	0.034
Non-carbonated >=1 litre	41	1.6	0.040
Fruit Juice >=1 litre	4	0.1	0.015
Carbonated >=1 litre	65	2.5	0.039

Source: NZIER

4 Gaps in the argument

4.1 Failure to model an evolving counterfactual

An NZIER peer review of the 2020 version of the Sapere cost benefit analysis criticised that analysis for failing to model changes in recycling and littering that would occur without the scheme:

> *The Sapere CBA is based on a static counterfactual. That is, it ignores any potential for recycling rates and littering rates to improve without the CRS. This is relevant because New Zealanders' attitudes to recycling have evolved over time, reflecting increasing concern for the environment, for marine life and for climate change. To assume, as the Sapere CBA has done, that the counterfactual remains static over a 30-year period is unrealistic*
>
> *Sapere's failure to account for an evolving counterfactual results in overestimated benefits from the CRS.*[15]

[15] 'Peer review of the draft cost-benefit analysis report on the proposed CRS, Todd Krieble and Sarah Hogan, 28 September 2020' page 5.

These observations apply to the latest version of the Sapere cost benefit analysis included in the RIS.

4.2 Kerbside recycling flows

The PwC estimates of the impacts of the CRS on kerbside recycling are difficult to reconcile with the volumes of recycling reported in the RIS for 2019.

The RIS reports the following about kerbside recycling:

- Plastic containers:
  - Total sold in 2020/21 was 587 million comprising: fresh milk/ cream 187 million, carbonated 147 million and water 115 million.
  - Proportion recycled in 2019 was 33 percent. Applying this percentage to the 2020/21 sales suggests 194 million containers were recycled, which implies the deposit refund would be $38.8 million.
  - Proportion of containers recycled at home is 81 percent for PET and 86 percent for HDPE, suggesting that between 225 million and 239 million of the plastic containers sold were consumed at home (which is low compared to the New South Wales RIS.
- Metal containers:
  - Total sold in 2020/21 was 823 million comprising: carbonated 394 million, alcoholic beverages 299 million and an unallocated residual of 115 million.
  - Proportion recycled in 2019 was 45 percent. Applying this percentage to the 2020/21 sales suggests 370 million containers were recycled, which implies the deposit refund would be $74.1 million.
- Glass containers:
  - Total sold in 2020/21 was 823 million.
  - Proportion recycled in 2019 was 60 percent. Applying this percentage to the 2020/21 sales suggests 596 million containers were recycled, which implies the deposit refund would be $119.1 million.[16]

The above analysis of the RIS information suggests that the kerbside recycling collects about 1,160 million items per year with a potential refund revenue stream of about $230 million. The PwC estimates of kerbside revenue and cost savings under a CRS are included in Table 6 below. They suggest that under a CRS kerbside, recycling of beverage containers will be less than 15 percent of current activity. The RIS does not include any comment on the significance of this adjustment for kerbside recycling.

[16] The RIS notes that commercial glass container recycling is about 15 to 20 percent of kerbside volumes - see RIS page 19.

Table 6 Kerbside revenue estimate

Indicative revenue and savings for Local Government with a 20cent deposit ($ million)

Scheme year	Deposit refund revenue	Recycling cost savings	Refuse cost savings	Landfill disposal cost saving	Total
1	35.3	14.1	2.2	1.3	53.0
2	31.7	15.0	2.2	1.8	50.7
3	27.9	16.1	2.2	1.8	48.1
4	23.9	17.2	2.5	1.8	45.4
5	24.1	17.7	2.7	1.6	46.0
6	24.1	18.1	2.7	2.0	46.9
7	24.4	18.6	2.9	2.0	47.8
8	24.6	19.2	2.9	2.0	48.7
9	24.8	19.7	2.9	2.2	49.6
10	25.0	20.1	3.1	2.0	50.3

Source: NZIER[17]

5 Unaddressed issues from previous CBA

5.1 Overestimated benefits from avoided litter

The benefit of avoided litter has the largest value of the benefits attributed to the CRS and is responsible for the CRS having a positive cost benefit ratio. The reliance on old willingness to pay surveys based on litter weight for the benefit estimate was criticised in the 2020 NZIER peer review.

The updated CBA has failed to:

- explain the estimate of litter volume
- include more recent willingness to pay studies from Australia or refer to the RIS for CRS schemes in Australian states
- fully recognise and adjust benefit estimates for the optimism bias in willingness to pay studies.

5.2 Estimate litter volume

The CRS CBA completed by Sapere uses the National Litter Audit completed by Keep New Zealand Beautiful to estimate the proportion of litter accounted for by beverage containers. An alternative approach would be to estimate the number (and location type) of beverage container litter to consider the efficiency of a CRS in changing littering behaviour. This approach would be more consistent with the questions asked in the surveys of willingness

[17] 'Container Return Scheme: Financial modelling report, Ministry for the Environment, March 2022, PwC'. See page 15. The values in the table are based on measurement of the height of the bars on the chart.

to pay to avoid litter which asked participants to answer questions about the appearance of litter which relate to the number of items and size of the items.

One of the main benefits quoted in the Sapere cost benefit analysis is the willingness to pay to avoid litter which the Sapere report claims are weight based:

> *The approach to calculating the welfare gain is very similar to that used for estimates of the benefits of additional recycling, utilising willingness-to-pay data and averaging across two separate sources. Like the benefit estimates associated with additional recycling, litter benefits are weight-based.*[18]

However, neither of the willingness to pay studies quoted by Sapere include questions about the weight of litter, and the PwC study specifically states in its conclusion that the estimated willingness to pay values cannot be reliably linked to litter weight.

> *One of the observations arising out of this research is that linkage between litter reduction, in terms of tonnes of waste packaging litter collected, and consequent visual aesthetics are not well understood. The values estimated in this survey are based on people's willingness to pay for a noticeable improvement and a significant improvement in aesthetics due to litter reduction. For the purposes of the survey it is assumed the reductions of 10% and 20% would result in a noticeable and significant improvement, respectively. This assumption needs to be tested if the unit values are to be used to assess the aggregate value impact of alternative litter management scenarios. ….*
>
> *The absence of a reliable and tested calibration scale for linking the choice modelling values for 'noticeable' and 'significant' improvements in visual aesthetics to reductions in litter prevents the survey results for litter being applied with confidence to the policy options considered in the BDA study.*[19]

5.3 Willingness to pay values for litter reduction

The willingness to pay studies quoted in the CRS CBA are more than 10 years old. A recent Australian study[20] estimated the willingness to pay for a 20 percent reduction in the share of sites with litter at about $23 to $32 per household per year, less than half of the values in the PwC and University of Leeds studies quoted in the CRS CBA.

5.4 Optimism bias

The CRS CBA mentions optimism bias in household estimates of willingness to pay and notes that a 50 percent optimism bias would be required to reduce the benefit cost ratio below 1. However, this analysis does not provide any insight into the range of estimates of willingness to pay or how the willingness to pay estimate could be tested. The Australian study quoted in the paragraph above suggests the CRS CBA willingness to pay estimates may be more than 50 percent too high.

18 Sapere cost benefit analysis, page 23.

19 'Environment Protection and Heritage Council Estimating consumers' willingness to pay for improvements to packaging and beverage container waste management, June 2010, Environment Protection and Heritage Council, PricewaterhouseCoopers' page v,

20 'Willingness to pay for reduced litter and illegal dumping, Stated preference research, Prepared for New South Wales Environment Protection Authority, Sustainability Victoria, and Queensland Department of Environment and Science, 8 February 2022, THE CENTRE FOR INTERNATIONAL ECONOMICS' Page 54, Table 5.6.

Ironically the PwC[21] estimate of the net cost per year per household of the CRS is $78 to $103 per year, is above the willingness to pay for a reduction in litter.

[21] 'Container Return Scheme: Financial modelling report, Ministry for the Environment, March 2022, PwC'. See page 16.