Expanding Queensland's container refund scheme to include wine and spirit bottles: Cost-benefit analysis – Summary Report

Executive summary

Queensland's Container Refund Scheme commenced on 1 November 2018. The scheme incentivises Queenslanders to return their empty beverage containers for a 10-cent refund. Since the introduction of the scheme, the rate of littering of beverage containers in Queensland has decreased, and the recovery rate for containers has increased.

Building on the successes of the scheme to date, the Queensland Government is examining options to expand the scope of containers eligible for a refund to improve beverage container recycling rates. In particular, it is seeking to expand the scheme to include glass containers that have contained wine and pure spirits.

Stakeholder consultation suggests that the community is extremely supportive of the scheme, and supportive of the inclusion of further containers to improve recycling of these materials. This report evidences that the scheme expansion is likely to benefit the Queensland community. The net benefits from the expansion will be maximised if its cost, in particular administrative burden on beverage manufacturers and importers, can be minimised to the extent possible.

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Introduction

Queensland's Container Refund Scheme (the scheme), *Containers for Change*, commenced on 1 November 2018. The scheme incentivises Queenslanders to return their empty beverage containers for a 10-cent refund. Since the introduction of the scheme, the rate of littering of beverage containers in Queensland has decreased, and the recovery rate for containers has increased.

Building on the successes of the scheme to date, the Queensland Government is examining options to expand the scope of containers eligible for a refund to improve beverage container recycling rates. In particular, it is seeking to expand the scheme to include glass containers that have contained wine and pure spirits.

Consumers, manufacturers and participants in the kerbside recycling and supply chains for recycled materials will be impacted by the scheme expansion. The Queensland Government released a discussion paper in December 2022, which explained the options being considered and sought feedback from stakeholders.[1] This report summarises the findings of a cost-benefit analysis, which was prepared to quantify these expected impacts and support decision-making regarding the scheme expansion.

Queensland's Container Refund Scheme

The scheme is legislated in the *Waste Reduction and Recycling Act 2011* and the *Waste Reduction and Recycling Regulation 2018*. The objectives of the scheme are to:

- increase the recovery and recycling of empty beverage containers
- reduce the number of empty beverage containers that are littered or disposed of to landfill
- ensure that the manufacturers of beverage products meet their product stewardship responsibility in relation to their beverage products
- provide opportunities for social enterprise and benefits for community organisations
- complement existing collection and recycling activities for the state.[2]

Eligible containers

Containers eligible for the scheme are made of glass, aluminium, plastic steel, and liquid paperboard with a capacity between 150 millilitres and 3 litres.[3] Eligible containers must contain a liquid approved by the scheme, and carry a refund mark and barcode.

Beverages that are currently included in the scheme include flavoured milk, fruit and vegetable juices (in small containers), soft drinks, water, beer, and non-grape based alcoholic beverages such as pre-mixed drinks and cider.

The existing scheme targets beverage containers that are more likely to be littered. The criteria for eligible containers are currently consistent with container refund/deposit schemes operated in other states and territories.

[1] Queensland Government 2022, *Proposal to expand the scope of eligible containers in Queensland's Container Refund Scheme – Containers for Change*, discussion paper, December 2022.

[2] Queensland Government 2018, *Waste Reduction and Recycling (Container Refund Scheme) Amendment Regulation 2018.*

[3] Queensland Government 2018, *Eligible Containers*, January 2018.

The Queensland Government is proposing to add glass wine and spirit bottles to the scheme. The New South Wales[4], Western Australian[5] and South Australian[6] governments have also expressed interest in expanding the scope of their schemes. The Victorian Government[7], yet to introduce their scheme, has stated an expansion is in consideration, while the Tasmanian Government is 'committed to a consistent national approach.'[8]

Expected impacts of the scheme expansion

There are a range of stakeholders that will be impacted by the expansion of the scheme:

- **Container Exchange (COEX)**, the not-for-profit organisation appointed by the Queensland Government to operate the scheme
- **Queenslanders** who purchase and return eligible containers
- **Beverage manufacturers and importers** that produce and sell products in eligible containers in Queensland
- **Container Refund Point (CRP) operators** that accept eligible containers for return
- **Materials Recovery Facilities (MRF) operators** that sort and process kerbside recycling collections
- **Local governments** who administer and fund the kerbside recycling collection process
- **Recyclers** that process containers that have been collected via CRPs or MRFs into raw materials for use in new products.

The expected benefits and costs of the scheme expansion are discussed separately in the following sections.

Benefits of the scheme expansion

The largest benefit of these schemes typically comes from reductions in litter. This benefit is not expected to be achieved by the scheme expansion, or if it does it will be small, as there is a low level of wine and spirit bottles found in litter streams.

Instead, the key benefit of the expansion is expected improvements in recycling rates for glass by including wine and spirit bottles in the scheme. Diverting wine and spirit bottles from comingled kerbside recycling to the scheme means that recyclers and material processors gain access to a higher volume of higher quality 'clean' glass that is easier to recycle. Glass in kerbside collections – for example, glass food jars – tend to have residual contaminants, resulting in lower yields of material for recycled glass producers. Glass collected via container refund schemes is less contaminated, and thus the material is more easily recovered.

Expanding the scope of the scheme to better recover these glass materials will assist the Queensland Government to achieve its policy objectives relating to the circular economy. Supporting the circular economy is in line with Queensland's *Waste Management and Resource Recovery Strategy*, which provides the strategic framework for Queensland to become a zero-waste society, where waste is avoided, reused and recycled to the greatest possible extent.[9]

[4] NSW EPA 2022, *Many happy returns for container deposit scheme*, December 2022.
[5] Winetitles Media 2022, *WA and QLD look to expand their container deposit schemes*, December 2022.
[6] SA EPA 2022, *Review of SA Container Deposit Scheme*, October 2022.
[7] The Fifth Estate 2022, *Victoria finally limping across the line to a container deposit scheme – but it might accept wine bottles*, May 2022.
[8] Department of Natural Resources and Environment Tasmania 2022, *Recycle Rewards FAQs*, August 2022.
[9] Queensland Government, *Queensland's Waste Strategy*, https://www.qld.gov.au/environment/management/waste/strategy

Participating in the circular economy can have a range of social and environmental benefits for the community, including:

- reducing the demand for virgin raw materials, preserving natural resources
- using less energy, thereby reducing greenhouse gas emissions and the environmental impact of resource extraction
- creating jobs in collection, sorting, processing, and manufacturing of recycled materials and products
- social benefits such as improved public health.[10]

The World Economic Forum estimated the value of a circular economy in Australia could be up to $26 billion per year by 2025 and contribute significantly to reducing emissions.[11]

The benefits expected to be accrued to each stakeholder by the scheme expansion are summarised in Table 1.

Table 1: Summary of benefits accrued by each stakeholder

Stakeholder	Benefit	Description
COEX	Beverage manufacturer payments	Increased revenues received from beverage manufacturers paying the scheme price
	Recycling revenue	Increased revenue received from selling glass to recyclers
MRFs	Refunds claimed	Increased revenue on containers sent to MRFs, shared with local governments as per their revenue sharing agreement
	Glass value loss avoided	Savings because of a lower volume of glass being sold at a loss
	Waste levy savings	Savings on waste levy payments due to reduced tonnage being sent to landfill
Beverage manufacturers	Increased revenue from beverage price increase	The increase in revenue due to expected increases in beverage sale prices to cover scheme costs
Consumers	Refunds claimed	10c refund value per extra container returned
	Environmental externalities avoided	Decreased external costs generated through disposing of material to landfill e.g., emissions, land use
Recyclers	Price received for sale of glass	Revenue received for the sale of increased recycled glass
	Price received for MRF glass	Revenue received for the purchase of MRF glass
Local government	Refunds claimed	Increased refunds claimed for containers sent to MRFs, via their revenue sharing agreement
	Gate fee savings	The reduction in gate fees paid to MRF operators due to reduced tonnage through kerbside collection
Community	Participating in the circular economy	Reduced energy use, preservation of natural resources, improved public health, etc

Access to the scheme for more kinds of containers is also of particular importance to regional councils who do not offer kerbside recycling services due to the prohibitive cost of providing such a service. These consumers have no option but to place all their waste, recyclable or not, into the red top bin. As a result of the expansion, regional areas are expected to experience larger volumes of material recovered and lower landfill volumes. This will increase the volume of glass recovered by the scheme and provide greater equity of access to recycling across Queensland.

[10] Queensland Government,

[11] Queensland Government, 2020, *State of the Environment Report*.

Costs of the scheme expansion

Costs incurred by beverage manufacturers and importers

There are two major categories of cost related to the scheme, which are largely incurred by beverage manufacturers and importers:

- **Direct costs** of participating in the scheme, namely the scheme price paid to COEX by beverage manufacturers and importers selling a container in Queensland.
- **Indirect costs** of complying with the scheme, such as the set-up and administration costs a beverage manufacturer or importer incurs from participating in the scheme.

Direct costs

All beverage manufacturers, suppliers or importers of eligible containers in Queensland must, by legislation, enter into a Container Recovery Agreement with COEX. A Container Recovery Agreement requires beverage manufacturers and suppliers to contribute to the running costs of the scheme through the payment of the 'scheme price' to COEX for every eligible beverage container sold in Queensland. As of 30 June 2022, 713 beverage manufacturers and suppliers have entered into Container Recovery Agreements[12] with COEX.

COEX sets the scheme price based on several factors, including:

- the cost of refunding consumers (based on the proportion of containers that are being returned to the scheme)
- a container handling fee paid to CRP owners
- logistics and processing costs.

Scheme prices vary by the type of material of an eligible container, reflecting the differences in the cost of handling and recycling different materials. The scheme price has increased since the scheme commenced, partly because a higher proportion of containers are being returned for a refund. The current weighted average scheme price is 13.3 cents, 3 cents higher than the initial scheme price.[13]

Most manufacturers pay COEX monthly, based on the number of eligible beverage containers sold in Queensland within the previous month. COEX allows smaller manufacturers (those who sell less than 300,000 eligible containers annually[14]) to report and pay quarterly, to reduce the administrative burden of the scheme.

If eligible containers are not recovered through CRPs or the kerbside network, COEX retains the 10-cent refund. COEX is required to reinvest any surplus revenue back into the scheme. COEX also earns revenue through online auctions of recovered material to approved recyclers.

Indirect costs

In addition to paying the scheme price, beverage manufacturers and suppliers incur compliance costs from participating in the scheme. These costs include expenses resulting from changing beverage container labels, and changing existing finance and inventory systems, implementing new systems, to be able to report container volumes to COEX.

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[12] Queensland Government 2022, *Proposal to expand the scope of eligible containers in Queensland's Container Refund Scheme – Containers for Change*, December 2022.

[13] Queensland Government 2022, *Proposal to expand the scope of eligible containers in Queensland's Container Refund Scheme – Containers for Change*, December 2022.

[14] Queensland Government 2022, *Proposal to expand the scope of eligible containers in Queensland's Container Refund Scheme – Containers for Change*, December 2022.

Beverage manufacturers already participating in the scheme should not face a significant change in their administration and compliance costs – they are already reporting to COEX. They will experience an increase in costs from paying the scheme price on a greater number of containers, and a one-off cost of registering new containers with COEX.

The impact on beverage manufacturers joining the scheme for the first time will be more significant. These manufacturers will need to register their eligible containers with COEX and will incur the initial set-up costs of developing and implementing a system to report sales of eligible containers. Consultation with stakeholders suggested compliance costs could range from $0.20 per container to $1 per container. Some smaller beverage manufacturers stated they expected to incur cost greater than $1 per container.

These compliance costs may have a larger impact on smaller manufacturers who can only spread the one-off costs across a smaller volume of product. There is a risk that this could impact the financial feasibility of small regional wine and spirit producers. The magnitude of these impacts is unlikely to be significant state-wide, but may significantly burden these stakeholders. The degree of the impact on manufacturers will depend on their ability to increase prices to recover these costs.

Cost impacts on consumers

When the scheme was originally introduced, consumers experienced an increase in beverage prices as the cost to manufacturers of participating in the scheme was mostly passed on. The original scheme price was 10.3 cents per container, while 9.9 cents per container was passed forward on average, resulting in 96.1 per cent of the cost being passed on to consumers.[15] Consumers who do not participate in the scheme experience a net cost as they pay higher prices for their beverages, without receiving some compensation from the 10-cent refund.

Impacts on local government and MRFs

Expansion of the scheme will result in a decline in the volume of wine and spirit bottle glass collected through kerbside recycling. The overall impacts of this on local government and MRFs are interrelated and uncertain.

The impact on the cost of kerbside collection for local government is likely to vary by local government. The key factor for local government is its ability to reduce the cost of kerbside recycling commensurate with the reduction of glass. Local government officers advised they are unlikely to achieve savings to their existing contracts for kerbside collection services in the short term.

With lower volumes of glass to process, the average processing cost of MRFs is expected to increase. However, the increase in processing costs can potentially be offset by the refund received on wine and spirit bottles processed by MRF operators. To be eligible to receive a container refund, a MRF operator must have a revenue sharing agreement in place with a local government. Therefore, there is uncertainty about the net impact on MRF operators' costs and charges to local government as it will be dependent on the terms of each revenue sharing agreement. The refund revenue may or may not offset the expected increase in average costs.

With fewer containers expected through kerbside recycling, the scheme expansion will decrease both the quality and volume of glass collected by MRFs for resale outside of the scheme. There are few buyers for glass, so some MRFs, particularly those in regional areas, currently sell glass at a negative price due to associated transport costs. Their only alternatives are to stockpile, which is a short-term solution and increases safety risks, or to send the glass to landfill. Both of these options

[15] Queensland Productivity Commission 2020, *Container Refund Scheme Price monitoring review*, January 2020.

are more costly than accepting the negative price. The scheme may further decrease the quality of glass, causing these MRFs to pay an even higher price for its removal.

Further, higher contamination rates could result in MRFs incurring the full waste disposal levy on a greater proportion of materials that cannot be recycled.[16] This increase has no net impact to the community as it is a financial transfer from MRF operators to the Queensland Government, who receive the waste levy revenue. However, it may have a significant impact on the viability of some MRF operators.

The ability of each MRF to pass on these increased costs will vary according to the terms of its contract with local government.

There is a possibility that the overall impact on some MRFs could be a net benefit. Depending on the current price a MRF is paying for glass, it may avoid this cost if the glass is processed through the scheme instead.

Summary of costs

The full range of costs expected to be incurred by each stakeholder is summarised in Table 2. The costs in Table 2 describe the extra costs resulting from expanding the scheme, rather than all costs incurred by stakeholders related to the scheme.

Table 2: Summary of costs incurred by each stakeholder

Stakeholder	Cost	Description
COEX	Refunds paid	10c refund value paid to CRPs to be forwarded on to consumers
	Handling fees	Increased costs of handling, sorting, and storing containers at CRPs
	Processing fees	Increased processing fees paid to CRPs
	Logistics fees	Increased costs associated with transport of materials from CRPs to recyclers
	MRF fees	Increased 10c refund (exclusive of GST) paid to MRFs per container (split 50:50 between MRF and local government)
	Administration costs	Increased costs associated with administration and enforcement of the scheme, such as legal costs and audits
MRFs	Collection fees	Increased costs paid (negative price received) for containers to be collected by recyclers
	Gate fees	Reduced gate fees from reduced tonnage through kerbside collection
Beverage manufacturers	Scheme price	The container price paid to COEX
	Participation costs	Increased internal costs involved in participating in the scheme, including reporting, container approvals and label redesign
Consumers	Increased beverage prices	The expected increase in the price of beverages as manufacturers pass on increased costs
	Participation costs	General increases to the cost of consumer participation in the scheme, including transport time, time spent at collection points and container throughput
Recyclers	Price paid for recycled glass	The costs associated with an increase in volume of glass purchased from CRPs

Most of these costs are transfer costs – that is they have a net zero impact as the cost is passed through to other stakeholders. For example, COEX should have a net-zero position as scheme prices adjust to account for their increased costs. Ultimately, the costs of the scheme are passed through to consumers in the purchase price for beverages. The magnitude of this cost will depend on the design of the scheme – as administrative burden for manufacturers of the scheme decreases, so too does the overall cost of the scheme.

[16] The waste disposal levy is a charge paid to the Queensland Government for disposing of waste in a landfill. MRFs target a resource recovery rate of at least 85 per cent (<15 per cent of material sent to landfill), as this qualifies them for a 50 per cent discount on the Queensland waste disposal levy.

Cost-benefit analysis of the scheme expansion

Cost-benefit analysis (CBA) is an economic technique used to evaluate the impact on a community's economic well-being of different ways of achieving a policy objective.

A CBA assesses the impacts, positive and negative, associated with policy changes by comparing them to the outcomes expected if no change were made. The information is a useful input into decision-making regarding the design of a policy approach as it:

- quantifies the impacts on the community
- describes how expected benefits and costs might vary for major stakeholders.

The following sections outline the methodology employed, key assumptions and data underlying the estimates, and the results of the cost-benefit analysis.

Methodology

The CBA methodology used is consistent with Queensland Treasury's *Guide to Better Regulation*. As such, it:

- monetises impacts wherever possible
- quantifies impacts where monetisation is not possible
- qualitatively assesses impacts with justification where quantification is not possible
- applies sensitivity analysis where there is uncertainty about key impacts.

The measured benefits and costs are valued in dollar terms (where possible). The analysis is forward looking, and so must set a time horizon over which future benefits and costs are measured and a discount rate to convert future benefits and costs to a value in today's dollars.

A range of stakeholders were consulted to test the validity of the assumptions and data underlying the analysis, and an independent peer review of the analysis was conducted to confirm and extend the findings.

The base case scenario: Continuation of the current scheme 'as is'

In this analysis, the 'base case' scenario is the continuation of the current scheme with no change to the type of eligible containers. The scheme would continue to operate as is, but over time the following factors that affect the scheme's outcomes are expected to change:

- redemption rates (the proportion of eligible containers returned to CRPs)
- scheme prices set by COEX
- beverage sales volumes
- supply and demand for recycled glass.

Assumptions related to these key factors driving the base case scenario are outlined in Appendix A.

Proposed scenario: Inclusion of glass wine and spirit bottles in the scheme

The options to be assessed is the inclusion of glass containers that have contained wine and pure spirits into the scheme. This is expected to increase scheme throughput by approximately 125 million containers in the first year.

The key underlying assumptions and data driving the results for this scenario are outlined in Appendix A, and include:

- costs incurred by COEX, MRFs, beverage manufacturers, consumers and recyclers

- benefits accrued by the same stakeholders
- other assumptions related to relevant beverage and recycling markets.

Assessment of qualitative impacts

Preparing a cost-benefit analysis for the scheme expansion is challenging for a number of reasons. In particular, the expected costs of the scheme are much easier to quantify than the expected benefits. As noted in the Queensland Treasury guidelines, where impacts cannot be quantified or monetised, a qualitative assessment should be undertaken. A best practice CBA should use reasonable and defensible methods to value the impact rather than excluding it from the analysis.

As outlined previously, the expansion of the scheme is likely to come with a range of social and environmental benefits. The most significant of these relates to the positive environmental impacts associated with the circular economy, such as the benefits of increasing the recycling of containers and reducing disposal to landfill. While some landfill externality savings were included in the quantifiable analysis, not all of the size of the environmental benefit was able to captured.

However, evidence suggests that Australian consumers are willing to pay to support the circular economy. Research shows that 78 per cent of Australians believe recycling is one of the most effective ways to stimulate the circular economy and 49 per cent of survey respondents said they are willing to pay more for sustainable products. Of those willing to pay extra, 57 per cent said they would pay 10 per cent extra for sustainable products, 35 per cent between 10 and 20 per cent extra, and 5 per cent said they would pay over 20 per cent more for sustainability.[17]

Further, as part of the extensive consultation undertaken on scheme expansion, more than 6,600 Queenslanders responded to a survey about including additional containers. An overwhelming 98.1 per cent of respondents were in favour of more containers being made eligible for refunds.[18]

There are various approaches for estimating the size of these kinds of environmental benefits, such as formal willingness-to-pay studies, but these are onerous and time-consuming to conduct. Queensland Treasury guidelines require that the amount of analysis undertaken is proportionate to the expected impacts of the proposal. As this proposal is extending an existing scheme, it would not be reasonable to undertake such a significant study to confirm the size of this expected benefit.

Willingness-to-pay studies have informed many of the Regulatory Impact Statements used to support introduction of schemes in Australian jurisdictions. In a review of these documents conducted by the Institute for Sustainable Futures, the authors demonstrated that, at a per-container level, the benefits of container refund schemes outweigh the costs. It also demonstrates that the willingness-to-pay estimate makes up the largest component of the benefit estimation (Table 3). It is the environmental benefit that, in all cases, shifts the estimated impact of the scheme from a net cost to a net benefit.

Table 3: Estimates of four RIS studies of the costs and benefits of container refund schemes per container (cents per container)

RIS	Unit cost	Unit benefit		Net unit benefit
		WTP component	Other benefits	
Victoria (2022)	2.64	2.34	1.17	0.87
WA (2019)	4.51	4.64	1.19	1.32
NSW (2018)	3.56	3.40	1.33	1.17

[17] Eco Voice 2022, *New research into the circular economy finds that almost half of Australian consumers are willing to pay extra for a product that was made using sustainable practices*, October 2022.

[18] Queensland Government, *Cheers! Glass wine, spirit bottles to be part of container refund scheme*, media release, 20 April 2023.

ACT (2017)	4.26	6.03	1.59	3.35

Source: Institute for Sustainable Futures 2023, *Review of the cost-benefit analysis of options to expand the scope of the Queensland Government Container Refund Scheme*, July 2023.

Importantly, the Victorian RIS found that implementing a CRS had an NPV of $269 million (over 20 years at a 7 per cent discount rate), increasing to $283 million when expanding the scope to include wine and spirits bottles. Increasing the scope of containers increases all costs and benefits of these schemes, but the increase in benefits is more than the increase in costs.[19]

Given the evidence suggesting the environmental benefits of container refund schemes is large, paired with the strong public support for the scheme, it is defensible to use evidence of strong public support in the absence of a formal non-market valuation of the size of these benefits.

Assessment of quantifiable impacts

A net present value (NPV) was calculated for each option. The NPV is a single dollar figure value for the estimated value (in 2023 dollars) of the flow of benefits less costs over time. A positive NPV means the measured benefits exceed the measured costs. The higher the value of the NPV the greater the net benefit . However, a positive result does not mean everyone in the community will benefit equally – some will gain and others will lose. A positive result means the winners gain more than the losers lose.

We estimate costs and benefits in net present value terms over a 10-year period. Future costs and benefits are discounted to present value terms using a real discount rate of 7 per cent, but other discount rates are tested in the sensitivity analysis. All amounts are stated in 2023 Australian dollars.

Importantly, the result only includes those benefits and costs that can be quantified and must therefore be considered alongside the other factors that cannot be suitably quantified (outlined in the preceding section).

It is estimated that, based on quantifiable impacts, the scheme expansion will come at a net cost to the community of $0.25 billion (Table 4).

Table 4: Summary of results

Benefit (NPV) ($b)	0.91
Cost (NPV) ($b)	1.12
Overall net benefit (NPV) ($b)	(0.25)

Note: Numbers may not add due to rounding.

Sensitivity analysis

The following sensitivity analyses were undertaken to test the robustness of the analysis to the assumptions made:

- varying the real discount rate
- varying container redemption rates (pessimistic and optimistic redemption rate scenarios)
- varying the container recovery method (proportion of containers returned to CRPs instead of recycled through kerbside collections)
- varying the wine and spirit manufacturer sales growth rates
- varying the ability of beverage manufacturers to pass costs through to consumers.

[19] Institute for Sustainable Futures 2023, Review of the cost-benefit analysis of options to expand the scope of the Queensland Government Container Refund Scheme, July 2023.

The sensitivity analyses show that the result is robust to changes in key parameter assumptions.

Overall assessment

The estimated NPV only incorporates those costs and benefits that can be readily quantified. As discussed earlier in this report, other studies of container refund schemes in Australia have shown that the difficult-to-quantify environmental benefits make up the largest part of the benefit estimation, and are what shifts the NPV from a net cost to a net benefit.

It appears reasonable to assume, based on existing evidence, that the size of this unquantifiable environmental benefit of the scheme expansion exceeds the net cost. It is expected that incorporating a reasonable estimate of the benefits to the environment would shift the NPV for the scheme expansion from a net cost to a net benefit.

Conclusion

Stakeholder consultation suggests that the community is extremely supportive of the container refund scheme in Queensland, and supportive of the inclusion of further containers to improve recycling of these materials. This report evidences that the scheme expansion is likely to benefit the Queensland community.

The benefits to the community will be maximised if the cost of the expansion can be minimised to the extent possible. The magnitude of the net cost to the community will ultimately depend on the design of the scheme. In particular, as administrative burden for manufacturers of the scheme decreases, so too does the overall cost of the scheme. The potential to reduce the administrative burden where possible could include consideration of:

- minimising reporting requirements to the lowest level possible while maintaining collection of the right information required for scheme operation and transparency – this may include revisiting what data is collected and how often to ensure it is fit for purpose and not imposing unnecessary burden
- considering allowing small manufacturers, such as those registered as artisan distillers, to choose not to participate in the scheme. The cost is highest for these manufacturers per container, so not including these manufacturers would come at a cost saving to the community.

Following the findings of this analysis, the Queensland Government and Container Exchange have taken measures to reduce compliance costs for businesses, including:

- legislating that manufacturers of 100,000 or less eligible product are not required to report sales and pay scheme costs more frequently than annually unless they elect to do so
- reimbursing the cost of bar code purchases for Queensland small producers (100,000 or less)
- legislating transitional arrangements providing three years (to 1 January 2027) for the refund mark to be displayed on the container, providing for existing label stocks to be used first
- providing a 12-month grace period for the bar code to be displayed on the container
- not requiring stock on hand to be labelled with the refund mark or barcode prior to sale

The Container Exchange Board also agreed to hold the scheme price steady (no increase) to allow new participant beverage manufacturers time to adjust.

Access to the scheme for more kinds of containers is also of particular importance to regional councils who do not offer kerbside recycling services due to the prohibitive cost of providing such a service. These consumers have no option but to place all their waste, recyclable or not, into the red

top bin. As a result of the expansion, regional areas are expected to experience larger volumes of material recovered and lower landfill volumes. This will improve redemption rates across the scheme and equity of access to recycling across Queensland.

Appendices

Appendix A: Data and assumptions

Base case scenario

Assumptions related to the key factors driving the base case scenario are outlined in Table 5.

Table 5: Base case scenario assumptions

Variable	Why it matters	Assumption made	Source
Redemption rates	The redemption rate impacts the handling and logistics costs of the scheme, and the payout of refunds to consumers, local governments and MRFs	• 70 per cent redemption rate in the first year • Redemption rate increasing to legislated 85 per cent target over the next four years • 25 per cent of containers via kerbside recycling and therefore 75 per cent through CRPs	Historical data received from COEX and advice from DES
Scheme price	The major cost impact for manufacturers	• Glass scheme price of $0.232 per container • Weighted average scheme price of $0.1363 per container for all materials • Scheme price varies with redemption rates	Data received from COEX
Beverage sales volumes	Benefits and costs increase with the number of eligible containers	• Year-on-year growth rate of 1 per cent	Advice from COEX
Recycled glass prices	Recycled glass is a revenue stream for COEX and MRFs (in the case of MRFs it can be negative if prices include freight)	• Glass prices stay at current level	Consultation with industry

The base case assumes that MRFs and local governments will continue to operate as they currently do. They will engage in contracts with each other where MRFs charge local governments a gate fee to deposit material, the price of which will be dependent on throughput volumes and MRF costs. Local governments will continue to provide kerbside collection services at their current frequency.

COEX also plans to expand the number of CRPs throughout Queensland whether the scheme is expanded or not. This is expected to affect redemption rates and has been taken into consideration for our analysis in both scenarios.

Proposed scenario

The data and assumptions underlying estimates of the costs incurred by relevant stakeholders are outlined in Table 6.

Table 6: Data and assumptions underlying estimates of the costs of scheme expansion

Stakeholder	Cost	Value	Source
COEX	Refunds paid to CRPs	$0.09091 per container	Provided by COEX
	Handling fees	$0.06887 per container	Provided by COEX
	Processing fees	$0.01291 per container	Provided by COEX
	Logistics fees	$0.01335 per container	Provided by COEX
	MRF fees	$0.09091 per container	Provided by COEX
	Administration costs (year 1)	$1,315,000	Provided by COEX
	Administration costs (ongoing)	$250,000	Provided by COEX
	Variable administration costs	$0.00803 per container	Provided by COEX
MRFs	Payments for recycler collection of materials	$0.01627 per container	Weighted average price, COEX market data
	Gate fees	$190 per tonne	Average of gate fee range of $160-220 per tonne estimated by DES
Beverage manufacturers	Scheme price for glass	$0.139 per container	COEX estimation
	Participation costs for large wine and spirit manufacturers	$0.56 per container	Consultation with wine industry
	Participation costs for small wine and spirit manufacturers	$1 per container	Industry representative estimation
Consumers	Participation costs	$0.009067 per container	Victorian RIS estimates[20]

[20] Department of Environment, Land, Water and Planning 2022, *Regulatory Impact Statement – Container Deposit Scheme,* May 2022.

	Increased price of beverages	96.1% of beverage manufacturer costs	Cost pass through rate determined by QPC[21]
Recyclers	Price paid for CRP glass	$0.01449 per container	Provided by COEX

The net effect on CRPs is expected to be neutral as their increased operating costs are offset by their payments from COEX. However, CRPs that use reverse vending machine (RVM) technology may need to consider investment to accommodate larger containers or those that are of an unusual shape. TOMRA advised in addition to adjusting the aperture dimensions to accept larger containers optics, sensor systems and conveying systems may need to be redesigned. COEX advised the fixed costs for RVMs are expected to be approximately $250,000.

The data and assumptions underlying estimates of the benefits accrued by relevant stakeholders are outlined in Table 7.

Table 7: Data and assumptions underlying estimates of the benefits of scheme expansion

Stakeholder	Benefit	Value	Source
COEX	Beverage manufacturer payments	$0.139 per container	Estimated by COEX
	Recycling revenue	$0.01449 per container	Provided by COEX
MRFs	Refunds collected	$0.045455 per container	10c refund, exclusive of GST, shared 50:50 with local governments
	Glass value loss avoided	$0.01627 per container	Weighted average price calculated from COEX market data
	Waste levy savings	N/A	DES
Beverage manufacturers	Increased revenue based on beverage price increase	96.1% of beverage manufacturer costs	Cost pass through rate determined by QPC[22]
Consumers	Refunds collected	$0.10 per container	10c refund for container redemption
	Landfill externalities avoided	$75 per tonne	External cost of sending material to landfill (e.g., emissions, land use)[23]
Recyclers	Price received for sale of glass	$0.06475 per container	Sustainability Victoria
	Price received for MRF glass	$0.01627 per container	Weighted average of glass prices, based on data provided by COEX
Local government	Gate fee savings	$190 per tonne	Average of gate fee range of $160-220 per tonne estimated by DES
	Refunds collected	$0.045455 per container	10c refund, exclusive of GST, shared 50:50

Other assumptions related to beverage and recycling markets are outlined in Table 8.

Table 8: Other assumptions related to beverage and recycling markets

	Factor	Value	Source
Beverage markets	Gross sales (no. of containers) (year 1)	110,833,333	COEX estimation
	Export rate	6%	COEX estimation
	Net sales (no. of containers) (year 1)	104,183,333	COEX estimation
	Gross sales (no. of containers) (year 2)	190,000,000	COEX estimation
	Net sales (no. of containers) (year 2)	178,600,000	COEX estimation
	Sales growth rate	1%	IBISWorld[24]
	Market share of 'small' manufacturers	2%	Consultation
	Market share of 'large' manufacturers	98%	Consultation
Recycling markets	MRF current resource recovery rate	85%	Consultation
	MRF resource recovery rate after expansion	70%	Consultation

Importantly, the analysis assumes that littering rates will not be impacted by the expansion. This is because the containers considered are rarely littered.

[21] Queensland Productivity Commission 2020, *Container Refund Scheme Price monitoring review*, January 2020.

[22] Queensland Productivity Commission 2020, *Container Refund Scheme Price monitoring review*, January 2020.

[23] BDA Group 2009, *The full cost of landfill disposal in Australia*, July 2009.

[24] IBISWorld 2022, *Wine Production in Australia*, March 2022.

Appendix B: Sensitivity analysis

The following sensitivity analyses were undertaken to test the robustness of the analysis to the assumptions made:

- varying the real discount rate
- varying container redemption rates (pessimistic and optimistic redemption rate scenarios)
- varying the container recovery method (proportion of containers returned to CRPs instead of recycled through kerbside collections)
- varying the wine and spirit manufacturer sales growth rates
- varying the ability of beverage manufacturers to pass costs through to consumers.

The sensitivity analyses show that the result is robust to changes in key parameter assumptions.

Varying the real discount rate

The NPV and the discount rate have an inverse relationship – as future cash flows are discounted at a higher rate the value reduces. Changing the real discount rate does not significantly change the size of the net cost to the community (Table 9).

Table 9: Summary of results for sensitivity analysis – varying the real discount rate

	4%	**7%**	**10%**
Total Benefits NPV ($b)	1.01	0.91	0.79
Total Costs NPV ($b)	1.34	1.16	1.02
Net Benefits ($b)	(0.28)	(0.25)	(0.23)

Note: Numbers may not add due to rounding.

Varying the redemption rate

As the redemption rate increases, the scheme becomes more expensive to operate. As such, increasing the redemption rate does increase the size of the cost to the community; however, the net cost remains relatively stable once benefits have been accounted for (Table 10).

Table 10: Summary of results for sensitivity analysis – varying the redemption rate

	60%	**70%**	**85%**
Total Benefits NPV ($b)	0.89	0.91	0.93
Total Costs NPV ($b)	1.14	1.16	1.17
Net Benefits ($b)	(0.25)	(0.25)	(0.25)

Note: Numbers may not add due to rounding.

Varying the container recovery method

The proportion of containers received via CRPs rather than MRFs also impacts the cost of the scheme – the scheme becomes more expensive as the proportion of material passing through CRPs increases. However, varying this proportion does not significantly impact the size of the estimated net cost to the community of the proposed options (Table 11).

Table 11: Summary of results for sensitivity analysis – varying the CRP:MRF redemption ratio

	75:25	**85:15**	**95:5**
Total Benefits NPV ($b)	0.91	0.94	0.96
Total Costs NPV ($b)	1.12	1.19	1.21
Net Benefits ($b)	(0.25)	(0.25)	(0.25)

Note: Numbers may not add due to rounding.

Varying the beverage sales growth rates

The growth rate of beverage sales impacts the expected costs and benefits of the scheme as it changes the overall number of containers eligible for return each year. Scenarios with much larger growth rates (2.5 per cent and 5 per cent) were tested, and under these scenarios the size of the net cost increased as would be expected (Table 12). These levels of market growth are unlikely given historical market performance.

Table 12: Summary of results for sensitivity analysis – varying the beverage manufacturer sales growth rate

	1%	2.5%	5%
Total Benefits NPV ($b)	0.91	0.96	1.05
Total Costs NPV ($b)	1.16	1.22	1.32
Net Benefits ($b)	(0.25)	(0.26)	(0.27)

Note: Numbers may not add due to rounding.

Varying the ability of manufacturers to pass costs on to consumers

The ability of manufacturers to pass costs on to consumers will not impact the overall size of the net cost to the community (Table 13). However, it will impact the extent to which the costs of the scheme are borne by beverage manufacturers or consumers.

Table 13: Summary of results for sensitivity analysis – varying the beverage manufacturer's ability to pass costs on to consumers

	80%	96.1% (Current)	100%
Total Benefits NPV ($b)	0.84	0.91	0.93
Total Costs NPV ($b)	1.09	1.16	1.18
Net Benefits ($b)	(0.25)	(0.25)	(0.25)

Note: Numbers may not add due to rounding.