



CONTAINER DEPOSIT SCHEME – CONSULTATION REGULATION IMPACT STATEMENT

Transport Canberra and City Services Directorate

December 2017

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EXECUTIVE SUMMARY

The ACT Government recently¹ passed legislation to commence a container deposit scheme (CDS) in early 2018. The proposed CDS will reduce the volume of litter, deliver a net benefit to the ACT economy and will have negligible impacts outside of the territory.

To minimise costs and confusion for both industry and consumers, the ACT CDS will align with the New South Wales CDS, which commenced on 1 December 2017. This alignment is particularly important, as the ACT is an island territory within NSW and goods and people flow between the jurisdictions on a daily basis. Because of the alignment with the NSW CDS, the proposed ACT CDS will also align with existing schemes in Northern Territory and South Australia, and the proposed scheme in Queensland.

The ACT CDS will be implemented through legislative amendment to the *Waste Management and Recovery Act 2016* (ACT) (WMRR Act). The ACT's CDS has also benefited directly from extensive consultation by the NSW Government with the beverage industry and the waste industry while developing the NSW CDS. The feedback from that consultation was overwhelmingly positive.

The ACT Government has considered the impact of the CDS on litter reduction as the key policy driver and has also assessed the economic cost and benefit impacts of the CDS. The assessment shows that the CDS will deliver a net benefit to the ACT economy and will have negligible impacts outside the territory. The analysis shows that the economic benefits rely heavily on an estimate of the community's willingness to pay for litter reduction.

As with other CDS projects, the distribution of costs and benefits shows that the costs would be borne by beverage consumers. In contrast, the environment would be the major beneficiary of the scheme, which means that residents of the ACT would benefit from the improved environment. Some further benefits, such as to the riverine environment, are expected to arise but were not quantified in the economic analysis.

For the scheme to be implemented, an exemption is required under the *Mutual Recognition Act 1992* (Cwlth) and the *Trans-Tasman Mutual Recognition Act 1997* (Cwlth) with respect to the provisions of the WMRR Act and regulations relating to the CDS.

The ACT Government has prepared this Consultation Regulation Impact Statement (RIS) to outline a proposal to permanently exempt the scheme under section 14 of the *Mutual Recognition Act* and section 45 of the *Trans-Tasman Mutual Recognition Act*.

This exemption for the CDS under the two Mutual Recognition Acts would follow the precedent set by the exemption for the Northern Territory and NSW CDSs.

1.0 STATEMENT OF THE PROBLEM

Approximately 217 million beverage containers are consumed each year in the Australian Capital Territory (ACT). Many are not recycled and instead end up in landfill or are disposed of incorrectly—resulting in litter.

Beverage containers are a highly visible part of the waste stream. These containers contribute to more than one third of the litter in our streets, waterways, parks and roadsides.² The containers break down over time and contribute to the pollution in waterways and other parts of the environment.

Data from other jurisdictions has demonstrated that the introduction of a beverage container deposit scheme (CDS) is likely to significantly reduce the volume of litter and increase recycling and recovery rates.

This Consultation Regulation Impact Statement (RIS) examines the cost and benefit implications of a proposed CDS in the ACT.

An important aspect of CDSs is their alignment with other States and Territories. The ACT's CDS is being developed in close consultation with the New South Wales (NSW) Government. The NSW CDS commenced on 1 December 2017.

1.1 Market failure

Where beverage containers are concerned, a number of market failures are present:

1. Consumers of packaged products (not covered by the CDS) do not have a strong financial incentive to recycle their residual packaging or dispose of it via the regular disposal systems (a split incentive).
2. Producers of packaged goods on the whole do not bear the costs of disposal of the packaging once the product has been consumed. Equally, they do not benefit from any values that arise from recycling instead of landfilling. This means that they are often faced with incentives to increase the use of non-recyclable materials to enhance attractiveness and presentation (a split incentive).
3. Littering harms social amenity, negatively affects human health (for example, through toxins and broken glass) and negatively affects the environment (for example, through animals' ingestion of plastic). The cost of cleaning up litter is mostly borne by governments. This means that the costs are not borne by the producers of packaged goods, so they do not have a financial incentive to minimise impacts when packaging is littered. Likewise, the incentives faced by consumers are mixed (externalities).

These market failures result in two undesirable outcomes. The first outcome is some beverage containers becoming litter; the second is containers that could be recycled instead going to landfill.

Australian governments often intervene in markets to improve their efficiency and to achieve economic, social and environmental benefits. For example, the ACT supports product stewardship approaches where they can deliver net benefits to the community. Product stewardship schemes seek to move the responsibility for managing waste and recovering resources up the supply chain. This ensures that the price signals are made apparent to those parties that have the power to redesign their products or to import and sell different products. This also ensures that waste management and recycling costs are internalised in the product costs, so that consumers see appropriate price signals when they purchase the product.

CDSs are among the most mature and proven product stewardship schemes.

1.1.1 The cost of litter

Litter is waste that is improperly disposed of outside of the regular disposal system. In economic contexts, it is best described as a side-effect of producing goods and services.

The need for policy intervention on littering arises because a number of social costs associated with littering are inadequately priced by the producers and consumers of beverage containers; that is, they are an externality. As a consequence, those costs are borne by society and the clean-up costs are borne by ratepayers.

Littering imposes a number of costs on the economy and community, including the following:

- **Economic costs**—A 2015 survey of local government, state agencies, private land managers and community groups found that more than \$3.1 million a year is currently being spent on managing litter in ACT.³ This is money that could be spent on other things.
- **Environmental damage**—Litter damages natural environments and harms terrestrial and riverine wildlife.
- **Visual costs**—Litter makes places look unsightly and uncared for, and attracts more litter.
- **Human costs**—Litter such as broken glass and syringes can injure people. The presence of litter makes it more likely that other antisocial behaviours will occur, such as graffiti and property damage.
- **Resource costs**—Easily recyclable and valuable resources, such as beverage containers, are lost when people litter. Even if littered items are subsequently collected, they are often too contaminated to be recycled.

The cost of litter removal to minimise harm is borne largely by the ACT Government, as well as volunteer community groups. Importantly, the costs of littering are not borne by producers of packaged goods, except to a limited extent, and those producers do not have a direct incentive to design their packaging to minimise its impact when littered. This is an example of a market failure.

1.1.2 The cost of containers going to landfill

While most types of beverage containers are able to be recycled, it is estimated that around 38% are currently going to landfill.⁴

Sending recyclable material to landfill both increases the use of raw materials and reduces the amount of landfill space available. Increased material going landfill ultimately increases the cost of landfill as the current facilities would become full requiring the development of new facilities, which tend to be located further away and so increase the disposal costs.

The ACT's waste management hierarchy is outlined in the ACT Government's ACT Waste Management Strategy (Figure 1). The hierarchy classifies waste management strategies according to their order of importance, the aim being to extract the maximum practical benefits from products while generating the minimum amount of waste. The movement of materials to landfill is considered the least desirable outcome.

The ACT CDS will reduce the proportion of containers going to landfill, as it will create a financial incentive for beverage containers to be diverted away from landfill.

Figure 1: The ACT waste management hierarchy



Source: ACT Government, *ACT Waste Management Strategy 2011–2025: Towards a sustainable Canberra*, 2011, Figure 2, p. 3.

1.2 Beverage container disposal in ACT

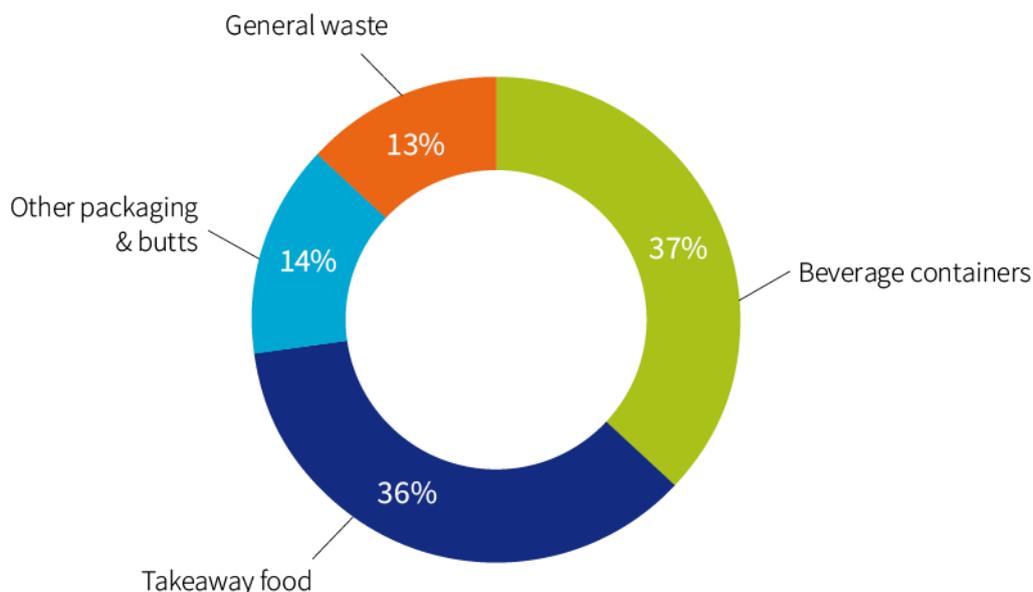
The contents of approximately 217 million beverage containers are consumed each year in the ACT.

Based on information from other states, containers consumed away from home make up around 20–30% of consumption (equating to between 40 million and 65 million containers).

Containers that are consumed away from home are more likely to either become litter or be disposed of to landfill due to limited or less convenient disposal and recycling options.

Beverage containers make up over one third of the litter stream in the ACT (Figure 2).

Figure 2: Litter in the ACT, by category, 2014–15 to 2016–17



Note: Based on the volume in litres of litter per square kilometre; excludes illegal dumping. Source: Analysis of National Litter Index data for the ACT, 2014–15 to 2016–17.

1.3 Mutual recognition

1.3.1 Background on mutual recognition

The *Mutual Recognition Act 1992* (Cwlth) (MR Act) and the *Trans-Tasman Mutual Recognition Act 1997* (Cwlth) (TTMR Act) apply as laws of the ACT by virtue of the *Mutual Recognition (Australian Capital Territory) Act 1992* (ACT) and the *Trans-Tasman Mutual Recognition Act 1997* (ACT), respectively.

In relation to goods, the MR Act and TTMR Act apply the ‘mutual recognition principle’. The principle, as explained in section 9 of the MR Act, provides that goods produced in or imported into one state, that may be lawfully sold in that state, may, by virtue of the MR Act, be sold in another state. The Trans-Tasman mutual recognition principle, as explained in section 10 of the TTMR Act, is that goods produced in or imported into New Zealand, that may be lawfully sold in New Zealand, may be lawfully sold in an Australian jurisdiction.

These Acts provide that sales of goods to which the principle applies do not require compliance with ‘further requirements’ of a type set out in the Acts that might otherwise be required under the laws of the importing jurisdiction. These include quality or performance standards, inspection requirements and labelling standards.

1.3.2 Impact of the proposed CDS on Mutual Recognition

The ACT CDS component of the amended *Waste Management and Resource Recovery Act 2016* (WMRR Act)⁵ will require all eligible beverages sold in the ACT to carry a refund mark that meets the requirements prescribed in the regulations. Further, beverage suppliers will need to obtain an approval for their beverage containers, and suppliers who bring containers into the ACT will need to enter into a supply arrangement with the CDS scheme coordinator appointed by the Government. These requirements, and some other elements of the scheme, may be considered to impose ‘further requirements’ under the MR Act or TTMR Act. For this reason, an exemption is required under the MR Act and TTMR Act.

The MR Act and TTMR Act make provision for specific goods or laws to be permanently exempted from their scope by their inclusion in schedules to the MR Act or TTMR Act.

The process for adding permanent exemptions requires the relevant ministerial council to seek the unanimous agreement of the Council of Australian Governments (COAG) to the exemption, the making of regulations by the Commonwealth to amend the relevant schedules to the MR/TTMR Acts and the prior signification of consent to the amendments by all jurisdictions by gazette notice.

The permanent exemption of the ACT CDS under the MR Act and TTMR Act would follow the precedent set by the Northern Territory CDS, which was exempted in 2013, and the NSW CDS, which was exempted in November 2017.

1.3.3 Scope of the proposed mutual recognition exemption

The wording of the exemption is yet to be determined, but the exemption would apply to:

- a. Part 10A of the WMRR Act;
- b. all other provisions of that Act, to the extent that they relate to the CDS established by that part; and
- c. regulations made under that Act, to the extent that they relate to that scheme.

2.0 OBJECTIVES OF GOVERNMENT ACTION

The ACT CDS discussion paper⁶ states that the objectives of the ACT Government action are to:

- reduce litter;
- recover eligible containers;
- increase the recycling rates of used beverage containers; and
- help engage the community in active and positive recycling behaviours.

Additionally, the ACT Government is seeking to provide a harmonised regulatory and recycling regime for beverage consumers and retailers in the ACT and NSW.

The objectives are also set out in Part 10A of the WMRR Act, which states:

The objects of this part [of the Act] are to—

- a. establish a cost effective container deposit scheme to assist the beverage industry in reducing and dealing with waste generated by beverage product packaging; and*
- b. promote the recovery, reuse and recycling of empty beverage containers.*

The CDS is the latest government action that aligns with, and directly supports, the achievement of the resource recovery objectives in the ACT Waste Management Strategy 2011–2025:⁷

1. less waste generated,
2. full resource recovery,
3. a cleaner environment, and
4. a carbon neutral waste sector.

In designing the CDS to maximise the scheme's effectiveness and minimise costs, the ACT Government has sought to align the CDS with existing schemes in South Australia and the Northern Territory, the new scheme in NSW (which commenced on 1 December 2017) and Queensland's proposed scheme.

Many people commute between NSW and the ACT each day, and an estimated 3.5 billion eligible beverage containers are sold into the NSW market each year, which means that the ACT makes up around 5% to 8% of the total ACT and NSW combined beverage market.

Because of the movement of people into and out of the ACT, it is proposed that the ACT scheme will allow for any eligible container to be returned for a refund in the ACT as long as the beverage was purchased in a jurisdiction where a legislated scheme operates and bears a valid refund mark or other identifier recognised under the scheme.

This approach is being used to minimise confusion in the beverage industry and among consumers and also to minimise industry costs.

Figure 3 shows the small area and the island nature of the ACT within New South Wales. Jervis Bay (Commonwealth Territory) is also identified on the map.

Figure 3: Map of the ACT within New South Wales



Note: For completeness, the map shows the Jervis Bay territory, which is administered under ACT law. However, Jervis Bay's small population and lack of infrastructure mean that the inclusion of the territory has no impact on the analysis presented here. Jervis Bay residents will be able to access the NSW CDS from 1 December 2017. ⁸ Source: Geoscience Australia, <https://ecat.ga.gov.au/geonetwork/srv/eng/search#!a05f7892-c39e-7506-e044-00144fdd4fa6>, accessed 17 November 2017.

3.0 OPTIONS TO ADDRESS THE PROBLEM

Due to the small size of the ACT, the Government is constrained in the options it has been able to consider for reducing the prevalence of beverage containers in litter and increasing recycling rates.

By choosing a CDS that aligns closely with the schemes already introduced in NSW and proposed for Queensland, the ACT Government has sought to minimise the costs to the beverage industry and avoid confusion for both industry and consumers.

The two options considered in detail in this RIS are the same as those considered by other COAG members:

- Option 1—No exemption for the ACT CDS, resulting in the scheme not being implemented; or
- Option 2—Granting a permanent exemption of the ACT CDS under mutual recognition legislation.

3.1 Option 1—No exemption of the ACT Container Deposit Scheme

Option 1 is that COAG members do not grant an exemption for the ACT CDS under the MR Act and TTMR Act. This would result in the CDS not being implemented in the ACT. As this would result in the scheme not being implemented, this option forms the base (business-as-usual) case against which Option 2 is assessed. Because Option 1 maintains the status quo, it would not achieve the reform objective.

As the NSW CDS has recently been implemented, it is likely that beverage manufacturers and suppliers will not differentiate between the ACT and NSW in determining any retail price adjustments due to the introduction of a CDS. For this reason, historical cost and price data might not be an accurate predictor of the future scenario under this option.

3.1 Option 2—A permanent exemption of the ACT Container Deposit Scheme

Option 2 is that COAG members grant a permanent exemption of the ACT CDS under the MR Act and TTMR Act. This would allow the ACT to implement the CDS under the relevant ACT legislation and would align with the exemptions granted to NSW and the Northern Territory.

3.2.1 The ACT Container Deposit Scheme

The ACT Government proposes to introduce the CDS in early 2018. The scheme will align closely with the NSW CDS introduced in December 2017 and will align with the schemes currently in place in South Australia and the Northern Territory.

The ACT CDS will allow anyone who returns an empty eligible beverage container to an approved ACT collection depot to receive a 10 cent refund.

A brief overview of the features of the scheme is as follows:

- Beverage containers with volumes between 150 millilitres and 3 litres purchased in the ACT, NSW or any other jurisdiction with an equivalent CDS will be eligible for a refund, with some exceptions (which are outlined in Section 3.2.2). The exceptions are the same as those that apply for the NSW scheme and are similar to the exceptions in the South Australian and Northern Territory CDSs, to aid consistency.
- Beverage suppliers (manufacturers, importers, wholesalers or retailers) that bring eligible containers into ACT will be responsible for funding the refund as well as associated costs.
- It is proposed that the CDS will be delivered through a two-part structure:
 - A single scheme coordinator will be responsible for the financial management of the scheme and for ensuring that the scheme achieves its territory wide access and recovery targets. The scheme coordinator will be the same scheme coordinator engaged in the NSW CDS.
 - The network operator will be responsible for setting up and running the network of collection points. They can build and operate the collection points or contract other organisations to do this.
- The Minister for Transport and City Services, as the Minister responsible for waste services, will appoint the scheme coordinator and network operator.

- Eligible containers collected from kerbside recycling will be able to be redeemed. The scheme will allow the material recovery facility (MRF) to use an approved method for accurately estimating the number of containers recovered in the facility and to claim the refund from the scheme coordinator. Under this approach, the MRF would receive only the refund amount. It would not be able to claim a handling fee, but would need to count or weigh material types, in accordance with the MRF Processing Refund Protocol. The scheme would also provide a regulatory incentive for the MRF, the ACT Government and local NSW councils that use the ACT MRF to share any benefits that may result from these arrangements.

3.2.2 Containers to be covered

The CDS will apply to most beverage containers between 150 millilitres and 3 litres in volume (Table 1). The scope of containers that will be covered by the CDS will be defined in the regulations supporting the WMRR Act⁹ and be consistent with the scope of containers covered by the existing NSW, South Australian and Northern Territory CDSs. Containers excluded from the CDS include:

- plain milk containers;
- glass containers that have contained wine or pure spirits;
- large containers (1 litre or more) that have contained flavoured milk, pure juice, cask wine or cask water;
- cordial and vegetable juice containers;
- sachets above 250 mL that have contained wine; and
- containers that have contained registered health tonics.

Table 1: Containers to be covered by the ACT CDS, 150 mL – 3 L, FY2017

Container material	Number of containers in CDS (150 mL–3 L)	Proportion of total number of containers covered by CDS (150 mL–3 L)	Weight (tonnes) of containers to be covered by CDS (150 mL–3 L)
Total	154,046,000	71.0%	15,700
Liquid paperboard	11,363,000	49.2%	237
Glass	60,028,000	70.1%	13,340
PET	44,102,000	91.4%	1,521
HDPE	1,448,000	6.3%	72
Aluminium	37,106,000	100.0%	530

PET = polyethylene terephthalate; HDPE = high-density polyethylene. Source: Marsden Jacob Associates, 2017.

3.2.3 Collection points and infrastructure requirements

The ACT CDS will be made up of a combination of container collection depots, container collection points and reverse vending machines. This mix of container return arrangements will provide for increased access and community involvement, contributing to the Scheme's success.

Container collection points

Container collection depots and collection points are permanent locations where consumers can return their empty beverage containers and receive a 10 cent refund payment.

The design and location of container deposit points is likely to vary depending on the needs of the local community.

Container collection points will require an approval to operate, and operators will have specific requirements placed on them. Those requirements may include defined opening hours and obligations to accept eligible containers. Importantly, all container collection depots will need to provide an accurate verification system in order to provide the correct refund and to receive accurate payment for the containers they have refunded.

There will be at least 11 collection points distributed across the ACT (Table 2).

Table 2: Proposed initial collection points throughout the ACT

Arrangement	Number
Total collection points	11
Collection depots	2
Collection points (social enterprise sites)	6
Reverse vending machine locations (operate 24 hours per day and 7 days per week)	3

Source: ACT NoWaste.

Container return points

Container return points will be locations where consumers can return their empty beverage containers but will not receive a refund payment. Instead, consumers returning containers to container return points will effectively 'donate' the 10 cent refund to the community group, school, sporting club or charity operating the site.

4.0 IMPACT ANALYSIS

The purpose of an impact analysis is to present information relating to:

- the estimated net economic impacts of the reform options;
- the impacts on different groups within the community that are likely to be affected by the options;
- the risks associated with each option; and
- any effects that the reforms may have on competition.

This section presents the findings from a cost–benefit analysis (CBA) and distributional impacts assessment by independent consultants.

4.1 Summary of findings

The introduction of the ACT CDS will deliver significant benefits to the ACT economy. Key findings of the analysis are as follows.

Key finding 1: Implementation of the ACT CDS is expected to significantly reduce litter by motivating changed littering behaviour

The ACT CDS is expected to change littering behaviour and thus have a significant impact on littering. By 2038, the CDS will have resulted in:

- 96 million fewer beverage containers being littered;
- 592 million fewer beverage containers ending up in landfill; and
- 545 million more beverage containers being recycled.

Key finding 2: The ACT CDS will be economically beneficial

Based on the results of the CBA, the ACT CDS will deliver positive benefits of \$40 million to the ACT and Australian economies. The benefit:cost ratio (BCR) of 1.79 indicates that \$1.79 of economic benefit will result for every \$1 of economic cost.

Key finding 3: Consumers will experience the greatest negative distributional impact, whereas the environment, service providers and the government will be positively affected

The key conclusions from the distributional analysis are as follows:

- Consumers experience the highest negative impact of \$49 million (PV).
- The environment receives the highest benefit from the scheme of \$71 million—a benefit that is experienced (indirectly) by consumers.
- Service providers and governments also benefit from the introduction of a CDS.

4.2 Cost–benefit analysis

A CBA was undertaken to assess the net economic impacts of the ACT CDS. The CBA compared the base case (no reform) scenario against the introduction of the CDS (described as Option 2 in Section 3.2).

4.2.1 Introduction

General assumptions underlining the analysis were as follows:

- The base year of the appraisal is FY2018 and the assessment is conducted over a 20-year period.
- Prices and results are in \$2017 unless otherwise indicated.
- The evaluation period is 20 years from FY2018 to FY2037.
- The discount rate applied is 7% (real); sensitivity testing is applied at 3% and 10%.
- The development period for the scheme is from 2017 to 2018, and the scheme commences by mid-2018.

The CBA was undertaken using a geographic scope of the ACT; however, some broader impacts identified in the distribution analysis (Section 4.6) and the qualitative consideration of effects outside the ACT (Section 4.7) were considered.

The results of the CBA are presented using two key metrics:

- the net present value (NPV), which is the PV of economic benefits delivered by the CDS less the PV of the economic costs incurred; and
- the benefit-cost ratio (BCR), which is the ratio of the PV of economic benefit to the PV of economic costs.

The NPV measures the expected benefit (or cost) to society of implementing the policy and is expressed in monetary terms, whereas the BCR identifies the option that provides the highest benefit per unit of cost.

The CBA results indicate that the ACT CDS will deliver NPV benefits of \$40 million to the economy. The BCR result is 1.79, indicating that for every \$1 of cost, \$1.79 of benefits will result (Table 3).

Table 3: Cost–benefit analysis results

Variable	Present value results
Incremental cost (PV)	\$50.2 million
Incremental benefit / avoided cost (PV)	\$89.7 million
NPV	\$39.6 million
BCR	1.79

Source: Marsden Jacob Associates, 2017.

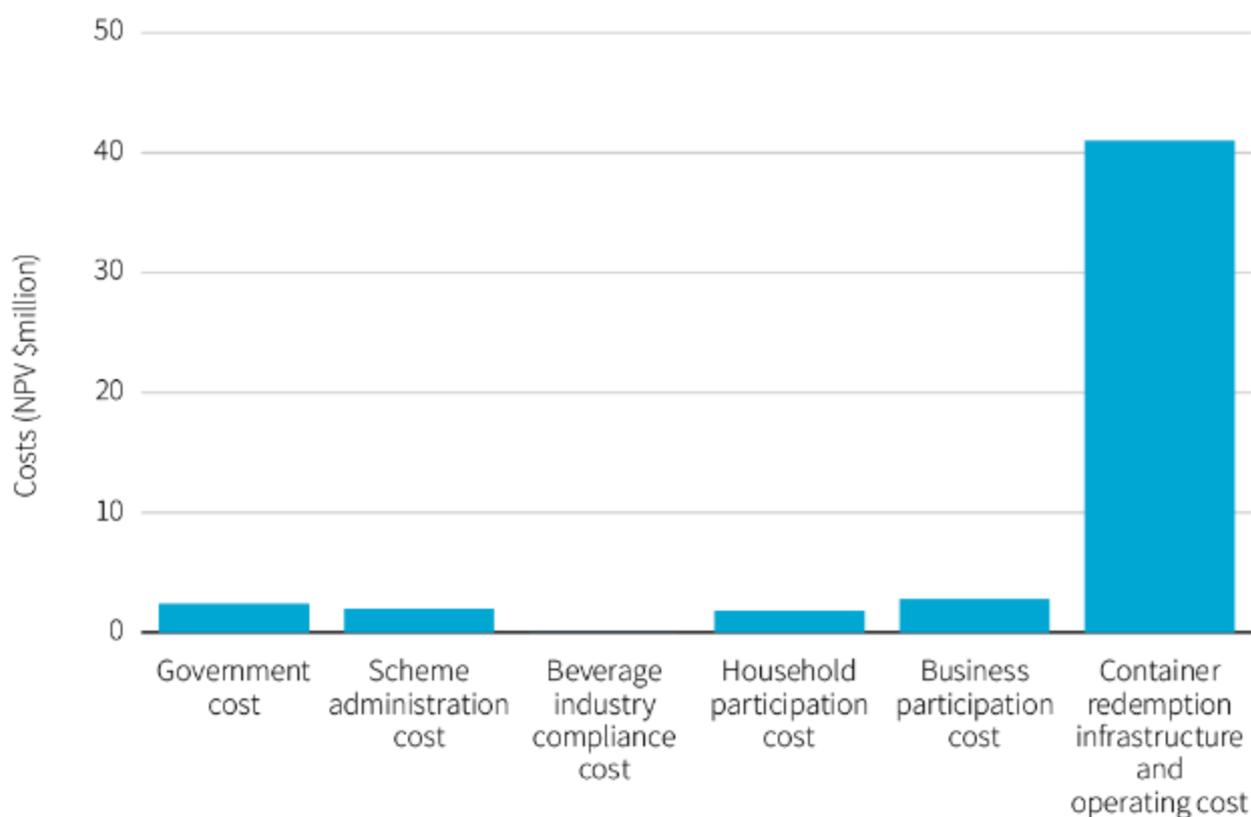
4.2.2 Costs

Cost outcomes from the CBA are divided into a number of broad categories:

- scheme design and administration costs, including avoided costs (government);
- scheme administration and coordination (scheme coordinator and network operator);
- business compliance costs (beverage industry);
- household participation costs;
- business participation costs; and
- container redemption infrastructure costs (collection points and RVMs).

Figure 4 shows the magnitude of the each of the cost outcomes. Table 3 provides a brief description and discussion of each cost or benefit item, with reference to underpinning assumptions.

Figure 4: Summary of cost outcomes (\$ million NPV)



Source: Marsden Jacob Associates, 2017.

Table 4: Description of cost assumptions

Cost category	Description of item	Basis of estimate
Scheme design and administration, including avoided costs	Government costs associated with the design and administration of the CDS include regulation design and implementation, government participation costs, communications costs, and government costs to administer regulations (including compliance and enforcement).	The assumed government scheme design and implementation costs are based on discussions with the ACT Government.
Scheme administration and coordination	One scheme coordinator is assumed to be required to report to the Government on recovery rates. The coordinator will also manage system efficiency targets; verify collection data from redemption points; make refund, handling and other payments to the network operator and the MRF operator. The costs for the scheme coordinator are minimal, as the scheme coordinator will be the same scheme coordinator as is used for the NSW CDS.	Estimates are based on information provided by the ACT Government.
Business compliance costs—beverage industry	Business compliance costs including transitional and ongoing compliance costs are assumed to be zero, as no additional burden is being imposed by the ACT beyond arrangements of other states' CDS.	Estimates are based on information provided by the ACT Government.
Household	Households face participation costs due to the	Value of time based on NSW LLS (Local Land

Cost category	Description of item	Basis of estimate
participation	time it takes to accumulate beverage containers and transport them to collection points. The material flow analysis used in the CBA assumes that 5% of containers that are consumed at home are diverted from kerbside recycling at the start of the scheme and that this proportion increases to 40% by the end of the scheme. Cost categories include vehicle operating costs, in-vehicle travel time and container deposit redemption time. The time is costed at \$30 per hour. Households are already involved in current waste management practices, so the accumulation time spent collecting empty containers is assumed to be nil.	Services) 2015, <i>Volunteer Co-ordinators Network manual: a guide for managing environmental volunteer programs</i> , 4th edition, NSW Local Land Services, Greater Sydney, Penrith Westfield NSW. Vehicle operating costs and vehicle travel time based on Transport for NSW guidelines; Nolan-ITU 2003, <i>Victorian CDL financial impact analysis</i> , EPA Victoria, Southbank, Victoria; and ISF-UTS (Institute for Sustainable Futures and University of Technology Sydney), 2001, <i>Independent review of CDL for NSW</i> , prepared for the Minister for the Environment, NSW.
Business participation	Businesses are assumed to incur some costs in accumulating and returning empty beverage containers as part of the scheme. Business/workplace participation costs are defined as costs incurred by employees taking beverage containers to temporary storage infrastructure and cleaners or other staff consolidating this in larger storage infrastructure, such as skip bins. Additional cleaner costs are assumed for businesses with a turnover of more than \$2 million per annum.	Number of commercial businesses based on Australian Bureau of Statistics (ABS), <i>Count of Australian businesses</i> , cat no. 8165, ABS, Canberra, 2017. Value of time for cleaners and costs for trips to transfer containers based on previous analysis: MJA (Marsden Jacob Associates) 2013, <i>Distributional and cost benefit analysis for the Packaging Impacts Decision Regulation Impact Statement: Data assumptions</i> , Attachment K to the <i>Packaging Impacts Decision Regulation Impact Statement</i> , Marsden Jacob Associates, Melbourne.
Container redemption infrastructure costs	The analysis assumes there will be a minimum of 11 collection points at scheme commencement: 2 Collection depots 6 Collection points (social enterprise sites) 3 Reverse vending machine locations Collection depot variable cost estimates include changes in operating costs at the collection depots and additional costs for the transport of containers from collection depots to the MRF, including costs of additional baling for transport. The RVMs are all assumed to be installed as new. Capital costs (including for installation), fixed operating costs (computer replacements and vandalism) as well as variable operating costs (container collection, cleaning and maintenance) are included in the analysis. The RVMs are co-located in retail and commercial areas, similarly to standard vending machines, so the redemption throughput does not change in sensitivity tests.	Estimates are based on information provided by the ACT Government.

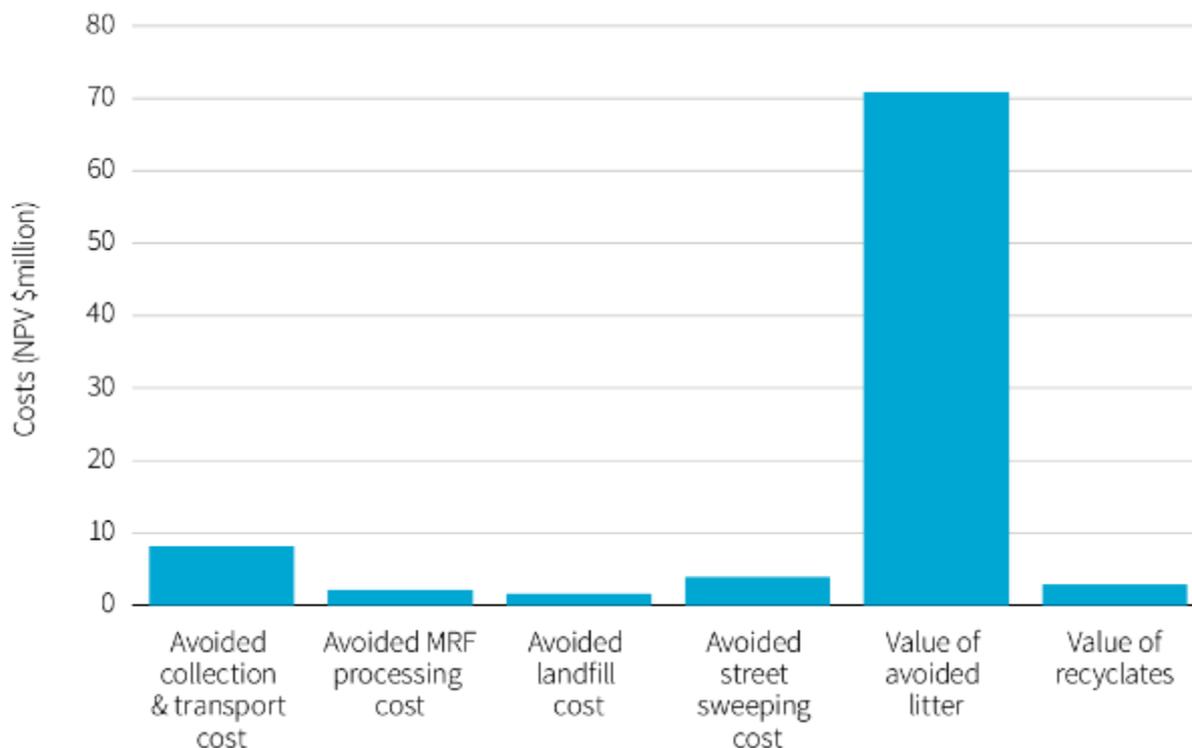
4.2.3 Benefits (avoided costs)

Benefit outcomes from the CBA include:

- avoided waste collection and transport costs (incurred by the ACT Government and passed through to consumers);
- processing or recycling at MRFs;
- avoided landfill costs;
- avoided litter costs; and
- the value of resources recovered through recycling.

Figure 4 shows the magnitude of each of the benefit outcomes. Table 5 provides a brief description of the underpinning assumptions used in estimating benefits.

Figure 5: Summary of benefit outcomes (\$ million NPV)



source: Marsden Jacob Associates, 2017.

5

Table 5: Description of benefit assumptions

Type	Description of item	Basis of estimate
Collection and transport costs	Collection and transport costs are incurred by the ACT Government (and passed through to residents) for existing waste management kerbside collection services (garbage and recyclates). While the current level of services is to be maintained, the CDS is expected to divert some of the existing costs of providing these services. Estimates used in the analysis distinguish between recyclables and garbage collection.	Estimates based on previous transport analysis by Marsden Jacob Associates. This is described in further detail in Appendix A to this RIS.
Processing of recycling at the ACT MRF	Although the CDS is expected to increase recyclates, the ACT MRF is not expected to experience a change in volume of recyclates it processes. Contamination rates are applied in the material flows analysis to containers going through the	Estimates based on prior work undertaken for the national Packaging Impacts RIS, adjusted for inflation. Material flows are described in further detail in Appendix A to this RIS

Type	Description of item	Basis of estimate
	<p>recycling stream, and the CBA modelling automatically applies the prevailing assumptions relating to landfill operating costs and externalities for this portion of the containers.</p>	
<p>Avoided landfill externalities</p>	<p>The CDS is expected to divert a portion of beverage containers away from landfill and into recycling streams. Avoided landfill costs attributable to the CDS include reduced landfill capital and operating costs and the value of avoided landfill externalities (greenhouse gases; note that the greenhouse gas potential of most beverage containers is very low). The average cost of landfill has been determined using information on the size distribution of Australian landfills and level of controls in Australian landfills. Landfills in the ACT are assumed to be typically larger landfills (compared to those in the study located in regional areas). The average externality costs of greenhouse gas emissions reductions are based on a number of variable factors: the extent of landfill gas capture at landfills; the average efficiency rate of landfill gas capture; the 'emissions factor' of the material being deposited in landfill; and the monetary value of environmental damage caused by greenhouse gases.</p>	<p>Landfill capital and operating cost estimates draw on data available in <i>Beverage container investigation: final report</i>, prepared for the Environment Protection and Heritage Council Beverage Container Working Group, BDA Group and Wright Corporate Strategy Pty Ltd, 2009, pca.org.au/application/files/4214/3769/1439/00760.pdf; WCS (Wright Corporate Strategy Pty Ltd) 2010, <i>Review of the application of landfill standards</i>, prepared for the Department of the Environment, Water, Heritage and the Arts, Wright Corporate Strategy Pty Ltd, North Sydney, 2010, online; and our previous project analyses on landfills to estimate the avoided landfill costs. This is described in further detail in Appendix A to this RIS</p>
<p>Avoided litter costs</p>	<p>The avoided costs of litter are estimated based on willingness to pay (WTP) to avoid litter, and sensitivity tests are conducted using an estimate of WTP to increase recycling. WTP to avoid litter reflects the value that households and the broader community places on litter avoidance. WTP to increase recycling reflects the amount</p>	<p>Estimates of WTP to avoid litter are based on recalibrated analysis from PricewaterhouseCoopers (PwC) 2010, <i>Estimating consumers' willingness to pay for improvements to packaging and beverage container waste management</i>, prepared for the Environment Protection and Heritage Council, PwC, 2010. WTP to increase recycling is based on R Gillespie, J Bennett, <i>Willingness to pay for kerbside recycling the Brisbane Region</i>, research report no. 97, Environmental Economics Research Hub, Canberra, 2011. WTP estimates are described in further detail in Appendix A to this RIS.</p>

Type	Description of item	Basis of estimate
	households would pay to reduce the amount of materials going to landfill. The two types of WTP are used independently of one another to avoid the potential for benefits to be double counted.	
Value of resources recovered through recycling	The value of resources recovered through recycling reflects the use value of beverage container materials. Projections of market values were developed for recoverable beverage container materials, including glass, aluminium cans, plastics and liquid paperboard. A premium for materials recovered from the CDS was also estimated for each type of material. Under the CDS, the different container types are separated at the point of redemption, so the materials are less contaminated than those collected through kerbside recycling (for example, when broken glass and other waste is incorrectly placed in bins) thus, their recycling potential is higher.	Estimates for aluminium cans, plastics and liquid paperboard align with those used in the national Packaging Impacts RIS. Discussions with stakeholders indicated a wide range of values for glass; the estimates used reflect recycling industry sources for material not yet processed.

4.3 Limitations

In this analysis, it has not been possible to quantify all of the benefits and costs. Also, as in all projection-based analysis, there are uncertainties in the data and projections.

4.3.1 Unquantified benefits

A number of potential economic benefits of implementing options are not directly valued in markets. Because of this, it can be difficult to ascribe dollar values, or at least values that provide a true reflection of their economic value, to those benefits. In the CBA, it has not been possible to assign values to:

- avoided environmental externalities due to reduced resource depletion (although some costs are captured in the value of recyclates);
- specific reductions in riverine litter, because there is a lack data on this issue; and
- broader behaviour change benefits.

Broader behaviour change benefits include flow-on benefits to other litter sources as a result of reduced beverage container litter. While the financial incentive (the redeemable deposit) will drive behaviour change where beverage containers are concerned, this incentive may also flow through to other litter sources and thus reduce littering of other material.

The absence of full valuation of non-market benefits restricts the analysis, since it is possible to make definitive statements about the efficiency of options only when all costs and benefits have been fully valued. Where data assumptions have the potential to significantly affect outcomes, the consultants preparing the CBA tested uncertainties using sensitivity analysis (described in Section 4.4). However, we note that including those unquantified factors would only improve the CBA outcome.

4.3.2 Costs are passed on to consumers

The CBA assumes that container deposits and any additional costs will be passed on to consumers by the beverage manufacturing industry,¹⁰ and this is reflected in the distributional analysis set out in Section 4.6. While the cost burden has been modelled to fall on consumers, it might not always be possible for the food and beverage industry to pass costs on to consumers.

4.3.3 Data and projection uncertainties

Although considerable background analysis has been used to assign suitable values to the variables, in practice there are still uncertainties in a number of them. Even variables that are directly valued in the market (such as the value of recovered material) are subject to uncertainty caused, for example, by fluctuations in market values over time and differences in market values from region to region and internationally.

Furthermore, all options are subject to uncertainty because of the inherent difficulty of projecting any variable over the 20-year analysis period. The impacts of the following factors may be subject to change in the future:

- recycling levels and decisions of various parties, including local governments, households and businesses, which are also influenced by the use-value of recycling in the absence of additional regulation;
- packaging consumption trends, which are affected by factors such as technology, logistical innovations, trade agreements and food and beverage prices;
- the value of the Australian dollar;
- unknown future impacts that may affect the ability of the options to achieve the outcomes specified; and
- unintended consequences arising from regulatory intervention and incentives, based on human and market responses that are not always predictable.

4.4 Sensitivity tests

The CBA is necessarily based on a series of assumptions, which means that there is a degree of uncertainty in the results. Sensitivity testing can help to identify those input values and assumptions that can materially change the results. For this CBA, sensitivity tests were undertaken by adjusting the input values of:

- discount rates;
- the analysis period;

- the number of containers;
- alternative home and away consumption splits;
- the kerbside diversion rate;
- WTP to avoid litter and increase recycling;
- WTP threshold analysis; and
- propensity to litter.

4.4.1 Discount rate

The stream of costs and benefits (in real terms) has been discounted using a real discount rate of 7%; sensitivity testing uses real discount rates of 3% and 10%. These values align with the discount rates proposed by the Australian Government’s Office of Best Practice Regulation.¹¹

The results from discount rate sensitivity tests are set out in Table 6, from which it can be seen that the BCR result is not highly dependent on the assumed discount rate.

Table 6: Discount rate sensitivity test

Variable	NPV	BCR
Discount rate 7%	39.6	1.79
Discount rate 3% (sensitivity)	59.5	1.85
Discount rate 10% (sensitivity)	30.0	1.74

4.4.2 Analysis period

A 20-year period is used in the analysis because it is assumed that the CDS will take several years to be established and for participation to develop. This analysis period accords with the Office of Best Practice Regulation’s *Cost-benefit analysis guidance note*.

Table 7 reports the results when the analysis period is reduced to 10 years. The shorter analysis period reduces the NPV from \$39.6 million to \$20.3 million. The BCR outcome declines from 1.79 to 1.72.

Table 7: Analysis period sensitivity test

Variable	NPV	BCR
Analysis period: 20 years	39.6	1.79
Analysis period: 10 years (sensitivity)	20.3	1.72

4.4.3 Number of containers

The business-as-usual case assumes a ‘container universe’ of 217 million beverage containers. There is some uncertainty about the container universe, so sensitivity testing (+/–10%) was performed on that assumption (Table 8).

The CBA results are not particularly sensitive to this assumption. A 10% increase in the number of containers leads to a small decrease in NPV from \$39.6 million to \$39.5 million, whereas the BCR remains stable. A decrease in the container universe does not affect the NPV.

Table 8: Number of containers sensitivity test

Variable	NPV	BCR
Number of containers: 217 million	39.6	1.79
Number of containers +10% (sensitivity)	39.5	1.79

Variable	NPV	BCR
Number of containers –10% (sensitivity)	39.6	1.79

4.4.4 Alternative home and away consumption splits

The analysis assumes that 67% of beverage containers are consumed at home and that the rest are consumed away from home. Discussions with the advisory committee confirmed that there is considerable uncertainty about this split, so a range of sensitivity tests were performed (Table 9).

Varying the consumption split does not change the number of containers recycled because the number of containers recycled is reasonably certain. However, changing the consumption split does affect the propensity to litter and the number of containers redeemed in public place locations.

The NPV result is somewhat sensitive to the consumption split. For instance, shifting from a 67:33 to a 50:50 consumption split improves the NPV result by \$5.9 million, from \$39.6 million to \$45.5 million.

Table 9: Consumption split (at home/away from home) sensitivity test

Variable	NPV	BCR
Consumption split (50/50) (sensitivity)	45.5	1.96
Consumption split (60/40) (sensitivity)	42.1	1.86
Consumption split (67/33)	39.6	1.79
Consumption split (80/20) (sensitivity)	36.1	1.70

4.4.5 Kerbside diversion rate

The volume of containers diverted from the kerbside depends largely on the scheme design and accompanying advertising and education campaigns. Therefore, there is some uncertainty about the kerbside diversion rate.

The analysis assumes that kerbside diversion increases over the first 10 years of the scheme, peaking at 40%. Sensitivity testing examined the impact of 30% and 50% diversion peaks (Table 9).

The result is sensitive to this assumption, which confirms the importance of careful scheme design to minimise the diversion rate from kerbside collection. Reducing the assumed diversion rate from kerbside recycling to 30% improves the NPV by about 21%.

Table 10: Kerbside diversion rate sensitivity test

Variable	NPV	BCR
Kerbside diversion: max. 40%	39.6	1.79
Kerbside diversion: max. 30% (sensitivity)	41.5	1.90
Kerbside diversion: max. 50% (sensitivity)	37.7	1.70

4.4.6 Willingness to pay to avoid litter and increase recycling

Some non-market benefits of recycling and litter reduction may not have been fully captured in the CBA. Non-market benefits will include (but are not limited to) environmental, amenity and existence values.

Two WTP measures were considered in the analysis of the CDS:

- WTP to avoid litter is assumed to be \$20,738 per tonne based on stated revealed preference valuation.
- WTP for recycling (\$717 per tonne), based on stated preference valuation, has also been included in the sensitivity tests (Table 10).

The WTP for recycling and the WTP to avoid litter are not mutually exclusive. When applying the WTP for recycling, the WTP to avoid litter and the landfill externalities are excluded (to avoid any double counting of benefits that may have already been included in recycling WTP estimates).

Based on the analysis, the WTP value for avoiding litter and the WTP value for recycling are key inputs for the CBA and affect whether the analysis produces a positive NPV and a BCR greater than one. Further discussion of the WTP is provided in Appendix A to this RIS.

These results need to be interpreted with caution because a specific assessment of WTP has not been undertaken in this analysis and the projects referenced to identify WTP estimates are subject to qualifications.

Table 11: WTP sensitivity test

Variable	NPV	BCR
WTP to avoid litter: \$20,738	39.6	1.79
WTP for recycling: \$717 (alternative scenario)	-15.6	0.69

Note that the high value for WTP to avoid litter is used in the CBA. This value was selected from well-conducted studies in the literature; however, it does not necessarily reflect the WTP to avoid riverine litter.

4.47 WTP threshold analysis

Threshold analysis was also undertaken on the values for WTP to avoid litter. The analysis identified the value at which the NPVs of the costs and the benefits are equal. It found that the WTP to avoid litter would need to be around \$9,170 per tonne in the ACT.

4.4.8 Propensity to litter

There is some uncertainty about the estimates for propensity to litter, so sensitivity tests (+/-20%) were performed on this assumption (Table 12).

This analysis reveals that changing the propensity to litter by 20% changes the NPV result by around 50%, so the result is quite sensitive to changes in this assumption.

Table 12: Propensity to litter sensitivity test

Variable	NPV	BCR
Propensity to litter	39.6	1.79
Propensity to litter +20% (sensitivity)	53.6	2.07
Propensity to litter -20% (sensitivity)	25.5	1.51

4.5 Litter volume impacts

Impacts on litter volume are driven by a number of assumptions in the model. Beverage consumption projections, changes in disposal methods and the projected impact of the CDS on litter are covered in this section.

4.5.1 Beverage consumption projections

Beverage container consumption for the base year, 2017, was estimated using data sourced from Industry Edge and Equilibrium.¹² The approach to estimating the total number of containers accords with the methodology that was used by Marsden Jacob Associates in the national CBA for the Packaging Impacts Decision Regulation Impact Statement.¹³

The beverage container universe in 2017 consisted of approximately 217 million containers. Projections of beverage container consumption for the analysis period were developed assuming an annual growth in consumption of 0.73% over the period from FY2017 to FY2022, falling gradually to annual growth of 0.54% by the 2032–2038 period. This means that per capita consumption falls, albeit slightly, over the period of the analysis.

Because the propensity to litter is higher in commercial and industrial locations as well as in public places, the analysis considered the consumption of beverage containers split across three locations:¹⁴

- at home (67%)
- away from home—public places (23%)
- away from home—non-public places (10%).

Because there is a degree of uncertainty around the estimated splits a number of sensitivity tests were also undertaken (*see Section 4.4.4*).

Under the base case, of the beverage containers used in 2017, 126.7 million containers (or 58%) were recycled, 83.3 million (38%) are estimated to have ended up in landfill, and the remaining 7.1 million (3%) are likely to have directly entered the litter stream.

4.5.2 Changes in disposal methods

Following use, beverage containers are disposed of via one of three main disposal streams. They may be recycled, enter the litter stream, or be directly disposed of as landfill.

The material flows analysis that underpins the CBA uses estimates of the current and future recycling rates and changes in the propensity to litter under the business-as-usual option and the CDS option. The number of containers that move directly into the landfill stream then becomes a balancing item (based on total beverage consumption projections).

4.5.3 Projected impact of the CDS on litter

Based on the effectiveness of similar CDSs in South Australia and the Northern Territory, the ACT CDS is expected to steadily reduce the proportion of beverage containers littered.

The estimated impact of the CDS on litter volumes uses the same framework, assumptions and data sources that were used in the Packaging Impacts Decision RIS.¹⁵ Section 3.3 of Attachment K to that RIS details the approach, assumptions and sources that were used.¹⁶ The apparent impact of the South Australian CDS on beverage container litter is described in detail Appendix A to this RIS.

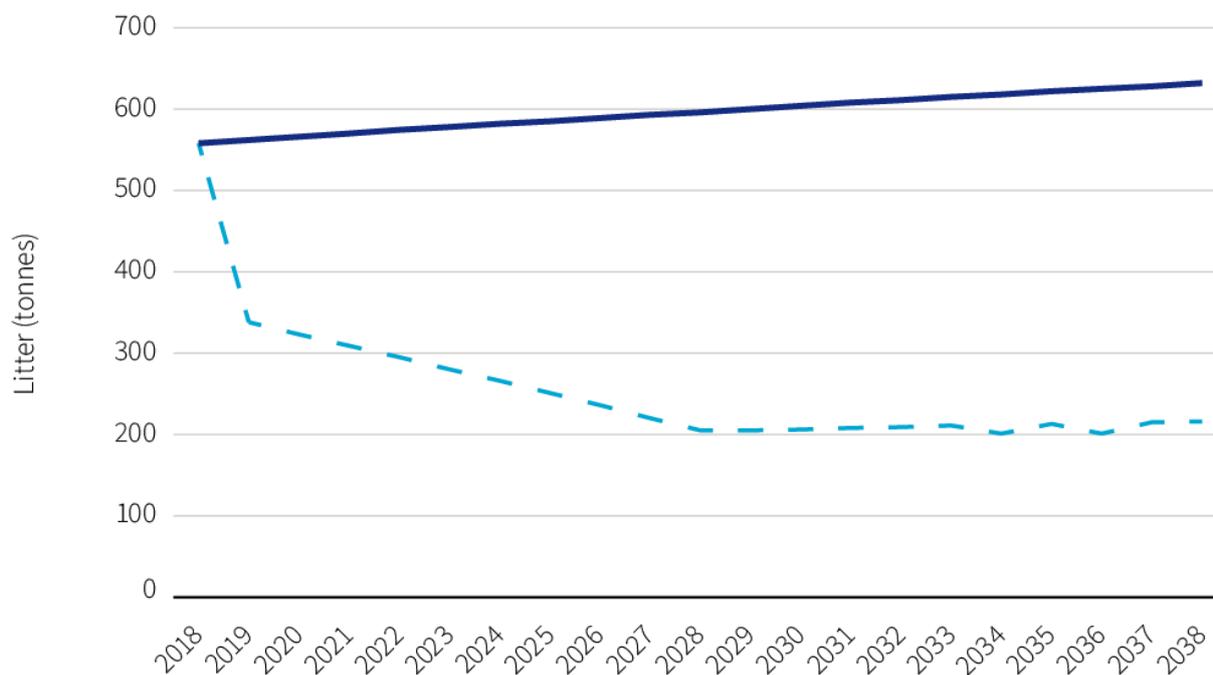
When applying this approach to the CBA of the ACT CDS, the only key change was to ensure that the propensity to litter reflects ACT circumstances, instead of the national propensity in the Packaging Impact Decision RIS. Note that these changes also introduce a degree of conservatism to this analysis when compared to the Packaging Impact Decision RIS analysis.

Figure 5 shows the impact of the business-as-usual and CDS options on the proportion of beverage containers littered, by tonnes.

By 2037, the CDS is estimated to result in:

- 91 million fewer beverage containers being littered
- 424 million fewer beverage containers ending up in landfill
- 515 million more beverage containers being recycled.

Figure 6: Litter, 2017 to 2038 (tonnes)



Source: Marsden Jacob Associates, 2017.

4.6 Distributional impacts and regulatory burden measurement

In addition to assessing the impact of the proposed reform on the ACT economy as a whole, it is useful to consider the distribution of the costs and benefits among stakeholder groups.

4.6.1 Stakeholder groups

The stakeholder groups considered for the distribution analysis are consistent with previous distributional impact assessments of container and packaging deposit schemes. The analysis focuses on the following stakeholders:

- the ACT Government;
- the Australian Government and other state and territory governments;
- MRFs and the network operator;
- Collection point operators including social enterprise sites and RVM operators;
- charities and community groups
- the food and beverage industry;
- beverage consumers; and
- the environment.

Table 13 summarises the impacts of the CDS, both positive and negative, on each of the stakeholder groups.

Table 13: Impacts by stakeholder group

Stakeholder	CDS impacts
ACT Government	The development and implementation of a CDS will affect the ACT Government. Cost impacts are assumed to include costs for: scheme development, including regulation and oversight mechanisms; approval responsibilities for container refund marking; ongoing administration of the scheme; and monitoring and enforcement. The CDS will increase beverage container prices, because scheme- and deposit-related costs will be passed on to consumers, which will mean that goods and services tax (GST) revenue increases. The analysis assumes that 2% of additional GST revenue that results from the price rise would benefit the ACT Government. ^a Benefits to the ACT Government will also accrue from reduced kerbside collection costs and extended landfill life. The analysis assumes that these benefits are directly passed on to local residents and businesses.
Australian Government and other state and territory governments	The Australian Government will benefit from an increase in income tax payments if the scheme coordinator is established using a 'for profit' corporate structure. If a not-for-profit structure is used, the Australian Government will not benefit from any increase in income tax. It is assumed that 98% of any additional GST revenue that results from the price rise would benefit the other state and territory governments.
Service providers (the MRF and the network operator)	MRF impacts include: reduced processing and lost value of recyclates; and benefit from increased revenue (handling fees and deposit redemptions) over and above additional operating costs. In the short term, benefits to the MRF may be elevated unless contracts are renegotiated with suppliers. The network operator will incur capital and operating cost impacts, but those costs are more than offset by handling fees.
Collection points including social enterprise sites and RVM sites	Collection point operators (including social enterprise sites and RVM sites) will incur capital and operating cost impacts, but those costs are more than offset by handling fees.
Charities and community groups	Charities and community including schools and sporting clubs that set up container return points as part of events or fundraising activities will benefit from the return of containers that would otherwise be captured by beverage consumers.
Food and beverage industry	The food and beverage industry will incur costs associated with the transition to and implementation of the scheme. This cost could be partially offset by revenue from the scrap value of recyclates. Based on consultation with the industry in the preparation of this report, it is assumed that the vast majority of these costs will be passed on to consumers. However, the analysis assumes that some costs, particularly producer surplus-related impacts that result from reductions in beverages sold, cannot be passed on to consumers.
Beverage consumers, including consumers at home and consumers in commercial/business locations	Consumer-related impacts include: price increases when scheme operation costs, deposits, handling fees and taxation are passed on; ^b participation costs; and reduced waste management charges.
Environment	Environmental impacts include: reduced landfill externalities; reduced litter externalities; and increased recycling.
Other	Change in harm to others (externality impacts) from a reduction in alcohol consumption. Change in employment opportunities for long-term involuntarily unemployed, resulting from social enterprise initiatives at beverage container redemption points.

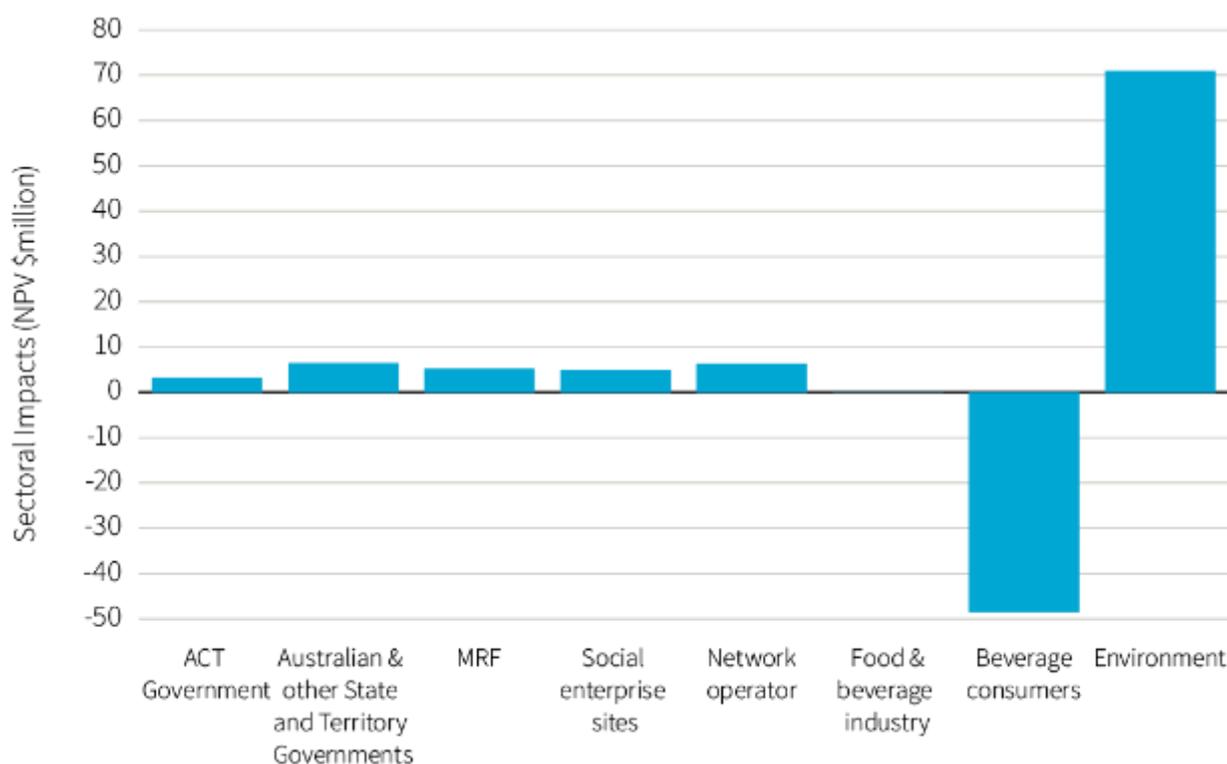
^a 2015 GST Review, Commonwealth Grants Commission, Australian Government, www.cgc.gov.au/index.php?option=com_content&view=article&id=219&Itemid=318. ^b The impact of price changes on consumption were

considered but were not quantified due to uncertainty around price elasticity for different kinds of beverages. In addition, there would be flow on effects such as potential health costs and benefits from any changes in consumer behaviour.

4.6.2 Results of distributional impact analysis

The CDS requires additional expenditure in order to fund litter and recycling outcomes. The outcomes of the distribution analysis are summarised in Figure 6. The analysis highlights where stakeholder groups benefiting from the scheme differ from the stakeholder groups that ultimately bear the costs of additional expenditure.

Figure 7: Distributional analysis (\$ million NPV)



Source: Marsden Jacob Associates, 2017.

The key conclusions from the distributional analysis are as follows:

- Consumers experience the highest negative impact of \$49 million (PV).
- The environment receives the highest benefit of \$71 million—a benefit that is (indirectly) experienced by residents of the ACT (and thus container consumers).
- Service providers and governments also benefit from the introduction of a CDS.

Community and charitable organisations may also benefit from the scheme by using the scheme as another way to raise funds or receive donations, or by partnering with the network operator to operate collection points.

The drivers of overall results for each sector are discussed in the following sections.

4.6.3 ACT Government

The net impact to the ACT Government is +\$3.2 million. While the Government incurs development and ongoing costs for the scheme, the benefits from increased GST revenue and savings in dedicated litter collection costs outweigh those scheme costs. The CBA assumes that the ACT Government receives 2% of the GST revenue from the sale of beverage containers under the CDS.

Where municipal services supplied by the ACT Government are concerned, the net impact of the CDS on the ACT Government is zero. While service levels are not expected to change, this result is driven by the assumption that all cost savings from the reduced collection and transport of kerbside rubbish as well as reduced landfill costs are passed through to residents and other customers. The CBA benefits transferred from the ACT Government in its capacity as a provider of municipal services to customers of those services are estimated to be \$9.7 million over the 20-year period.

4.6.4 Australian Government and other state and territory governments

Benefits to the Australian Government and other States and Territories are driven by corporate tax received from the scheme coordinator as well as increased GST revenue. The CBA assumes that 98% of GST revenue from the sale of beverage containers is distributed to the Australian Government and other state and territory governments.⁴⁷ The net benefit for those governments is \$6.6 million.

4.6.5 Service providers

Service providers (the MRF, social enterprise sites and the network operator) will benefit from expanded business opportunities and a reduction in net processing costs. In addition, MRFs will benefit from the redemption of deposits on containers that are returned through kerbside recycling. It is also expected that community not-for-profit and charitable organisations will partner with the network operator to operate collection points and we refer to these as social enterprise sites.

4.6.6 Beverage manufacturing industry

The net impact on the beverage manufacturing industry is estimated to be zero, as all costs will be passed on to the consumer.

4.6.7 Beverage consumers

Beverage consumers will receive benefits from cost savings passed through from reduced waste management service costs and from the MRF in the form of reduced fees. In addition, those people who deposit beverage containers at depots will receive the scheme refund of 10 cents per container.

Consumers will face higher prices for beverages covered by the scheme, as the scheme costs and increased compliance costs incurred by beverage manufacturers will ultimately be passed on to them.

The impact of the scheme on consumers of beverages covered by the scheme is \$49 million (NPV) over the 20-year period. As noted above, this equates to an annualised cost of \$4.6 million or 22 cents per person per week, although consumers are ultimately the primary beneficiaries from environmental benefits delivered by the scheme.

4.6.8 The environment

The main beneficiary from the ACT CDS will be the environment. As noted above, the community will be the primary beneficiaries from environmental improvement. The scheme is expected to enable \$71 million that would otherwise have been borne as costs by the environment to be retained by the environment.

Benefits to the environment have been quantified as:

- avoided landfill externalities of \$37,000; and
- reduced litter costs of \$70.9 million (based on the willingness to pay estimate).

Note that this assessment omits any consideration of the benefits arising from reduced riverine litter because they could not be quantified in this analysis.

4.6.9 Regulatory burden measurement

COAG's decision on whether to grant a permanent exemption for the ACT CDS under the MR Act and TTMR Act would impose minimal regulatory burden on businesses, community organisations or individuals. For this reason, a full analysis of the regulatory burden measurement is not required to be set out here. However, the CBA does include consideration of administrative compliance costs, substantive compliance costs and delay costs.

4.7 Qualitative consideration of effects outside ACT

The CBA set out above considers the impact of the proposed reform on the economy and community of the ACT.

While the quantitative analysis is focused on the ACT, the impact on other jurisdictions is expected to be small due to the alignment of the currently operating and proposed CDSs in Australia and the limited opportunity to import containers into the ACT to collect refunds from states that do not have a CDS.

4.7.1 Neighbouring jurisdictions have a CDS or plan to introduce a CDS

The ACT is an island jurisdiction within the State of NSW. On 1 December 2017, NSW implemented a CDS that aligns with the ACT's proposed CDS. The ACT CDS will assist in the effective operation of the NSW scheme, particularly in the council areas surrounding the ACT (see Section 4.7.3).

One other jurisdiction that borders NSW already has a CDSs. South Australia has a CDS that has been in place since 1977.¹⁸ The Queensland Government has announced that it intends to introduce a CDS in 2018.¹⁹ Based on this information, it appears likely that, apart from Victoria, all jurisdictions that border NSW will have CDSs by the end of 2018.

4.7.2 Alignment with other jurisdictions to minimise red tape

The ACT Government has worked with the NSW, Queensland, South Australian and Northern Territory governments to align the CDSs wherever possible. This has included discussion and an in-principle agreement on a common refund mark that suppliers will be able to use in all States and Territories. Consistency across all jurisdictions will simplify the process for industry, minimise red tape and reduce the need for any future changes to the refund marking.

4.7.3 Cross-border movement of empty containers

As outlined above, the consistent approach to the CDSs across the ACT, NSW, Queensland, the Northern Territory and South Australia means that there is unlikely to be a net movement of containers between states that have CDSs. Any movement of containers from jurisdictions that do not have a CDS to ones that do (in order to claim a refund unfairly) is likely to be limited to areas that border the jurisdictions. For this reason, the introduction of the CDS in the ACT is likely to reduce the cross-border movement of empty containers compared to the base case.

The Hume MRF in the ACT processes recyclables from four NSW councils: Snowy River, Upper Lachlan, Queanbeyan Palerang and Yass Valley.

Jervis Bay Territory is Commonwealth land that operates under the same laws and administration as the ACT. Accordingly, the CDS will apply there, too. However, Jervis Bay's small population and lack of infrastructure mean that the inclusion of the territory has no impact on the analysis presented here.

The quantification of the flow of containers across the border will be the responsibility of the NSW and ACT scheme coordinators. The ACT scheme coordinator will collect and report on that data.

4.7.4 GST and corporate tax

As noted in the distributional analysis (Section 4.6), the Australian Government and other jurisdictions would benefit from additional GST that would be collected under the scheme. This would arise because the GST would apply to the deposit on each container.

In addition, the implementation of the CDS will create a role for the scheme coordinator, which is likely to accrue corporate tax that would be paid to the Australian Government. The CBA estimates the NPV of those benefits at \$6.7 million over the initial 20-year period of the scheme.

4.7.5 Impacts on beverages manufactured in other jurisdictions and sold in the ACT

The ACT imports a range of beverages from other jurisdictions that are covered by the MR Act or TTMR Act but that do not currently plan to have a CDS (such as New Zealand, Victoria and Tasmania).

Many beverages that are imported and sold in ACT, such as wine, will be excluded from the CDS, as per the list in Section 3.2.2.

For beverages that are not captured in the CDS, the proposed reform will have no impact.

For beverages that are captured in the CDS, the key cost impacts for any beverage that is imported are as follows:

- The producer will pay for an approval of the container²⁰ and refund marking.²¹
- The costs of all beverages included in the scheme are likely to increase. It is expected that a portion of those costs will be passed through to consumers.
- The distributor or importer will contribute to scheme costs, which will be based on market share (to cover handling fees). It is expected that this cost will be passed through to consumers.

Producers of beverages that are currently exported from New Zealand into the Australian market may need to amend refund marking that is specific to the South Australian and Northern Territory CDSs (companies have two years to change the refund marking). For products that are imported in small volumes, a sticker that is added to the label may be acceptable and the easiest solution for an interim period of two years. The ACT would welcome input from stakeholders on this topic and further clarification may be provided in the Decision RIS.

However, as the provisions in the ACT CDS, including those for container approvals and the refund marking, will align with the requirements of the NSW CDS, the additional costs to beverage producers and suppliers are expected to be negligible.

4.8 Competition analysis

The ACT Government has considered whether the proposed reform would restrict competition. This analysis included consideration of impacts on:

- buyer power;
- supplier power;
- barriers to entry or exit;
- the availability of substitutes; and
- internal levels of competition in the market.

It was noted that the requirement to gain container approval could impose barriers to market entry and that those burdens may be heavier for smaller beverage producers than for larger ones. However, as the ACT Government has committed to closely harmonising its CDS requirements with those of NSW, the marginal impact of the ACT CDS is expected to be negligible.

The ACT CDS also allows for a container approved in another CDS jurisdiction (such as NSW) to be taken to be approved in the ACT, thereby imposing no additional regulatory burden on the beverage industry. The only additional cost for businesses that operate in the ACT and other jurisdictions is a requirement to report twice on sales into the ACT: once to the Australian Tax Office and once to the scheme coordinator.

Hence, the analysis concluded that the ACT CDS would not restrict competition in the market for beverages sold in sealed disposable containers.

5.0 CONSULTATION

5.1 Consultation undertaken to date

The ACT Government has committed to the development of a CDS over an extended period. Key elements of the consultation undertaken to date include:

- In September 2016, Chief Minister Andrew Barr announced that the ACT Government would introduce a CDS in early 2018 if returned at the October 2016 election.
- The ACT Government's parliamentary agreement from November 2016 commits to implementing a CDS in the ACT.²²
- Information and frequently asked questions have been made available on the Transport Canberra and City Services website since August 2017²³
- The Container Deposit Scheme discussion paper was released in early October 2017. The paper was circulated to seek community views. Submissions received from the community demonstrate that there is a high level of enthusiasm within the Canberra community for participation in the scheme.
- The community has been pointed to the YourSay web page for further information on the CDS.²⁴

The ACT's CDS consultation has benefited directly from the extensive consultation that the NSW Government has undertaken with the beverage industry and the waste industry in developing the NSW CDS. The NSW consultation commenced in June 2015 and considered a broad range of proposals from industry and other stakeholders.

5.2 Current consultation

Because this consultation runs across the Christmas and New Year period, the period for submissions on this Consultation RIS will be eight weeks.

Submissions on the proposed reform should be submitted to communityengagement@act.gov.au.

Submissions will close at 5 pm on **Friday 9 February 2018**.

6.0 EVALUATION AND CONCLUSION

As demonstrated through this Consultation RIS, Option 2—the permanent exemption of the ACT CDS under the MR Act and TTMR Act—is the only option that will allow ACT to achieve its policy objectives for waste and litter reduction and increased recycling.

As set out in Sections 3 and 4, the ACT Government has assessed alternative strategies and has determined that aligning with the new CDS in NSW would be the most effective way to minimise costs and confusion for both industry and consumers.

Importantly, the Government has designed the scheme to minimise costs and to work with existing schemes, such as kerbside recycling. As a result, the program is expected to deliver a net benefit to the ACT. The economic analysis is detailed in Section 4 of this RIS.

The economic analysis also demonstrates that the net outcome of the program is expected to be positive and will have minimal impacts outside of the ACT, as NSW, South Australia and the Northern Territory all have similar schemes and Queensland plans to implement a similar CDS in 2018. However, it is acknowledged that the economic benefits rely heavily on an estimate of the community's willingness to pay for litter reduction.

Based on this analysis, it is recommended that COAG progress the permanent exemption of the ACT CDS under the MR Act and the TTMR Act.

The introduction of the proposed reform under the amended WMRR Act and the granting of a permanent exemption from the MR Act and the TTMR Act are the only option that will achieve the policy objective.

7.0 IMPLEMENTATION AND REVIEW

7.1 Commencement

The ACT CDS legislation was passed into law on 9 November 2017, and the scheme will commence in early 2018.²⁵

The ACT Government is now undertaking a process to engage the scheme coordinator and network operator in accordance with the legislation and to implement a successful CDS in the ACT in response to community feedback.

The Government is committed to developing a CDS that will effectively harmonise with the NSW scheme so that both schemes will be as interoperable as is feasibly possible in order to minimise cross-border confusion and demonstrate regional cooperation.

7.2 Review

The amended Act requires that a review be undertaken after five years of operation. The review is to present a report to the Legislative Assembly within three months of the five-year period being reached in order to fully assess the viability of the scheme.

The network operator agreement and network arrangements will also be reviewed on an annual basis through the scheme coordinator's reports assessing the ACT scheme modelling, possible business and technical improvements to be implemented, and community awareness and participation in the scheme.

8.0 RESOURCES

8.1 Definition of terms

Term	Definition
BCR	benefit:cost ratio
CBA	cost–benefit analysis
CDS	container deposit scheme
COAG	Council of Australian Governments
GST	goods and services tax
MR Act	Mutual Recognition Act 1992 (Cwlth)
MRF	material recovery facility
NPV	net present value
PV	present value
RIS	regulation impact statement
TTMR Act	Trans-Tasman Mutual Recognition Act 1997 (Cwlth)
WMRR Act	Waste Management and Resource Recovery Act 2016 (ACT)
WTP	willingness to pay

8.2 Relevant legislation

Legislation	Location
Trans-Tasman Mutual Recognition Act 1997 (Cwlth)	https://www.legislation.gov.au/Details/C2010C00297
Mutual Recognition Act 1992 (Cwlth)	https://www.legislation.gov.au/Series/C2004A04489
Mutual Recognition (Australian Capital Territory) Act 1992 (ACT)	http://www.legislation.act.gov.au/a/1992-66/
Trans-Tasman Mutual Recognition Act 1997 (ACT)	http://www.legislation.act.gov.au/a/1997-30/default.asp
Waste Management and Resource Recovery Act 2016	http://www.legislation.act.gov.au/a/2016-51/default.asp
Waste Management and Resource Recovery Amendment Act 2017 (ACT)	http://www.legislation.act.gov.au/a/2017-36/default.asp

8.3 Relevant resources

Policy / document	Location
ACT Waste Management Strategy 2011-2025	https://www.tccs.act.gov.au/recycling-and-waste/resources/ACT_Waste_Management_Strategy

APPENDIX A – TECHNICAL ANNEX

A.1 Acknowledgement of original text

This technical annex draws heavily from the information and data provided in the Decision RIS for the NSW CDS prepared by the NSW Environment Protection Authority.²⁶

The ACT Government recognises the State of NSW and the NSW Environment Protection Authority as the author of the original material.

A.2 Introduction

This technical annex accompanies the Consultation RIS on the ACT CDS. It provides background for selected assumptions presented in the main document, including:

- data on the impact of CDSs;
- avoided landfill costs and avoided landfill externalities;
- avoided transport and collection costs;
- household participation costs;
- business participation costs; and
- willingness to pay (WTP).

The framework for the material flows analysis underpinning the cost–benefit analysis (CBA) is also briefly discussed.

A.3 Data on the impact of container deposit schemes

The likely impact of the CDS in the ACT can be estimated based on litter data for South Australia, as an example of an existing scheme. The following text has been adapted from Attachment K²⁷ to the Packaging Impacts Decision RIS:²⁸

A detailed breakdown of NLI data from two years (2011 and 2012) was undertaken for this study separating beverage container, non-beverage container packaging and non-packaging litter data for South Australia and the rest of Australia. That data was used to develop estimates of beverage container and other packaging litter rates in South Australia compared to the rest of Australia.

The estimates used are based on South Australia data that shows beverage container litter rates were only 41% of beverage container litter rates Australia wide (on a weight basis). Litter rates of other packaging were similar in South Australia to the rest of Australia.

A.4 Avoided landfill costs and avoided landfill externalities

Two types of avoided landfill costs are included in the cost–benefit analysis (CBA):

- avoided cost of landfill; and
- avoided landfill externalities.

Avoided landfill costs

The introduction of the CDS will divert containers away from landfills. To estimate the economic benefit associated with reduced landfilling, the CBA drew on data provided by the ACT Government.

Based on this information, the average cost of landfill for the ACT is estimated at \$66 per tonne, consisting of:²⁹

- capital costs of \$26 per tonne;
- capital remediation costs of \$19 per tonne; and
- operating costs of \$22 per tonne.

The average cost of landfill for the ACT is somewhat higher than the average cost of landfill for metropolitan regions of NSW due to the different types of landfill in operation.

As was the case for the NSW values, it should be noted that the operating costs do not include transport to landfill, which has been included under collection and transport costs. Further, the operating costs do not include landfill levies. Landfill levies are a transfer from one stakeholder group (waste producers/managers) to another stakeholder group (State governments) and, as such, do not constitute an economic cost. As a result, these costs are significantly lower than the financial costs of landfilling that may be seen in the market.

The avoided cost of landfill operating cost is calculated in the CBA as the product of the operating costs on a per tonne basis multiplied by the tonnage of containers that are expected to be diverted away from landfill and into the recycling stream.

Avoided landfill externalities

Two types of avoided landfill externalities were included in the analysis:

- avoided greenhouse gas (GHG) emissions; and
- other avoided landfill externalities, including other emissions and disamenity.

Greenhouse gas emissions reductions

The average externality costs of GHG emissions reductions for a given region depend on several factors:³⁰

- the extent of landfill gas capture at landfills;
- the average efficiency rate of landfill gas capture;
- the 'emissions factor' of the material being deposited in landfill; and
- the monetary value of environmental damage caused by GHGs.

The CBA drew on previous analysis that derived a specific externality cost for GHGs based on the region in which a given tonne of material is being deposited and the material type.³¹ In the ACT, it is assumed that the proportion of GHGs to which emissions factors and environmental values should apply is 40%. This is consistent with the value used for metropolitan regions of NSW in the NSW CDS Decision RIS.

Valuing the environmental benefit of reductions in GHGs is a highly contested issue, and there are several possible approaches. At one end of the spectrum, it is argued that Australia's GHG emissions represent a minuscule contribution to global emissions, and that the latter are more important when considering global warming and associated welfare losses. At the other end of the spectrum, preliminary estimates of the marginal social cost of carbon in the United Kingdom's 2006 Stern review were US\$85 per tonne CO₂e (tCO₂e).³² However, the review's methodology, notably its use of a very low discount rate, drew some criticism. The forecast cost of abatement and the traded market price of carbon permits in Australia may also serve as proxies for the value of changes to GHG emissions. The former is expected to increase in line with increasingly stringent pollution caps, ranging from approximately \$30/tCO₂e to approximately \$150/tCO₂e, according to modelling by the Australian Treasury.³³ The latter will be heavily influenced by the expected price of carbon in the European Union Emissions Trading Scheme, which is uncertain, although current permits under that scheme are trading at approximately \$10/tCO₂e or less.

The estimate used in the CBA, consistent with Australian Treasury modelling, is a value of \$30/tCO₂e.³⁴

The analysis also assumed that only liquid paperboard containers would emit GHGs if they were landfilled, as all other container types are inert from a GHG perspective. As a result, the incremental GHG benefit from the diversion of containers under the CDS is very small because liquid paperboard makes up only 2% of the beverage container universe (by tonnage).

Other air emissions

The CBA assumed that the diversion of waste from landfills will also deliver air emissions benefits. Externality costs for other air emissions (excluding GHGs) were derived from the 2010 *Review of the application of landfill standards* and were assumed to be \$0.70/tonne.³⁵

Leachate

Consistent with previous analysis, including the 2017 NSW CDS Decision RIS, leachate costs are assumed to be negligible. In part, this stems from the generally low level of hazardous materials in beverage containers susceptible to causing leachate. In any case, leachate control is now generally well established in landfills, especially in metropolitan areas. Therefore, the CBA model assumes no externality cost for leachate.

Disamenity

The diversion of waste from landfills is also assumed to result in avoided disamenity benefits. The avoided disamenity benefits are assumed to be \$1.17/tonne. This estimate was derived by considering litter and odour management practices derived from the 2010 *Review of the application of landfill standards*.³⁶

A.5 Avoided transportation and collection costs

The introduction of the CDS will result in avoided transportation and collection costs associated with:

- kerbside collection going to material recovery facilities (MRFs)
- kerbside collection going to landfills
- commercial and industrial collection going to MRFs
- commercial and industrial collection going to landfill
- public place collection going to MRFs
- public place collection going to landfill.

The following collection and transport cost estimates are used in the analysis:

- recyclables: \$108.78/tonne.
- garbage: \$147.50/tonne.

These values have been derived from previous recycling transport analysis³⁷ and are consistent with the values used for metropolitan regions of NSW in the 2017 NSW CDS Decision RIS.³⁸

The avoided transportation and collection costs are calculated based on changes in the tonnage of waste that is transported to the MRF and landfill operations, because households are now assumed to be redeeming containers at deposit redemption points (such as depots, collection points and reverse vending machines). Note that these avoided costs are more than offset by the household participation costs and infrastructure development costs assumed in the CBA.

A.6 Household participation

The material flow analysis assumes that 5% of containers that are consumed at home are diverted from kerbside recycling at the start of the CDS (in 2018), increasing to 40% by 2027.

In the CBA, households face participation costs due to the time it takes to accumulate beverage containers and transport them to collection points. These costs are divided into four main subcategories: accumulation time, vehicle operating costs, in-vehicle travel time and container deposit redemption time. The estimated values are summarised in Table 15.

Table 15: Consumer participation cost elements

Cost element	Assumption	Sources
Value of time	\$30/hour	NSW Local Land Services, Volunteer Co-ordinators Network manual: a guide for managing environmental volunteer programs, 4th edition, NSW Local Land Services, Greater Sydney, Penrith, Westfield NSW, 2015
Accumulation time	Nil	Households already involved in current waste management practices
Vehicle operating costs and in-vehicle travel time	2 km; fuel and maintenance costs of 15.4 c/km	South Australia data; Nolan-ITU, Victorian CDL financial impact analysis, EPA Victoria, Southbank Victoria, 2003; Institute for Sustainable Futures and University of Technology Sydney, Independent review of CDL for NSW, prepared for the Minister for the Environment, NSW, 2001
Container deposit redemption time	1.6 minutes for reverse vending machines and 10 minutes for other collection points	Based on assumed throughput of reverse vending machines; Harrison Research, CDL awareness and support research report, EPA South Australia and Zero Waste SA, Adelaide, 2012.

It is noted that the change in littering behaviour will arise from a combination of people:

- holding onto their beverage container so it can be recycled (rather than disposing of it incorrectly); and

- people picking up litter that would otherwise not have been picked up.

However, there is a lack of data around the importance of each process and around the time and cost of each changed behaviour. For these reasons, the costs are not estimated in the analysis.

Based on the assumptions outlined above, annual household participation costs were estimated over the course of the analysis. The cost increases over time, reflecting increased redemption rates and therefore increased redemption times. In 2022, for example, costs are estimated to be \$105,000, increasing to \$235,000 in 2027.

Households and the broader community place a value on recycling that includes a range of market and non-market values. These values are separately accounted for in the CBA analysis (see the WTP sections below).

A.7 Business participation costs

As with household accumulation, time incurred by employees taking packaging to temporary storage infrastructure is assumed to be zero, as employee time spent taking containers to storage is likely to be no greater than the time that is already involved in current waste management practices.

Instead, business and workplace participation costs are defined as costs incurred by employees taking beverage containers to temporary storage infrastructure and cleaners or other staff consolidating this in larger storage infrastructure, such as skip bins.

Clean-up costs are based on the following assumptions:

- An additional trip every four days will be needed to transfer containers to larger storages (averaged over all participating businesses).
- The number of commercial businesses with a turnover of more \$2 million per annum was estimated to be 1,874, based on ABS data.³⁹
- The value of time is assumed to be \$44.70 per hour for cleaning costs (including salaries, on-costs and normal margins). This function could be completed by existing staff or could be outsourced without affecting the economic outcome.

Drawing on these assumptions, business participation costs are estimated for each year. In 2022, for example, costs are estimated to be \$273,000.

A.8 Non-market values—willingness to pay

As with recycling, households and the broader community place a value on litter avoidance. That value is not fully reflected in observable market values (or costs). WTP is an all-encompassing measure of consumer surplus that identifies the value of a good or service, including both market and non-market values.

To inform the economic analysis of the CDS, previous WTP studies were reviewed, including two reports commissioned by the ACT Government to understand community preferences for waste collection:

- Instinct and reason: bulky waste collection, for ACT NoWaste, September 2017
- Instinct and reason: Container Deposit Scheme, for ACT NoWaste, August 2017.

The approach used in each of the studies is suitable for determining community preferences; however, neither study directly estimates community members' WTP.

The key inputs to the CBA are the public's:

- willingness to pay to reduce packaging waste going to landfill; and
- willingness to pay to reduce litter arising from packaging waste.

The sources of utility underpinning WTP to reduce visual litter in public places and WTP to increase recycling overlap. They can include:

- avoided environmental and social externalities associated with the operation of landfills (such as pollution);
- avoided environmental externalities due to reduced resource depletion;
- a sense of 'civic duty' that accompanies recycling and waste avoidance;
- general disutility from visual litter in public spaces (unsightly, negative environmental impacts);
- avoided damage costs of litter in public spaces (such as from stepping on syringes);
- avoided landfill externality costs (leachate, smell);

- avoided land cost from waste disposal in landfill; and
- preservation of resources for future generations (option values).

As recycling and reduction in visual litter may have common sources of utility, the values placed on each form of WTP are strictly non-separable. For this reason, the results of the CBA consider only one form of WTP at any one time (to avoid any potential double counting).

The Consultation RIS makes use of the WTP to increase recycling with the WTP to avoid litter estimates. It draws from recalibrated estimates of PricewaterhouseCoopers (PwC) WTP for metropolitan NSW regions used in the sensitivity analysis.⁴⁰

The approach for valuing packaging waste recycling and public litter reductions follows the frameworks and approaches set out in the Office of Best Practice Regulation's *Cost-benefit analysis guidance note*⁴¹ and the Australian Government's best practice regulation requirements for environmental valuation.⁴² The approach also draws on recommended approaches for best-practice value transfer from the Productivity Commission⁴³ and the UK Government's recommended values for including local environmental factors in economic analyses.

Willingness to pay to avoid litter

To assess WTP to avoid litter, two key studies were identified for the purpose of value transfer:⁴⁴

- PwC, Estimating consumers' willingness to pay for improvements to packaging and beverage container waste management, report prepared for the Environment Protection and Heritage Council (EPHC), 2010; and
- M Wardman, A Bristow, J Shires, Estimating the value of a range of local environmental impacts, report prepared for the UK Department for Environment, Food and Rural Affairs, University of Leeds and Loughborough University, April 2011.

PricewaterhouseCoopers Australia study

In 2010, PwC was commissioned by the EPHC to undertake a study of households' WTP for recycling.

The study was recalibrated for the purpose of estimating the WTP to avoid litter for the NSW CDS Decision RIS.

The PwC study was reviewed with the aim of conducting a similar recalibration for the ACT. However, a number of deficiencies were identified:

- The PwC report found that the average WTP of ACT households to reduce visual litter was not statistically different from zero.⁴⁵
- The PwC analysis of ACT data was based on just 150 respondents.⁴⁶ Moreover, respondents in the age range of 18–30 years were oversampled and respondents 50 years or older were undersampled, relative to the representative population.⁴⁷

Furthermore, it was not possible to rerun the WTP estimates because it was not possible to access the necessary datasets.

Given the above limitations and the similarities between the ACT and metropolitan NSW, the NSW metropolitan WTP estimates are the most appropriate estimates to use in the CBA. The NSW values have been adjusted to reflect ACT population and inflated to \$2017. The results are shown in Table 16. These estimates are used in the standard modelling, and values as outlined below are used in sensitivity testing.

Table 16: WTP to reduce public space litter, ACT households (\$2017)

	Value of litter reduction	Lower 95% CI	Upper 95% CI
10% reduction in public place litter	3,060,000	1,690,000	5,590,000
1% reduction in litter (\$ per ACT household per year)	2.21	1.22	4.04
Litter reduction (\$/tonne)	20,738	11,432	37,914

UK Department of Environment, Food and Rural Affairs study

The 2011 study by Wardman, Bristow, & Shires was commissioned by the UK Department of Environment, Food and Rural Affairs.⁴⁸ The purpose of the study was to estimate the economic value of local environmental amenity factors. The factors were:

- urban quiet areas;
- fly-tipping;
- litter;
- fly-posting;
- graffiti;
- dog-fouling;
- chewing gum;
- trees;
- light pollution; and
- odour.

The UK benefit transfer estimates resulting from this study are the UK Government's recommended parameters for incorporating local environmental values for things such as litter, noise pollution, graffiti and other urban waste into CBAs.

Using benefit transfer, we estimate the WTP using recalibrated UK study results to be between \$67.78 and \$81.37 per person per year.

These benefit transfer estimates are significantly higher than the original 2010 PwC estimates (for NSW metropolitan regions). Several points should be noted here:

- Because of the elevated results (in comparison to the PwC study), we have contacted the UK study leaders, who confirmed that the results have been correctly interpreted and adjusted for an Australian/NSW/ACT context.
- An advantage of the UK study is that WTP valuations for improvements in local environmental factors were all expressed on a common 0–10 scale (from bad to good). This translates directly to 10% incremental improvements from any baseline condition.
- We think there are several reasons that the WTP values are higher than the PwC estimates:
 - Payments are for local litter reduction, and people may be often willing to pay more for this proximity benefit.
 - The litter-related images used in the study are particular to the UK (Figure 7). In particular, the considerably narrower kerbsides may mean that people are willing to pay more for this proximity benefit.
 - In the UK study, 'litter' means all litter, not just packaging waste. As a result, the UK study estimates are for all public litter, not just packaging waste.
- We have adjusted the UK value estimates for purchasing power parity differences. A key assumption is that UK and ACT populations experience similar loss of amenity from public space litter.
- We have restricted the aggregation to people over the age of 18 years in the ACT, given that the valuation survey did not survey people younger than 18.

Figure 8: Litter images, UK study



Source: UK Department for Environment, Food and Rural Affairs, *Local environmental quality: scale of local environmental quality: illustrations and descriptions*, August 2013, www.gov.uk/government/uploads/system/uploads/attachment_data/file/226568/leg-scale-illustrations.pdf.

Cautions and issues remain:

- The study is not sufficiently disaggregated to the level of being able to indicate the extent (if any) to which the estimated WTP values include market benefits (such as the value of recyclates) and litter reductions and other non-market benefits estimated in the CBAs.
- The values transferred in the UK study were not estimated with reference to the specific environmental changes being examined in the ACT study. As a result, there remains uncertainty about the ACT community's actual WTP. At best, benefit transfer can provide an indication of the order of magnitude of the community's WTP for environmental services.

Willingness to pay to increase recycling

Households and the broader community place a value on recycling that includes a range of market and non-market values. Market values have been fully captured in the main analysis, but non-market values only partly so. Potential non-market values of recycling include:

- avoided environmental and social externalities associated with the operation of landfills (such as pollution and noise);
- avoided environmental externalities due to reduced resource depletion; and
- a sense of 'civic duty' that accompanies recycling and waste avoidance.

A review of the literature identified the following study as being preferred for the application of benefit transfer to packaging waste recycling: R Gillespie, J Bennett, *Willingness to pay for kerbside recycling in the Brisbane region*, research report no. 97, Environmental Economics Research Hub, Canberra, 2011.

Gillespie and Bennett's survey investigated respondents' WTP for an existing household kerbside recycling scheme in the Brisbane region and the amount of waste that goes to landfill or is recycled. Materials recycled are paper, cardboard, glass, plastic and aluminium.

Using benefit transfer, we estimate WTP for a 1% increase in the level of packaging waste recycling in the ACT by ACT households in 2017 is in the range of \$199,000–304,000 per annum (\$2017), and \$1.99–3.04 million for a 10% increase. This equates to between \$575 and \$876 per household per tonne per annum (Table 18).

Table 18: WTP to increase waste packaging recycling, ACT households (\$2017)

Willingness to pay	Value of recycling	Lower 95% CI	Upper 95% CI
Kerbside recycling (1% change in waste packaging) (\$ per year)	\$249,000	\$199,000	\$304,000
Kerbside recycling (10% change in waste packaging) (\$ per year)	\$2,488,000	\$1,994,000	\$3,038,000
Kerbside recycling (\$ per household per year)	\$152	\$122	\$186
Kerbside recycling (\$/tonne recycled)	\$717	\$575	\$876

The estimated WTP of \$717 per tonne has been used in sensitivity tests in the CBA. Because this value overlaps with the WTP to avoid litter, the two WTP values have not been used at the same time, as that would result in double counting. We have therefore excluded the WTP to avoid litter when the WTP for increased recycling is used in sensitivity tests.

However, we note that the value overlap between the two WTP measures is not absolute; therefore, the results of both sensitivity tests are somewhat conservative.

Material flows analysis

The CBA presented in the Consultation RIS considers both the economic impacts (costs and benefits) and the relevant subset of financial (distributional) impacts. This approach reflects the fact that all costs and all market benefits associated with options will have a financial impact on one or more stakeholder groups. However, financial transfers between stakeholder groups have been excluded from the CBA because they do not result in a net economic cost or benefit.

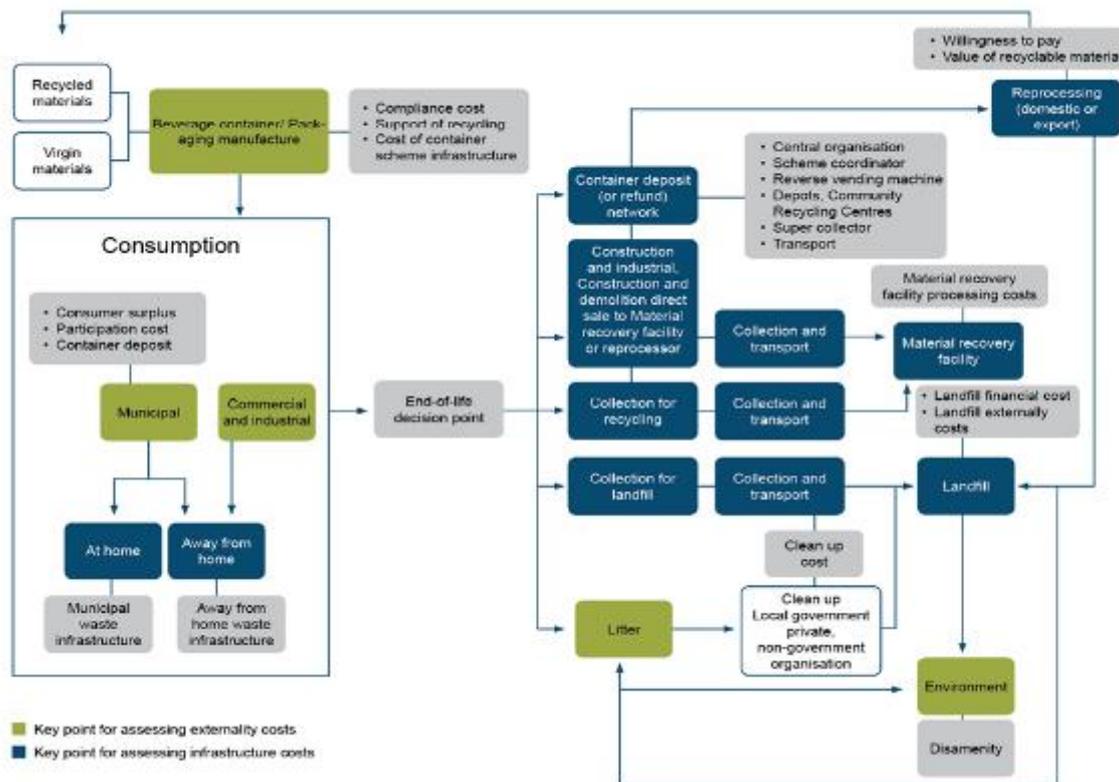
To achieve this disaggregation required the integration of the CBA model with a material flows analysis. Note that the physical flow of packaging waste ultimately drives many (although not all) of the costs, benefits and distributional impacts of the options (Figure 8).

Costs and benefits that have been assessed in the CBA are set out in Table 19. The categorisation of costs and benefits is not rigid and, in practice, a number of the variables listed as costs will present in the analysis as avoided costs (that is, benefits) for at least some options.

Table 19: Costs and benefits

Costs	Benefits
<p>Administration costs</p> <ul style="list-style-type: none"> government regulation development, administration and enforcement scheme administration avoided administration costs 	<p>Avoided landfill costs</p> <ul style="list-style-type: none"> garbage collection and transport landfill operating costs landfill externalities Avoided costs of litter
<p>Recycling and litter infrastructure and operating costs</p> <ul style="list-style-type: none"> recycling infrastructure and operations recycling and waste collection and transport MRF processing litter programs 	<p>Value of recovered material/recyclates</p> <ul style="list-style-type: none"> paper/cardboard glass plastics steel cans aluminium cans
<p>Participation costs</p> <ul style="list-style-type: none"> households engaged in recycling businesses engaged in recycling community engaged in cash for cans beverage and retail industry costs compliance and transition costs producer surplus impacts Consumption-related consumer surplus costs 	<p>Employment benefits</p> <ul style="list-style-type: none"> Health and less harm to others

Figure 9: Chain of 'physical flows' and associated costs and benefits



Source: Mutual Recognition Amendment (NSW Container Deposit Scheme) Regulations 2017, Explanatory statement.

¹ The *Waste Management and Recovery Amendment Act 2017* (ACT) was passed on 9 November 2017

² Analysis of National Litter Index surveys for November 2016 and May 2017 in the ACT.

³ Information provided by ACTNoWaste, 2017, unpublished.

⁴ This estimate is based on the assumption that all containers that are not recycled or littered end up in a landfill.

⁵ Part 10A of the WMRR Act and Regulations associated with that Part.

⁶ Transport Canberra and City Services, *Container Deposit Scheme: discussion paper*, October 2017, www.yoursay.act.gov.au/act-container-deposit-scheme.

⁷ ACT Government, *ACT Waste Management Strategy 2011–2025: towards a sustainable Canberra*, 2011, http://www.environment.act.gov.au/data/assets/pdf_file/0007/576916/ACT-Waste-Strategy-Policy_access.pdf.

⁸ Australian Government Department of Infrastructure and Regional Development, *Community Bulletin 2017/15— ACT Container Deposit Scheme*, November 2017, http://regional.gov.au/territories/jervis_bay/community/bulletins/bulletins-2017/bulletin-2017-15.aspx

⁹ Containers will be defined in the Regulations under a head power in section 64E of the amended WMRR Act.

¹⁰ This would result in the cost to consumers per beverage being 10 cents plus the cost of administration.

¹¹ Office of Best Practice Regulation (OBPR) 2016, *Regulation cost–benefit analysis guidance note*, Department of the Prime Minister and Cabinet, Canberra, [online](#).

¹² Industry Edge and Equilibrium, *Compilation of contestable data for 2011–12 on the consumption and recycling of glass, aluminium, LPB, HPDE and PET beverage containers and in addition aluminium aerosol containers*, report for the Packaging Stewardship Forum of the Australian Food and Grocery Council, 2013.

¹³ MJA, *Distributional and cost benefit analysis for the Packaging Impacts Decision Regulation Impact Statement: data assumptions*, Attachment K to the Packaging Impacts Decision Regulation Impact Statement, Marsden Jacob Associates, Melbourne, 2013, www.environment.gov.au/system/files/resources/0d61a8da-4263-4844-928c-e4f9e07472ef/files/attachmentk-data-assumptions-report.docx.

¹⁴ MJA, *Distributional and cost benefit analysis for the Packaging Impacts Decision Regulation Impact Statement: data assumptions*, Attachment K to the Packaging Impacts Decision Regulation Impact Statement, Marsden Jacob Associates, Melbourne, 2013, www.environment.gov.au/system/files/resources/0d61a8da-4263-4844-928c-e4f9e07472ef/files/attachmentk-data-assumptions-report.docx.

¹⁵ National Environment Protection Council (NEPC), *Packaging Impacts*, National Environment Protection Council Service Corporation, Canberra, 2014, www.nepc.gov.au/projects/packaging-impacts.

¹⁶ MJA, *Distributional and cost benefit analysis for the Packaging Impacts Decision Regulation Impact Statement: data assumptions*.

¹⁷ T Dale, *Distributing GST revenue to the states: where is the revenue raised and what is a 'relativity'?*, Parliament of Australia, 2014, www.aph.gov.au/about_parliament/parliamentary_departments/parliamentary_library/flagpost/2014/july/gst-relativities-where-is-revenue-raised.

¹⁸ Department of Climate Change and Energy Efficiency, July 2012. *Australian National Greenhouse Accounts— National Greenhouse Account factors*, Australian Government, Canberra.

¹⁹ S Miles, 'Container deposit scheme for Queensland', media release, 22 July 2016, Minister for Environment and Heritage Protection and Minister for National Parks and the Great Barrier Reef, <http://statements.qld.gov.au/Statement/2016/7/22/container-deposit-scheme-for-queensland>.

²⁰ The ACT is not proposing to charge a container approval fee, but it is expected that most containers will be approved in NSW (and will then be deemed to be approved in the ACT). NSW charges an \$80 fee for five-year container approval period.

²¹ The cost of adding a refund marking is not known, but it is expected that most containers have a marking anyway – due to the requirements of other states and Territories with existing CDSs.

- [22](#) A Barr, 'Parliamentary Agreement for the 9th Legislative Assembly for the Australian Capital Territory', 2016, www.cmd.act.gov.au/data/assets/pdf_file/0005/1013792/Parliamentary-Agreement-for-the-9th-Legislative-Assembly.pdf.
- [23](#) Transport Canberra and City Services, *Container Deposit Scheme*, ACT Government, 13 November 2017, www.tccs.act.gov.au/recycling-and-waste/drop-off/recycling/container-deposit-scheme.
- [24](#) ACT Government, 'ACT Container Deposit Scheme: a bit about the scheme', *YourSay*, 2017, www.yoursay.act.gov.au/act-container-deposit-scheme.
- [25](#) *Waste Management and Resource Recovery Amendment Act 2017* (ACT), www.legislation.act.gov.au/a/2017-36/current/pdf/2017-36.pdf.
- [26](#) The NSW Decision RIS is included in the Mutual Recognition Amendment (NSW Container Deposit Scheme) Regulations 2017, Explanatory statement, www.legislation.gov.au/Details/F2017L01503/Explanatory%20Statement/Text.
- [27](#) Marsden Jacob Associates (MJA), *Distributional and cost benefit analysis for the Packaging Impacts Decision Regulation Impact Statement: data assumptions*, MJA, Melbourne, 2013, p. 37, www.environment.gov.au/system/files/resources/0d61a8da-4263-4844-928c-e4f9e07472ef/files/attachmentk-data-assumptions-report.docx.
- [28](#) National Environment Protection Council (NEPC), *Packaging Impacts Decision Regulation Impact Statement*, prepared for the former COAG Standing Council on Environment and Water, March 2014, www.environment.gov.au/system/files/resources/0d61a8da-4263-4844-928c-e4f9e07472ef/files/packaging-impacts-decision-ris.pdf.
- [29](#) Note a discrepancy arises due to rounding errors
- [30](#) It is noted for consistency the analysis should capture the greenhouse gas emissions from other processes in the CDS. For example, the additional collection/transport activities and the emissions embodied in the construction of new infrastructure would ideally be captured. However due to difficulties in estimating the marginal change in emissions these have been omitted from the analysis. Additionally we note that the assumed economic cost of transport is based on the values recommended in the Transport for NSW economic appraisal guidelines which includes various amenity impacts: <https://www.transport.nsw.gov.au/sites/default/files/media/documents/2017/principles-and-guidelines-for-economic-appraisal-of-transport-investment.pdf>
- [31](#) MJA, *Distributional and cost benefit analysis for the Packaging Impacts Decision Regulation Impact Statement: data assumptions*, Attachment K
- [32](#) NH Stern, *The economics of climate change: the Stern review*, Cambridge University Press, Cambridge, UK, 2006.
- [33](#) Australian Treasury, *Strong growth low pollution: modelling a carbon price (SGLP)*, Australian Government, Canberra, 2011.
- [34](#) Australian Treasury, *Strong growth low pollution: modelling a carbon price (SGLP)*.
- [35](#) WCS, *Review of the application of landfill standards*. The estimate of the disamenity has been adjusted because the majority of beverage containers would produce little odour.
- [36](#) WCS, *Review of the application of landfill standards*.
- [37](#) MJA, *Distributional and cost benefit analysis for the Packaging Impacts Decision Regulation Impact Statement: data assumptions*.
- [38](#) www.legislation.gov.au/Details/F2017L01503/Explanatory%20Statement/Text
- [39](#) Australian Bureau of Statistics (ABS), *Count of Australian businesses*, cat no. 8165, ABS, Canberra, 2017.
- [40](#) PricewaterhouseCoopers (PwC), *Estimating consumers' willingness to pay for improvements to packaging and beverage container waste management*, report prepared for the Environment Protection and Heritage Council (EPHC), 2010.
- [41](#) Office of Best Practice Regulation (OBPR), *Cost-benefit analysis guidance note*, Department of the Prime Minister and Cabinet, Canberra, 2016, www.dpmc.gov.au/resource-centre/regulation/cost-benefit-analysis-guidance-note.
- [42](#) OBPR, *Research report: environmental valuation and uncertainty*, Department of Prime Minister and Cabinet, Canberra, 2014.
- [43](#) R Baker, B Ruting, *Environmental policy analysis: a guide to non-market valuation*, staff working paper, Productivity Commission, Canberra, 2014.
- [44](#) Value transfer: In an ideal world, environmental values would be estimated for each proposed policy, taking into account all of the particular details of the specific policy. However, the use of primary research to estimate environmental values can be costly and time consuming, and in real-world policy processes the time and money required often is not available. Value transfer is the process of estimating environmental values in a location of interest (the policy site) by transferring values from studies already completed in another location (the study site). This removes the need for primary research.
- [45](#) PwC, *Estimating consumers' willingness to pay for improvements to packaging and beverage container waste management*, p. 38.
- [46](#) PwC, *Estimating consumers' willingness to pay for improvements to packaging and beverage container waste management*, Table 24.
- [47](#) PwC, *Estimating consumers' willingness to pay for improvements to packaging and beverage container waste management*, Table 39.
- [48](#) M Wardman, A Bristow, J Shires, *Estimating the value of a range of local environmental impacts*, report prepared for the UK Department for Environment, Food and Rural Affairs, University of Leeds and Loughborough University, April 2011.