



**South Australian
Environment Protection Authority**



**Container Deposit Scheme
Economic Analysis Review**

Final Report

December 2020

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1 EXECUTIVE SUMMARY

The South Australian Environment Protection Authority (EPA), on behalf of the South Australian Government, is currently reviewing the Container Deposit Scheme (CDS). The aim of the EPA review is to examine changes in the CDS that would further promote beverage container product stewardship, continue to support reduced litter in the State and enhance recovery of resources embedded in beverage container materials. The EPA review is broad in scope and encompasses an examination of containers included within the CDS, incorporating currently excluded containers, the role of new technology, governance structures, markets for recovered materials and contribution towards a circular economy.

As part of the EPA review, Hudson Howells has been engaged to address the following specific elements of the overall review:

- Determine the value of SA's Container Deposit Scheme.
- Determine the extent to which there is unrealised value within SA's Container Deposit Scheme.

The following provides a summary of our findings in relation to the specific project specifications and terms of reference, and specifically modelling and analysing the value of SA's current 10c baseline deposit scheme and an increase to 20c in relation to the following proposed scenarios:

- Current SA CDS operations, efficiencies, container and financial flows, beneficiaries and workable competition.
- The contribution and value of SA CDS to the SA economy and circular economy.
- An increase to a four bin kerbside system, incorporating a glass waste bin.
- Incorporation of the currently excluded beverage containers up to 3L in accordance with the *Environment Protection Act 1993* and *Environment Protection Regulations 2009*.
- Harmonising the refund/deposit per container to 20c across all jurisdictions that currently have or intend to have a CDS including SA.
- Transition costs to a single scheme coordinator model (change from the current multiple Super Collectors to a single scheme coordinator). Specifically benefits and costs to Government, existing Super Collectors and existing Depot owners i.e. capital and infrastructure costs and maintenance or otherwise of existing current contracts.
- Transition costs of a retained multiple scheme coordinator model (retain current Super Collectors) with an altered governance arrangement to improve dispute resolution and enable Depot owners to contract with a single Super Collector. Specifically benefits and costs

to Government, existing Super Collectors and existing Depot owners i.e. capital and infrastructure costs and maintenance or otherwise of existing current contracts.

- Transition costs associated with additional return points. Specifically benefits and costs to Government, existing Super Collectors and existing Depot owners.

This CDS Economic Analysis Review entailed substantial stakeholder consultation and detailed econometric modelling based on a range of assumptions in the absence of data (e.g. determining elasticity of demand assumptions). The detail of the stakeholder consultation and economic modelling are contained in two accompanying technical papers:

- Appendix 1 – Stakeholder Consultation.
- Appendix 2 – Modelling Technical Report.

Section 3 of the main report provides an outline of the stakeholder consultation. Section 4 discusses the market and regulatory environment and summarises the current economic footprint of the South Australian CDS. Section 5 provides the results of the scenarios economic modelling while Section 6 provides an overall summary and recommendations for consideration by the South Australian Government.

Section 4 assesses the current contribution and value of SA's CDS to the SA economy and circular economy. Based on the CDS economic footprint detailed in this review, economic modelling estimates the following South Australian economic impacts associated with current CDS activities¹, incorporating the CDS proportion of operations of Depots, Super Collectors and Material Recovery Facilities (MRFs):

- Direct Impact
 - Employment (FTE's) – 469
 - Gross State Product/Value Added (\$m) - \$47.6
- Induced (or Multiplier) Impact
 - Employment (FTE's) – 914
 - Gross State Product/Value Added (\$m) - \$110.0
- Total Impact
 - Employment (FTE's) – 1,383
 - Gross State Product/Value Added (\$m) - \$157.6

¹ The size of the sector is indicative and based on modelling in that auditable data is not available. What data exists comes from different periods, and in many cases is not available due to the businesses being private operations and as such accounting records are not publicly available. In addition, many of the operators undertake recycling outside of CDS eligible containers.

Section 5 contains the results of the detailed economic modelling of the above scenarios and is undertaken and presented at three scenario impact levels as follows:

1. The impact of each scenario on the CDS supply chain.
2. The impact of each scenario on the above State (SA) economic impacts.
3. Community Benefit Cost outcomes.

The economic modelling is undertaken on a **mutually exclusive** basis – i.e. each scenario being implemented without the other scenarios, plus on a **non-mutually exclusive basis** whereby the above impacts are modelled for each scenario including the refund/deposit per container increasing to 20c across all State/Territory jurisdictions that currently have or intend to have a CDS, including SA.

In relation to overall community benefit cost outcomes, the **mutually exclusive** modelled benefit cost outcomes measure the estimated per annum unrealised value in the South Australian CDS associated with the range of options available to improve the scheme. The options/scenarios (mutually exclusive) are ranked below in order of the priority in which they could contribute per annum unrealised value to the South Australian community:

- Incorporating Currently Excluded Containers (up to 3L - plain milk; glass wine/spirit bottles; fruit juice over 1L; flavoured milk over 1L) - \$86.19 million.
- Increase the Deposit Rate from 10 to 20 cents – \$85.69million.
- Additional Return Points - \$75.84million.
- 4th Bin Kerbside System - \$58.41 million.
- Single Scheme Coordinator - \$55.73million.
- Enable Depot Owners to Contract with a Single Super Collector - \$53.52 million.
- Improved Dispute Resolution - \$49.81 million.

The full economic modelling has also been undertaken on a **non-mutually exclusive** basis whereby the above impacts are modelled for each scenario including the refund/deposit per container increasing to 20c across all State/Territory jurisdictions that currently have or intend to have a CDS, including SA. The modelled benefit cost outcomes measure the estimated per annum unrealised value in the South Australian CDS associated with the range of options available to improve the scheme. The options/scenarios (not mutually exclusive) are ranked below in order of the priority in which they could contribute increased value to the South Australian community:

- Incorporating Currently Excluded Containers (up to 3L - plain milk; glass wine/spirit bottles; fruit juice over 1L; flavoured milk over 1L) - \$171.88 million.
- Additional Return Points - \$161.53 million.

- 4th Bin Kerbside System - \$144.10 million.
- Single Scheme Coordinator - \$141.42 million.
- Enable Depot Owners to Contract with a Single Super Collector - \$139.21 million.
- Improved Dispute Resolution - \$135.50 million.

In summary, all scenarios will deliver a positive benefit cost to the South Australian community and warrant serious consideration for implementation from a South Australian perspective, with *incorporating currently excluded containers* having the greatest potential to capture unrealised CDS value (in conjunction with a rate increase to 20c).

The 4th bin kerbside scenario includes an assumption of the need to invest in a glass optical sorting plant (to be established within a dedicated facility) at an assumed capital cost of \$12 million. There are also significant transition costs associated with the *incorporating currently excluded containers* and *additional return points* scenarios (estimated at an ongoing annualised rate of \$3 million and \$2 million respectively) that will impact existing industry participants (notwithstanding the overall benefits that will accrue to the SA community). There are also additional costs for product suppliers. These costs have been included in the overall evaluation.

As part of this review and based on the modelled economic benefits, the EPA has sought recommendations in relation to changes to SA's CDS and harmonisation of the CDS scope across all State and Territory jurisdictions.

It is therefore **recommended** to prioritise the inclusion of *incorporating currently excluded containers (up to 3L - plain milk; glass wine/spirit bottles; fruit juice over 1L; flavoured milk over 1L)* in SA's CDS and increase the deposit rate from 10 to 20 cents subject to the commissioning and review of national consumer based research to determine elasticities of demand across all container types and a review of our economic modelling which has been based on an overall elasticity of -0.5. In relation to deposit harmonisation, we note that this is a national issue for container deposit schemes and deposit harmonisation and would benefit from the above recommended national approach and research.

The other modelled scenarios all are modelled as producing positive economic benefit and Circular Economy outcomes, and it is therefore **recommended** that the non-mutually exclusive priority order above be adopted by the EPA for future CDS policy decision making, thereby maximising unrealised value and the scheme's contribution to the State and national circular economies.

2 PROJECT OBJECTIVES AND REPORT STRUCTURE

2.1 Project Objectives

The South Australian Environment Protection Authority (EPA) on behalf of the South Australian Government is currently reviewing the Container Deposit Scheme (CDS). The aim of the EPA review is to examine changes in the CDS that would further reduce litter pollution in the state and enhance recovery of resources embedded in beverage container materials. The EPA review is broad in scope and encompasses an examination of containers covered by the CDS, consumer attitudes towards the scheme, the role of new technology, governance structures, markets for recovered materials and contribution towards a circular economy.

As part of the EPA review, Hudson Howells has been engaged to:

- Determine the value of SA's Container Deposit Scheme.
- Determine the extent to which there is unrealised value within SA's Container Deposit Scheme.

The specific objectives include to develop a baseline from South Australia's current 10c container deposit scheme with consideration to:

- How the SA CDS operates within the current regulatory and market environments in terms of efficiencies, container and financial flows, beneficiaries and 'workable competition' (as defined within the 'NSW Container Deposit Scheme – Monitoring the impacts on container beverage prices and competition' NSW IPART report dated December 2018).
- Determine the contribution and value of the SA CDS to the SA economy (including Gross State product and employment) and state and/or national circular economy and identify both the realised and unrealised value under the scenarios listed below.
- Provide recommendations based on the above to the EPA.

Hudson Howells' recommended methodology adopted for the project are detailed below:

- **Stage 1** - The impact of CDS on prices, competition and consumers.
 - Desktop review of previous studies and a general literature review (for context).
 - Consultation with CDS industry stakeholders in order to gather data for the current assessment of economic impacts and the economic modelling of the agreed Scenarios as detailed below.

- Financial and economic modelling to assess the impacts on levels of economic activity in the State. Based on the literature and consultation, the impacts of increased (net) costs on consumers and business have been considered against the offsetting factors of economic activity occurring in the Container industry itself – applied to Hudson Howells’ developed Input Output Model for South Australia (for the 2019) based on the latest national IO tables and SA State Accounts and Labour Force Data.
- **Stage 2** - How the CDS scheme works and the regulatory and market environments that it operates within.
 - Desktop review plus incorporation into the Stage 1 stakeholder consultation.
 - Scheme mapping.
 - Identification of key regulatory and market environments.
- **Stage 3** - Analysis of the results and make recommendations from the Material Flow Analysis undertaken by consulting firm Rawtec.
 - Access and review the Material Flow Analysis report and implications for the Scenarios Analysis below.
- **Stage 4** - Determine the contribution of the CDS to the SA and national Circular Economy including contribution to Gross State Product and FTE Jobs.
 - Econometric modelling along with the Australian national table including modelling framework design, input of data from Stages 1 – 3 and modelling of the results – to Gross State Product and employment, including all direct impacts and indirect (or multiplier) impacts.
- **Stage 5** - Analyse the **benefit/cost** positions of a range of scenarios against the current baseline position including:
 - An increase to a four bin kerbside system, incorporating a glass waste bin.
 - Incorporation of the currently excluded beverage containers up to 3L in accordance with the Environment Protection Act 1993 and Environment Protection Regulations 2009.
 - Harmonising the refund/deposit per container to 20c across **all jurisdictions** that currently have or intend to have a CDS.
 - Transition costs to a single scheme coordinator model (change from the current multiple Super Collectors to a single scheme coordinator). Specifically benefits and costs to local government, Super Collectors and Depot owners i.e. capital and infrastructure costs and maintenance or otherwise of existing current contracts.
 - Transition costs of a retained multiple scheme coordinator model (retain current Super Collectors) with an altered governance arrangement to improve dispute resolution and enable Depot owners to contract with a single Super Collector. Specifically benefits and costs to local government, Super Collectors and Depot

- owners i.e. capital and infrastructure costs and maintenance or otherwise of existing current contracts.
- Transition costs associated with additional return points. Specifically benefits and costs to local government, Super Collectors and Depot owners.
- **Stage 6** - Based on the analysis above, discuss the extent to which there is unrealised value within the SA CDS and the implications of the alternative scenarios.
 - Analysis of the econometric modelling results of the various scenarios detailed above against the current situation (from Stage 4 above).
- **Stage 7**- Draft and Final Reports including recommendations to address all project objectives and impacts or behaviours arising from the operations of the CDS.

The approach was to assess the change in material flows based on the above scenarios, and to assess the community wide benefit/cost position for each scenario to assist the EPA with future policy decision making, especially in relation to economic impacts on the Circular Economy, Gross State Product and Jobs (based on the economic model) with additional consideration of sources of value other than levels of economic activity.

2.2 Report Structure

This CDS Economic Analysis Review entailed substantial stakeholder consultation and detailed econometric modelling based on a range of detailed and sometime complex assumptions (e.g. determining elasticity of demand assumptions). The detail of the stakeholder consultation and econometric modelling are contained in two accompanying technical papers:

- Appendix 1 – Stakeholder Consultation.
- Appendix 2 – Modelling Technical Report.

Section 3 of the main report provides a summary of the stakeholder consultation. Section 4 discusses the market and regulatory environment and summarises the current economic footprint of the South Australian CDS. Section 5 provides a summary of the scenarios economic modelling while Section 6 provides an overall summary and recommendations for consideration by the EPA.

3 SUMMARY OF STAKEHOLDER CONSULTATION

This section of the report contains a summary of the key findings of the stakeholder consultation and do not represent the opinions of Hudson Howells. The detailed findings of the stakeholder consultation are contained in Appendix 1 and follow the sequence of the approved consultation template. Responses were received from 3 Super Collectors, 12 depots, Scouts SA (representing 10 depots) and Recyclers of South Australia (representing 107 depots).

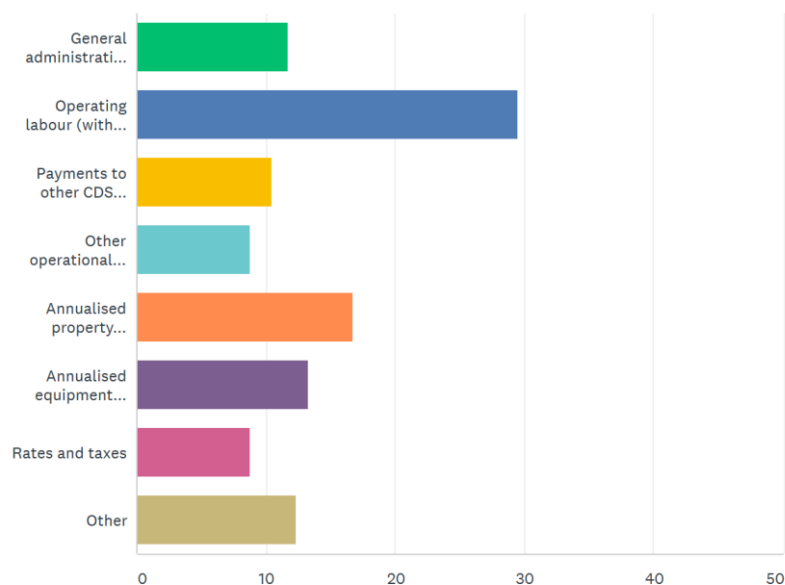
The information and data gathered via this stakeholder consultation has been used to inform the assumptions underpinning the economic analysis and modelling. All responses were aggregated (to maintain confidentiality) with the following key findings from the Depot responses used to inform the economic modelling:

- Average Number of Employees per Depot (including part time and casual) - 6
- Average Number of Full Time Equivalent Employees per Depot – 3.1 FTEs
- Average Value of Refunds Paid Per Annum - \$642,000
- Average Annual Sales Turnover (including the handling fee payment by Super Collectors to Depots where relevant) - \$1.25 million

Depots were asked to provide an indicative breakdown of costs into the following categories:

- General administration (including salaries with on-costs)
- Operating labour (with on-costs)
- Payments to other CDS entities
- Other operational costs
- Annualised property (including maintenance and repairs and depreciation)
- Annualised equipment (including maintenance and repairs and depreciation)
- Rates and taxes
- Other

The 4 Depots that responded via Hudson Howells' Online Survey Monkey facility provided the following average results:



The remainder of the survey responses validate the above findings for Depots generally with Operating Labour representing the major cost component at around 30% and combined Annualised Property and Equipment Costs around the same percentage. So, in terms of variable operating costs, Operating Labour represents 40 to 50% of variable costs.

The stakeholders were asked to consider the various proposed scenarios under investigation, and to indicate what impact they thought each scenario would have on South Australia's rate of recycling and litter reduction. The aggregated responses are summarised as follows (see Appendix 1 for detailed summaries):

- **An increase to a four bin kerbside system, incorporating a glass waste bin** – stakeholders were split evenly on this issue with contamination raised as a potential issue. However, consultation with O-I Australia indicated that glass containers contaminated with residues (e.g. sauces, jams and other food materials) was acceptable due to convenience and other cost advantages of the system on the basis that ceramics, stone and porcelain in the glass stream were avoided. That is, the benefits of recovering additional glass materials for glass manufacturing outweigh the costs associated with removing contamination.
- **Incorporation of the currently excluded beverage containers up to 3L (plain milk; glass wine/spirit bottles; fruit juice over 1L; flavoured milk over 1L)** – There was almost total support for this scenario with only 1 Depot indicating a negative impact based on these containers already going into kerbside collection.
- **Increasing the refund/deposit per container from 10c to 20c** – Again there was almost total support for this scenario with only 1 Depot indicating a negative impact based on increased cost to consumers, cash flow, entry to market restrictions, etc.

- **Change from the current multiple Super Collectors system to a single scheme coordinator** – There was good support for this scenario (50%) with others citing there will be no impact on SA's rate of recycling and litter reduction as Super Collectors already coordinate the next step in the process after the CDS empty beverage containers are returned to depots for a refund of the deposit.
- **Change from the current multiple Super Collectors system to a single scheme coordinator, and existing collection Depots collaborating with a network coordinator in regions that currently have a low return rate or limited accessible return options (e.g. remote regions of SA)** – While there was good support for this scenario (40%) increased cost and governance requirements of an additional system layer were highlighted as reasons against this scenario.
- **Altered governance arrangement to improve dispute resolution** – Again there was good support for this scenario (40%) with those opposed on the basis of there being no impact on South Australia's rate of recycling and litter reduction.
- **Enable Depot owners to contract with a single Super Collector of their choosing** - There was good support for this scenario (50%) with others citing that this is similar to the existing NT model, which is less effective and less efficient with several administration issues and reporting problems, and that it will have no impact on South Australia's rate of recycling and litter reduction.
- **Establishment of additional Depot return points (including reverse vending machines)** – This scenario was not well supported (17%) most likely due to competitive reasons, but some stakeholders did highlight that improved convenience is likely to have a positive impact on South Australia's rate of recycling and litter reduction.

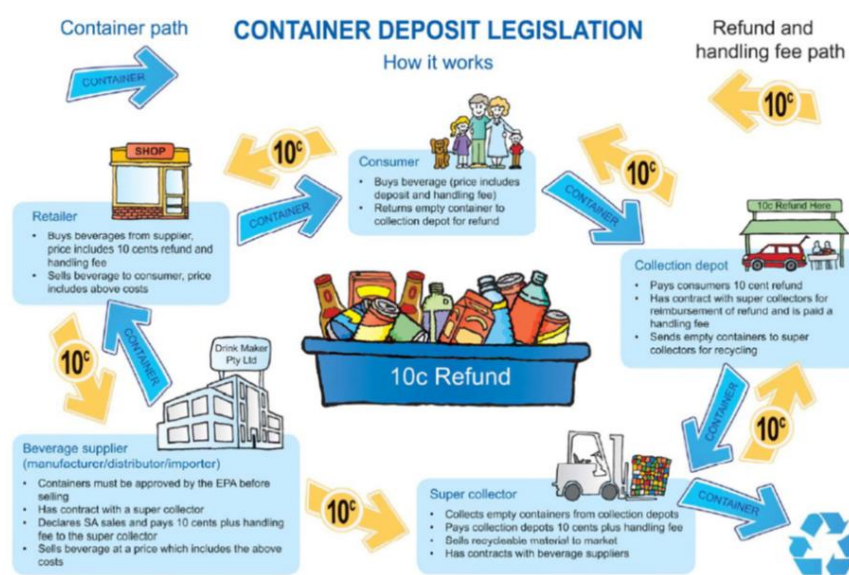
Stakeholders were also asked by container type, what percentage changes to their business throughput, revenues and costs the above scenarios will have on their businesses. While noting that there were limited responses to requests for data, in summary respondents considered that the inclusion of currently unincorporated containers and the increase in the levy from 10¢ to 20¢ would have positive impacts while opinions re other scenarios was mixed, and more muted. The purpose of this question was to obtain information on transaction costs and revenues associated with the scenarios under consideration. The aggregated responses are contained in Appendix 1.

4 REGULATORY MARKET AND ECONOMIC ENVIRONMENT

4.1 Functioning of the CDS System

The following diagram, obtained from the EPA website (<https://www.epa.sa.gov.au/environmental>), describes how the current Container Deposit Legislation works in South Australia.

Figure 1 – Container Deposit Legislation in SA



In summary, the 10 cent deposit and an agreed handling fee is included in the wholesale price of the beverage to the retailer. The 10 cent deposit and handling fee are included in the retail price paid by the consumer for the beverage. The deposit and handling fee is retained by the manufacturer/wholesaler, or their agent who operates as the Super Collector to facilitate returns from the collection Depots. The deposit and agreed handling fee are held until the deposit containers are returned to them by the Depots to be recycled.

The Depots sort the containers by beverage container material type, i.e. aluminium, PET, liquid paperboard and glass according to colour for return to the appropriate Super Collector. In South Australia these include:

- Marine Stores Pty Ltd (for brewery - Lion Nathan / SA Brewing, Coopers and CUB products).
- Statewide Recycling and FlagCan Distributors (for soft drinks - Coca Cola, Schweppes, and companies marketing a wide range of boutique beers, spring waters etc. (cans, PET and non-refillable glass containers).

Once containers are sorted, the relevant Super Collector coordinates the handling of that material for sale to recyclers. Super Collectors employ a weight based formula to pay the Depots the refunded deposits (paid to consumers in step 3) and agreed handling fee. To support this approach Super Collectors periodically undertake audits of the returned containers and the collection Depot operations.

The economic modelling framework developed in later sections for this project, along with estimating the current economic footprint of the CDS scheme as of 2020, is based on the following explanation of flows through the systems:

- People return eligible containers to Depots and the Depots send them on to the Super Collectors. Super Collectors coordinate the handling of the recovered beverage containers and on sell the materials for recycling.
- People place eligible containers into kerbside or public recycling bins which are collected by a waste collector and taken to a Materials Recovery Facility (MRF). The MRF sorts and recovers a range of recyclable materials including CDS eligible containers for refund through a contractual arrangement with a Depot. There are major issues with breakage and contamination, so the system is somewhat inefficient. The Northern Adelaide Waste Management Authority (NAWMA) indicates that it provides a significant revenue stream and employment opportunities at the facility.
- People place eligible containers in general rubbish which goes to direct to landfill and are not recovered for recycling. **This flow presents unrealised value and the largest opportunity for system improvement.** The bin collection can be residential or in a public place (e.g. council provided bins).
- Waste generated from commercial industry and the hospitality industry is collected in a variety of ways:
 - In some (mostly small) cases they have access to a co-mingled recyclables bin, and this is collected as per the kerbside waste collections.
 - Business returns the container direct to a Depot for the refund.
 - The majority approach (based on the Rawtec report) is that businesses contract for the removal of product, and waste collectors collect containers from venues (pubs, restaurants, etc.).
- Eligible containers end up as litter, noting that this impact is reduced as a result of effort by various organisations including local government, community groups and not-for-profits that undertake clean-up events and litter collection programs resulting in some return of eligible beverage containers to Depots or MRFs.

Important to the flows, but not as a direct part of the CDS scheme, is the role of the MRFs (e.g. NAWMA).

There is now a significant push toward MRFs setting up processing plants on the ground in South Australia to supplement the processing that is occurring. The NAWMA is currently building a processing plant, and many other councils/regions are looking for investment funds to build their own processing plants. The Southern Region Waste Resource Authority (SRWRA) has a business case for a \$21 million facility at Seaford. This plant would employ 37 FTE's and process 60,000 tonnes per annum and there is a similar proposal linked to the establishment of the Central Adelaide Waste and Recycling Authority (CAWRA) by the Cities of Port Adelaide Enfield and Charles Sturt to process the co-mingled recyclables bins and recover resources, including CDS eligible containers, for recycling.

The following **key issues** are noted in relation to the regulatory and market environments (including issues raised during the stakeholder consultation):

- South Australia is the only State that requires Collection Depots to **sort by brand** (soft drink cans to Statewide and brewery brands to Marine Stores). Options include:
 - Appointing only one coordinator (NSW, Victoria and WA).
 - Super Collectors to have in place agreements to pay for their share of product returned through any Depot (Depots choose which Super Collector they wish to contract with).
- Only South Australia and the Northern Territory rely on **payment by weight** by Super Collectors using an audit-based methodology – this often does not reconcile with the counts of containers received by Depots. 'Light weighting' and variety of sold product are important Depot issues. Other key issues raised in relation to this issue included:
 - Infrequency of audits and small sample size.
 - Potential weighbridge inaccuracies to determine the exact number of glass containers.
 - If the current system is retained, it should be run by an independent body.

Again, the issues of payment by weight was not a specific requirement of this project but is incorporated in the discussion on dispute resolution.

- The **cost of dispute resolution** is generally acknowledged to be high with each party meeting their own costs leading to inequity of funds available for mediation and arbitration. An independent entity could minimise these costs, but will itself possibly create other costs (depending on the eventual processes introduced to more efficiently resolve disputes).

- The credibility of the scheme is diminished by the range of **anomalies in containers** captured by the scheme. *Hudson Howells acknowledges here that the original purpose of CDS was focussed on litter reduction and hence most containers consumed ‘at home’ were excluded. However, with a greater focus and objective shift to reuse and recycling, identifying the extent to which there is unrealised value within the current scheme, and its current and potential contribution to the State’s and/or national circular economy and State Gross Product, becomes of greater importance.*
- Unlike other jurisdictions, South Australia and the Northern Territory have yet to adopt the more advanced technology for tracking, data collection and efficiency of the scheme. While there are issues around affordability for smaller depots, there are potential benefits to Depots employing such technology - especially counting and sorting technology. While cost efficiency may be an issue for smaller Depots, there may be a benefit cost advantage for this sector to be incentivised by the Commonwealth or State Government similar to other industry modernisation programs. This issue is not raised directly in the project brief scenarios but can result in stronger viability linked to economies of scale.
- South Australia has been the national leader in the development and adoption of container deposit schemes nationally. So, should the **deposit be increased to 20 cents**, what benefit costs would that represent to the State and the nation if nationally adopted? The consultation raised the following issues:
 - Potential for additional disputes because of payment by weight.
 - There would need to be all jurisdiction adoption including container type consistency.
 - Additional theft concerns.
 - Could consider sliding scale depending on container size.
 - Would improve return rates.
 - Why not 15 cents instead of 20?
- Other issues raised included:
 - Removal of bottle tops for weigh contestations (not required for other products).
 - New collections coming into the scheme must be recyclable.
 - The existing infrastructure should be used for other products.

In terms of **‘workable competition’**, (as defined within the ‘NSW Container Deposit Scheme – Monitoring the impacts on container beverage prices and competition’ NSW IPART report dated December 2018) workable competition means that there is enough rivalry between firms to ensure that, over time, prices are determined by underlying costs rather than any market power. In turn, this means there is no need for any government intervention in relation to prices. Based on this review Hudson Howells is of the view that workable competition is in place with the current CDS scheme

given the number of Depots and Super Collectors and the competitive basis for establishing handling fees and the dispute resolution process.

However, while there was good stakeholder support (50%) for a change from the current multiple Super Collectors system to a single scheme coordinator, such a move might challenge the workable competition principles (e.g. some market control over handling fees vested in one Super Collector) with others citing there will be no impact on South Australia's rate of recycling and litter reduction as Super Collectors already coordinate the next step in the process after the material is returned from the consumer. Such a proposal would therefore need to consider the inclusion of independent price setting for handling fees and the effects on market control to ensure the retention of, or an improvement in, workable competition, improved transparency, and the ability to resolve areas of dispute.

4.2 Economic Footprint of the CDS system

Public and definitive information on the economic activity that takes place in the formal CDS system is not readily available as many participants are private operations and operate across the CDS sector and other recycling. The underlying base information includes:

- The revenues that the CDS system generates being the combination of the deposit value and the handling fee – which amounts in 2019/20 (based on EPA provided data) to an estimated \$106.0 million to Depots and Super Collectors (606 million containers returned, with a deposit of 10c and an assumed handling fee/administration cost in total of 7.5c²). The net revenue to Depots and Super Collectors after the return of the deposit to the customer is \$45.4 million. In addition there is revenue earned from the disposal of containers for processing to cullet.
- The Recycling Activity Survey 2017/18 states that the waste management, resource recovery and recycling sector employs approximately 4,800 South Australians (both directly and indirectly). Of these employees 1,718 FTE are employed in the resource recovery sector.
- ABS Census data indicate that 800 people are employed in the 'Waste Remediation and Materials Recovery Services' sector in South Australia (Depots and Super Collectors would fall within this sector).

The economic analysis uses modelling to derive a more detailed footprint of the sector, and its relationship to activities by product category. Appendix 2 provides detail of the modelling and the

² The handling fee is assumed to be 5.5c for depots and an administration cost of 2.0c for Super Collectors.

underlying assumptions. In summary, Table 4.1 provides the economic modelling estimates re South Australian economic impacts associated with the CDS specific activities:

Table 4.1 – Estimated Economic Footprint of CDS Operations

	Net Revenue (\$m)	Employment (FTE s)	Wages (\$m)	Other Value Added (\$m)
Depots	\$33.31	292	\$13.56	\$11.48
Super Collectors	\$23.29	110	\$9.32	\$3.96
MRF's (Proportion linked to CDS product only)	\$9.97	68	\$4.28	\$2.57
Totals	\$66.58	469	\$27.16	\$18.00

Based on this direct CDS economic footprint detailed in this review, economic modelling as summarised in Table 4.1 estimates the following South Australian economic impacts associated with the CDS activities. The total estimated net (of refunds paid) revenue of \$66.58 million is made up of \$45.4 million for Depots and Super Collectors in handling and scheme administration fees (\$33.3 million for Depots and \$12.1 million for Super Collectors), Super Collectors raise a further \$11.2 million in the sale of returned cullet/materials from containers returned for deposit, and \$9.97 million in revenue to MRF's (sale of returned containers for processing). This results in a total of 469 Full Time Equivalent jobs, the generation of \$27.2 million of wages and \$18.0 million of value added. In addition to these direct impacts there are flow through/induced affects in the rest of the economy that are the result of the operators in the CDS purchasing inputs from the rest of the economy and the spend of wages by people employed in the sector and calculated from an 2019/20 Input Output Table for the State created for this analysis, with the total impacts summarised below.

- Direct Impact
 - Employment (FTE's) - 469
 - Gross State Product/Value Added (\$m) - \$47.6
- Induced (or Multiplier) Impact
 - Employment (FTE's) - 914
 - Gross State Product/Value Added (\$m) - \$110.0
- Total Impact
 - Employment (FTE's) – 1,383
 - Gross State Product/Value Added (\$m) - \$157.6

There are two other indirect ways that the CDS impacts on the economy:

- The CDS system interacts with the kerbside collections system operated by Local Government. Separation of waste collected through Local Government systems into general

and recyclables adds costs on the one hand but produces value on the other in that it facilitates the capture of additional value due to the improved ability to extract recyclable materials. Specifically, the CDS materials (once sorted) provide a revenue stream to contractors and local governments, and Rawtec data indicates that 106.3 million eligible containers are disposed of through kerbside collection from households (66.5 million through the recycling bin, and 39.9 million through the general waste bin) with a weight of 8,753 tonnes. In addition, there is an estimated 41,736 tonnes of metal, glass and plastic non CDS containers that flow through the kerbside general waste and recycling bins (33,705 tonnes through the recycling bin, of which 19,568 tonnes is wine/spirit/beverage bottles). Local government spends in the order of \$220 million on waste collection annually, and for this study it is estimated that the recycling bin and CDS or CDS prospective materials contribute \$91 million of that cost (or 41%)³. The CDS revenue earned through collection represents an offset of around \$5 million, or over 5% of that spend.

- Based on assumptions as outlined in Appendix 2, it is estimated that the processing of CDS eligible materials currently supports in the order of 205 jobs in the State, paying wages of \$13.2 million, and making a contribution of \$21 million per annum to the State economy. The value of materials recovered is indicatively priced based on the mix of high value (through CDS collection) and lower value (through other co-mingled sources – e.g. kerbside collections), recovered beverage containers materials, assumed levels of local sales versus exported materials, and factored up to an indicative turnover figure and benefit to users of the materials through lower costs. This data is converted to employment, wages and value added using the industry ratios and multipliers for the glass and polymer plastics sector from the SA Input Output Table.

³ LOCAL GOVERNMENT FINANCES, Financial performance and position (Dept. of Planning, Transport and Infrastructure) indicates that for 2017-18 the spend by Local Government on waste management was \$198 million. However, since that time, there has been increases in the landfill levy and other costs and as such the modelling in the cost in 2019/20 is assumed to be \$220 million. The core drivers of cost are assumed to be the number of properties, the number of bins and the tonnes collected. In terms of the impact of the CDS scheme, the majority of councils have a kerbside bin that is collected every second week. Relating to CDS costs therefore there is assumed to be a share of fixed costs of 20%, 35% related to the number of recycling bins per collected (0.5 per week per household and \$25 million per annum per collection run) and the balance of 45% related to costs per tonne (including the waste disposal costs incorporating the waste levy). The total cost of collection due to product that could be subject to CDS is therefore estimated at \$90.7 million per annum or 44% of the annual cost – largely due to the weight of glass in the bin.

5 SUMMARY OF SCENARIOS ECONOMIC MODELLING

5.1 Definition of Scenarios

The project specifications require modelling and analysing the value to the SA's current 10c baseline and an increase to 20c in relation to the following proposed scenarios:

- An increase to a four bin kerbside system, incorporating a glass waste bin.
- Incorporation of the currently excluded beverage containers up to 3L in accordance with the Environment Protection Act 1993 and Environment Protection Regulations 2009.
- Harmonising the refund/deposit per container to 20c across all jurisdictions that currently have or intend to have a CDS.
- Transition costs to a single scheme coordinator model (change from the current multiple Super Collectors to a single scheme coordinator). Specifically benefits and costs to local government, Super Collectors and Depot owners i.e. capital and infrastructure costs and maintenance or otherwise of existing current contracts.
- Transition costs of a retained multiple scheme coordinator model (retain current Super Collectors) with an altered governance arrangement to improve dispute resolution and enable Depot owners to contract with a single Super Collector. Specifically benefits and costs to local government, Super Collectors and Depot owners i.e. capital and infrastructure costs and maintenance or otherwise of existing current contracts.
- Transition costs associated with additional return points. Specifically benefits and costs to local government, Super Collectors and Depot owners.

To address these specifications, we have modelled the following:

- The impact of an increase in the refund/deposit per container from 10c to 20c, including a consideration of implementation across all jurisdictions, relative to just in South Australia (note that this is not treated as a separate scenario).
- The outcomes of the additional scenarios, independent of a deposit rate change.
- The outcomes of the additional scenarios, in conjunction with a deposit rate change.

5.2 Scenario Benefits and Costs

The outcomes of the stakeholder consultation and research is used in this section to summarise major benefits and costs/risks that have implications for the economic modelling of the scenarios under consideration. The benefits and costs/risks detailed below for each scenario along with the key issues identified are utilised in the economic modelling in section 5.3.

Increase the Deposit From 10c to 20c

Benefits	Costs/Risks
<ul style="list-style-type: none"> Improved economics for consumers to return containers thereby increasing return rates 	<ul style="list-style-type: none"> Additional carrying costs for consumers in the gap between payment for the product and receiving the container refund
<ul style="list-style-type: none"> Increased return rates achieve greater economies for Depots – increasing profitability and sustainability 	<ul style="list-style-type: none"> Additional carrying costs for Depots in the gap between payment for the container and receiving the container refund

Key issue: Elasticity of demand for product returns and consequent impact on return rates through Depots. The majority of other States have only recently introduced, or are about to introduce, similar schemes at 10c.

4th bin Kerbside System

Benefits	Costs/Risks
<ul style="list-style-type: none"> Increases prospects for further development of a local glass recycling industry, and less going into low value civil uses. 	<ul style="list-style-type: none"> Local government cost for additional bin provision and collection
<ul style="list-style-type: none"> Reduced product contamination (plastics separated from glass) but offset by increased breakage) 	<ul style="list-style-type: none"> Self-selection at the bin (i.e. placed in incorrect bin) leading to continued contamination
<ul style="list-style-type: none"> Increased clarity to households in terms of where to place containers, with some transfer of recyclable material from the general bin 	<ul style="list-style-type: none"> Space required for bin storage at residential properties
	<ul style="list-style-type: none"> Reduced business and economies of scale (increased costs) for Depots
	<ul style="list-style-type: none"> Additional investment needed in glass processing and recovery infrastructure in order to produce high value glass cullet for glass bottle manufacturing

Key issue: The recycling of recovered glass back to bottles is dependent on the supply of colour segregated cullet that does not contain ceramics, stone and porcelain. The inability to achieve this standard of cullet will lead to recovered glass being supplied to low value recycling markets e.g. sand replacement in civil works or disposed to landfill. Glass return to depots (including volumes of wine, spirit and other non-CDS bottles) clearly achieves that but the view/concern expressed was that the 4th bin would reduce direct returns to depots.

Incorporating Currently Excluded Containers

Benefits	Costs/Risks
<ul style="list-style-type: none"> Increases cash back opportunities for returnees including consumer and collectors (e.g. scouts, hotels, sporting clubs, community centres) 	<ul style="list-style-type: none"> Higher initial price of newly incorporated beverage products to consumers (passed through the supply chain), depending on the pricing strategies of retailers
<ul style="list-style-type: none"> Increases the recovery rate of collection for recycling, reducing landfill disposal, with environmental benefits, and economic benefits of extending life of land fill 	<ul style="list-style-type: none"> Potentially reduced profits for stakeholders in the supply chain, where costs are not fully passed on to the next level
<ul style="list-style-type: none"> Increases throughput for Depots and Super Collectors, increasing business activity, economies of scale profitability and employment 	<ul style="list-style-type: none"> Increased disputes between super-collectors and Depots due to the employment of a weight based deposit and handling reimbursement method.
<ul style="list-style-type: none"> Potentially makes Depots viable in regions where they are not currently viable to establish 	<ul style="list-style-type: none"> Additional investment in property and equipment to handle increased volumes at depots
<ul style="list-style-type: none"> Development of new opportunities in recycling and processing of container materials 	<ul style="list-style-type: none"> Increased frequency and scope of container return auditing and administration
<ul style="list-style-type: none"> Reduced contents and weight of the co-mingled kerbside bins, e.g. reduce glass containers by up to 15% 	
<ul style="list-style-type: none"> Reduced volumes of co-mingled recyclables required for processing at MRFs 	

Key issue: This is the broadest of the scenarios to be considered and much of the emphasis is on wine, spirit and other non-CDS beverage containers (estimated at over 50 million consumed per year in SA).

Single Scheme Coordinator

Benefits	Costs/Risks
<ul style="list-style-type: none"> Costs savings through economies of scale which can result in increased rates of profitability to both coordinator and some savings passed on to Depots 	<ul style="list-style-type: none"> Reduction of competition – leading to abuse of monopoly power, reduced innovation
<ul style="list-style-type: none"> Increased levels of scheme promotion and marketing (increasing return rate) 	<ul style="list-style-type: none"> Cost of new equipment for the successful Super Collector
<ul style="list-style-type: none"> Opportunity for container counting and auditing innovation and investment 	<ul style="list-style-type: none">

Key issue: While there was good stakeholder support (50%) for a change from the current multiple Super Collectors system to a single scheme coordinator, such a move might challenge the workable competition principles (e.g. some market control over handling fees vested in one Super Collector). Others suggested that there will be no impact on South Australia's rate of

recycling and litter reduction as Super Collectors already coordinate the next step in the process after the material is returned from the consumer.

Improved Dispute Resolution

Benefits	Costs/Risks
<ul style="list-style-type: none"> Reduction in administration costs - time and resources in resolving disputes 	<ul style="list-style-type: none"> Costs of additional audits
<ul style="list-style-type: none"> Reduced financial costs for carrying transactions 	<ul style="list-style-type: none"> Administration/negotiation time to develop appropriate system
<ul style="list-style-type: none"> Better aligning of returns to payouts, i.e. a shift to payment by container count 	

Key issue: The methodology used to calculate refunds. The scheme is based on a cost per container – consumers/returnees are refunded on this basis, but Super Collectors pay on a per tonne basis, and due to variations in sizes of containers there is a discrepancy that needs to be resolved.

Enable Depot Owners to Contract with a Single Super Collector

Benefits	Costs/Risks
<ul style="list-style-type: none"> Decreased negotiation time Reduced transport costs Reduced administration costs 	<ul style="list-style-type: none"> Additional negotiating power for the Super Collector

Additional Return Points

Benefits	Costs/Risks
<ul style="list-style-type: none"> Additional return points reduce the costs of time and travel for individuals to return containers. This is especially an issue for smaller/isolated communities 	<ul style="list-style-type: none"> Potential to reduce throughput of existing facilities and therefore reduce profitability/sustainability
<ul style="list-style-type: none"> Return of additional beverage containers via the CDS 	<ul style="list-style-type: none"> Reduced revenue resulting from CDS eligible materials recovered via MRFs

5.3 Modelling the Outcomes of the Scenarios

The following tables summarise the **mutually exclusive** results for:

- The modelled economic footprint of each scenario under consideration.
- The modelled economic impact of each scenario compared with the current CDS economic footprint.
- The modelled benefit/cost outcome for each scenario.

General relationships that underpin the modelling **across all scenarios** include:

- Assumptions about changes in variable cost per unit are core drivers of changes in the modelling. The factors that drive cost changes are identified in the general discussion above. Reductions (and increases) in per unit costs are assumed to be partially allocated back to support a reduction or increase in the handling fee under each scenario. This will not be automatic and will depend on negotiation.
- The change in deposit value and the handling fee impacts the price at which the product is sold. Total amount of produce sold depends on the elasticity of demand. The increase of the deposit is therefore modelled in this context. **It is assumed that the elasticity of demand is on average -0.5** for discretionary products and that the average price per container is \$3 generally, and \$15 for wine bottles (this will in reality vary based on point of sale). That is, a 10 cent increase on a \$3 container (3.33%) will see demand reduced by 1.67% and a reduced demand of 0.33% for a \$15 container (wine bottle) and 0.17% for a \$30 container (liquor). As will be seen in the sensitivity analysis, this assumption is very important.

This evidence is indicative only, as elasticity of demand is not linear (bigger proportional increases would generally be more elastic) and is a behavioural response that depends on many other factors (e.g. the extent to which increased deposits can be recovered by returning the containers). The more inelastic the demand response assumed, the lower the decline in sales, but at the cost of a larger income effect on consumers (an income neutral situation is a demand elastic of -1, as the proportional change in price is matched by the proportional change in quantity purchased).

The research and practice evidence are varied, with for example:

- The NSW Independent Pricing and Regulatory Tribunal (IPART) – NSW Container Deposit Scheme - Monitoring the Impacts on Container Beverage Prices and Competition (2018). This study identified changes in behaviour attributable to the NSW CDS, especially that consumers reduced their overall consumption of container beverages. It found as a consequence of introducing CDS at 10c, there was a decrease in the consumption of non-alcoholic beverages in NSW of around 950 mL or 6.7% per household per month. That is an **elasticity of demand of - 2.03** based on a 3.33% price increase. IPART considered this impact in line with what could be expected given the scheme's impact on the prices of container beverages, and with the impacts being felt by suppliers. However, this is the elasticity associated with a first implementation of a container deposit, not a subsequent increase within a scheme that has been in operation since 1977, as contemplated in this review.

- University of Melbourne research indicates that price elasticities for sugar-sweetened beverages in Australia range from -0.83 to -0.94⁴ while international studies provide estimates as high as -1.39. This study only covers sweetened product, while the CDS is more encompassing – implying less substitutes which would make demand more inelastic. Further, the prospect of recovering the deposit (albeit at an opportunity cost of time) will potentially offset this elasticity.

In South Australia's current case, the elasticity of demand also needs to take into consideration the effect of **diminishing marginal utility** - all else being equal as consumption increases the marginal utility derived from each additional unit declines. That is, South Australia cannot expect a similar response for increasing the deposit value from 10c to 20c and what was achieved when increased from 5c to 10c.

In the economic modelling, sensitivities have been undertaken for elasticities of demand in response to the deposit increase of -1, -0.5 and -0.1).

The other detailed assumptions that underly the following economic modelling of each scenario are presented in Appendix 2 - Modelling Technical Report.

5.3.1 Modelling the Scenarios Independently

The following tables provide summaries of the implications of the various scenarios on the economic footprint of the sector. Most importantly, these tables summarise the financial and economic modelled outcomes of implementing each scenario recognising that while there is a net benefit or cost, the distribution of these benefits and costs will vary across all stakeholders including the consumer, industry (e.g. manufacturers) and government (e.g. local government). Although not a specific requirement of this study, it must also be recognised that there will be varying impacts between small and large businesses, especially beverage manufacturers. A small beverage manufacturer for example may be more severely impacted by higher labelling costs than larger manufacturers that may be able to amortise such costs across a broader volume or range of products. Such costs also raise the barriers of entry for new market entrants and existing participants looking to enter new products into new market segments.

The modelling identifies the core outcomes with respect to the CDS system based on assumptions as detailed in Appendix 2. This modelling includes estimates relating to transition costs and the impact on consumers and product suppliers, with the outcomes summarised in Section 6.

⁴ <https://melbourneinstitute.unimelb.edu.au/downloads/working-paper-series/wp2016n25.pdf>

Table 5.1
Modelled Outcomes Relative to Current Situation
(Increasing the Deposit From 10c to 20c and Adopting the
Other Scenarios While Leaving the Deposit at 10c)

	Current	Increase deposit rate from 10c to 20c	4th bin kerbside system	Incorporating currently excluded containers	Single scheme coordinator	Improved dispute resolution	Enable depot owners to contract with single super collector	Additional return points
Number of eligible containers sold	789.3	776.3	789.2	916.1	789.6	789.6	789.6	788.7
# containers recycled (million) through CDS	605.6	639.1	602.7	709.3	620.0	610.5	617.7	625.4
Percentage change in containers recycled		5.5%	-5.7%	17.7%	-12.6%	-1.5%	1.2%	1.3%
Recycling rate of eligible containers	76.7%	82.3%	76.4%	77.4%	78.5%	77.3%	78.2%	79.3%
Propn directly through depots	59.9%	68.0%	58.7%	60.1%	61.7%	60.5%	61.4%	62.9%
Propn through other	16.8%	14.3%	17.6%	17.3%	16.8%	16.8%	16.8%	16.4%
Possible value of material going to landfill (\$m)	\$1.89	\$1.52	\$1.73	\$0.90	\$1.66	\$1.70	\$1.67	\$1.63
Estimated local govt waste management costs (\$m)	\$91.6	\$86.1	\$116.5	\$57.5	\$89.6	\$90.3	\$89.8	\$88.7
Employment directly in CDS (Depot/Supercollectors)	402	415	406	465	392	387	390	427

Note the employment numbers in Table 5.1 represent estimated employment outcomes for Depots and Super Collectors only and do not include the non-CDS aspects of Depot operations (they often also collect non-CDS recyclable material such as cardboard and metals), nor the estimated numbers of persons employed in handling CDS eligible products through MRF's of local government. The broader view of employment outcomes is included in Table 5.3.

These findings are very important for future CDS policy decision making, as are the underlying assumptions detailed in Appendix 2.

In summary:

- The greatest number of containers recycled is realised by the incorporation of currently excluded containers (a consequence of increasing the base of eligible materials).
- The highest recycling rate is achieved when the deposit value is increased from 10 to 20c.
- All scenarios if implemented would make a contribution to the **Circular Economy** via a combination of increased recycling rates and total numbers of containers recycled, and increased processing opportunities. The most significant contribution to the volume of recycling would come from *incorporating currently excluded containers* (an additional 81 million containers through the scheme) followed by *increasing the deposit rate from 10 to 20 cents* (an additional 38 million containers).
- One of the key objectives of the CDS is to reduce the level and value (in terms of lost opportunity) of resources going to landfill, thereby achieving cost savings and environmental benefits. Under the assumptions used in the economic modelling, this is achieved for all

scenarios except for the 4th bin kerbside system, with *incorporating currently excluded containers* having the biggest impact on achieving this outcome.

- Direct economic impact, as measured by formal jobs created within Depots and Super Collectors, is greatest for *incorporating currently excluded containers* (an extra 63 full time equivalent employees) but is mostly small for all other scenarios, and actually declines in some due to the improved efficiency of the system. Incorporating currently excluded containers results in the transfer from volunteer community labour to employed Local Government labour, and there is no value placed in this context on the volunteer effort, and there is no acknowledgement of the cultural and educational benefits to the volunteer participation in addition to the economic benefit.

Table 5.2 below details the modelled outcomes for tonnes of CDS (currently eligible and prospective) product going to landfill, including currently non-eligible containers, with *incorporating currently excluded containers* producing the greatest reduction, followed by increasing the deposit rate. This outcome is a consequence of the acknowledged efficiency of the CDS in terms of returning containers with minimum breakage and contamination, and therefore increasing the amount that can be sold for processing and reducing the amounts that go to landfill. All options except the 4th bin system involve some reduction in waste to landfill. For the 4th bin system the assumptions of containers going to depots being reduced and instead put into the 4th bin result in modelled increases in breakage/contamination and therefore less (relative to the other scenarios) being recovered and more going to landfill. The estimates of tonnes going to landfill are broadly consistent with the data included in Rawtec surveys, but differ marginally based on implications of modelling assumptions.

Table 5.2

Modelled Outcomes Relative to Current Situation

Tonnes of CDS Product Going to Landfill (Including Currently Non-Eligible Containers)

	Current	Increase deposit rate from 10c to 20c	4th bin kerbside system	Incorporating currently excluded containers	Single scheme coordinator	Improved dispute resolution	Enable depot owners to contract with single super collector	Additional return points
Aluminium	166	101	177	152	145	159	148	132
Glass - currently eligible	1,028	476	1,017	925	874	977	900	827
Glass - wine	5,808	5,808	5,808	1,149	5,808	5,808	5,808	5,808
Glass - other current non-eligible	636	636	636	626	636	636	636	636
HDPE	887	569	592	253	589	591	590	587
LPB	290	262	291	242	285	288	286	282
PET	501	457	495	455	486	496	488	483
Total	9,317	8,308	9,015	3,802	8,822	8,955	8,856	8,756

Table 5.3 below extends the modelling results to a more comprehensive view of impact on the State's economic activity by including employment in the broader sector (Local Government and processing of materials). These impacts are modelled with the following additional assumptions:

- The employment levels for Local Government are based on the assumed operating cost relationship described in Footnote 2. It is assumed that costs, less the waste disposal costs or gate fee, will be 35% labour related. The average FTE salary is as per the ABS Census 2016 for the waste management sector (\$85,000⁵). For the 4th bin kerbside system there is an assumed extra cost of a pick-up per fortnight, as well as the costs associated of slight increases in tonnages due to diversion from depots. Industry feedback suggested that a collection every second week was the most likely scenario, although there was a need to investigate the monthly option. Limitations in the available equipment and further complications in this option require more detailed investigation.
- The employment to expenditure ratio (induced) for Depots, Super Collectors, Local Government costs, and MRF's is based on the 'other waste and energy sector' of the State Input Output Tables, while those for product suppliers and processors are based on the manufacturing sector of State Input Output Tables⁶.
- The direct wages induced impacts are based on an average FTE salary across the sector of \$85,000 (calculated from the average income for the waste management sector in the 2016 census).
- The direct Gross Operating Surplus⁷ (GoS) impact for Depots and Super Collectors is calculated based on the ratio for the relevant sectors in a South Australian Input Output Table for 2016/17).
- The direct tax estimate is based on the taxes paid for the CDS sector from the Hudson Howells' survey of Depots applied to all employment outcomes. This includes taxes such as GST, payroll tax and land tax/rates. It does not include income tax on wages.
- The induced GoS impact is derived from the State Input Output Tables, with the assumption regarding sectors as above.

A major outcome of the CDS scheme is providing an efficient way to collect high value (colour sorted and uncontaminated) materials that can be recycled back into glass bottles. In addition to the assumptions discussed above it is assumed that the creation of new opportunities with the scenarios induces a more than proportional opportunity with respect to processing opportunities (50% increase

⁵ Adjusted for inflation to 2019/20

⁶ This is derived from a State Input Output Table generated at the 35-sector industry level with sectors defined for the energy, waste and renewables sector. The table is based on the 2016/17 national table as prepared by the ABS and uses the location quotient method, applying labour force data and superior income data from the State national accounts.

⁷ Gross Operating Surplus represents returns to capital - including financing costs and profits.

on top the underlying processing value). In economic terms this assumes a supply elasticity of 1.5 brought about by the attention achieved through the recognition of the value of the scheme. This is applied to processing activity based on both existing tonnage (as an increase from the base) and new tonnage, and it is therefore presumed that the increase in activity will be related to an increased focus on the opportunities based around any of the scenarios.

Table 5.3

Summary of Modelled Economic Impact Across the Scenarios – Change on 2019/20 Levels

	Increase deposit rate from 10c to 20c	4th bin kerbside system	Incorporating currently excluded containers	Single scheme coordinator	Improved dispute resolution	Enable depot owners to contract with single super collector	Additional return points
Employment (FTEs)							
Direct							
In CDS system (Depots and Supercollectors)	13.6	4.6	63.9	-9.1	-14.3	-11.2	25.4
Local Government funded services	-20.1	82.0	-121.8	-7.4	-4.7	-6.7	-10.5
Product Suppliers and trade	-64.5	-0.3	-5.0	1.4	0.6	0.7	-1.2
MRFs	27.3	16.4	-45.2	10.3	10.2	10.3	15.2
In processing opportunities	108.0	84.7	166.3	96.7	92.6	95.7	100.4
<i>Direct</i>	<i>64.4</i>	<i>187.3</i>	<i>58.1</i>	<i>92.0</i>	<i>84.4</i>	<i>88.8</i>	<i>129.4</i>
Induced	103.4	296.1	89.8	147.8	135.9	142.8	206.5
Total Employment	167.8	483.4	147.9	239.8	220.4	231.6	335.9
Incomes (\$ million)							
Direct							
Wages and Salaries	\$13.92	\$40.93	\$12.53	\$20.47	\$18.88	\$19.84	\$28.29
Increased Gross Operating Surplus	\$4.97	\$9.74	\$5.33	\$8.24	\$7.69	\$7.96	\$9.95
Impact on Taxes	\$0.43	\$1.15	\$0.41	\$0.65	\$0.60	\$0.63	\$0.87
<i>Direct Impact on Gross State Product</i>	<i>\$19.32</i>	<i>\$51.82</i>	<i>\$18.27</i>	<i>\$29.35</i>	<i>\$27.18</i>	<i>\$28.44</i>	<i>\$39.11</i>
Induced GSP Impact	\$21.45	\$42.35	\$28.87	\$22.61	\$20.39	\$21.73	\$33.75
Total GSP Impact	\$40.77	\$94.17	\$47.14	\$51.97	\$47.56	\$50.18	\$72.86

In summary, all scenarios result in increased contributions to SA employment and GSP. This increase in employment is heavily due to the assumptions of increased processing opportunities arising from the greater segregation of recyclable materials, at the earliest point, across all of the scenarios. The lowest impact is found in the option of increasing the deposit rate from 10c to 20c and incorporating currently excluded containers where the increases in employment outcomes through processing are offset by a decline in initial product sales (due to the 10c increase in the deposit rate), and due to the greater use of increased voluntary labour (people returning containers for the deposit) which is offset by reductions in formal labour (in kerbside collection). The greatest economic impact is generated by the 4th bin kerbside option (additional 483 FTE jobs and \$94.17 million GSP, but noting that this comes at an extra cost to Local Government and eventually ratepayers), followed by *additional return points* (additional 336 FTE jobs and \$72.86 million GSP).

However, this measures the impact in the formal economy and is not a full measure of the benefit/cost outcomes for each scenario as it excludes other economic/financial benefits/costs such as investment in the infrastructure required for the 4th kerbside bin collection and subsequent

beneficiation as summarised below. Again, one of the core economic propositions of the CDS system is that it is effectively consumer non-paid leisure time that is used to deliver the required outcomes, and so parts of the formal economy are transferring to the informal economy.

Table 5.4 converts the outcomes in Tables 5.1, 5.2 and 5.3 to the more comprehensive benefit cost comparison of evaluating the 7 scenarios relative to the base case (of not implementing the scenario). The key assumptions used to generate this table include:

- The cost of using landfill to dispose of general rubbish is assumed to be \$184.32 per tonne. This is based on 77.6% of South Australians living in greater metropolitan Adelaide where the average gate fee per tonne is \$200 and \$130 non-metro (inclusive of the current waste levy of \$143 and \$71.50, respectively). This cost is then doubled to reflect transport, administration costs and waste disposal on-costs. It is possible this will continue to increase over time as suitable land becomes scarcer and/or environmental penalties increase over time.
- While increased returns through the CDS generate more income for the general population, it is assumed there is an opportunity cost (time taken in the return process) of 25% of the income earned. Therefore, the income earned is reduced by 25% to reflect the costs of deriving that income (travel costs to and from depots, storage cost, and travel time). It is noted that the system encourages charity and volunteer input to reduce the opportunity cost of time.
- Environmental benefits value is measured by applying the environmental emissions data as indicated in the 2017/18 SA Recycling Activity Survey Report, and applying prices based on social values as outlined in Appendix 2.
- It is assumed that there is 25% consumer surplus loss⁸ on the consumption value of product sold in eligible containers. Consumers are required to pay more for their product and as such lose that value in consumption – which is somewhat offset by the income increase modelled as above. However, consumers also will acknowledge that the extra cost produces a range of environmental and social benefits, and therefore this consumption loss is discounted to reflect that.
- It is assumed Local Government will need to finance additional equipment to facilitate the 4th bin collection adding 10% to underlying annual operating costs, and also provide ratepayers with an extra bin (included as an annualised cost at a 6% opportunity/financing rate).

⁸ “Consumer surplus is an economic measurement of consumer benefits. Consumer surplus happens when the price that consumers pay for a product or service is less than the price they're willing to pay. It's a measure of the additional benefit that consumers receive because they're paying less for something than what they were willing to pay”. (Source: https://www.investopedia.com/terms/c/consumer_surplus.asp)

- A critical assumption (that drives net benefit across all scenarios) is that the changes to the system will be linked to greater investment in processing as the alternative scenarios provide improved material flows and a greater interest in circular economy outcomes.
- There will need to be investment by the operators in the system to facilitate some scenarios, including:
 - A specialised operation set up (as or in an MRF) with an optical sorting system to effectively recover glass from the 4th bin collection – estimated to be \$12 million.
 - Expansion of facilities and equipment by CDS operators to handle the additional load under the scenario of incorporating excluded materials – assumed to be \$30 million. There is also a cost under this scenario for product suppliers of having products approved and in labelling requirements etc. There is assumed to be an upfront administrative cost to product suppliers averaging 11¢ per container in coming under the system. There is also assumed to be a small unreimbursed cost in terms of government administration. These are a cost recovery initiative that can be replaced with more efficient methods to recover costs.
 - Cost of introducing new dispute resolution options, which will vary in amount and funding based on the eventual system introduced, and indicatively assumed to be \$50,000 per year.
 - Expansion of facilities and equipment to establish new return points under that scenario – assumed to be \$20 million.
 - The financing cost for private operators is assumed to be 10% (slightly higher than government financing/required rate of return parameters).

Table 5.4
Summary of Modelled Benefit Cost Outcomes Across the Scenarios
 (\$ million)

	Increase deposit rate from 10c to 20c	4th bin kerbside system	Incorporating currently excluded containers	Single scheme coordinator	Improved dispute resolution	Enable depot owners to contract with single super collector	Additional return points
Benefits							
Benefits of reduced landfill	\$0.37	\$0.17	\$1.00	\$0.24	\$0.20	\$0.23	\$0.26
Income generated from returns	\$50.44	-\$0.22	\$7.78	\$1.08	\$0.37	\$0.91	\$1.49
Net change in incomes through economic activity	\$40.77	\$94.17	\$47.14	\$51.97	\$47.56	\$50.18	\$72.86
Value of Environmental Benefits	\$1.14	\$0.37	\$2.00	\$0.65	\$0.51	\$0.62	\$0.76
Total benefits	\$92.73	\$94.50	\$57.91	\$53.94	\$48.64	\$51.93	\$75.38
Costs							
Change in consumer surplus on consumption	\$12.61	-\$0.05	\$1.94	\$0.27	\$0.09	\$0.23	\$0.37
Direct local government costs	-\$5.57	\$24.83	-\$34.12	-\$2.06	-\$1.31	-\$1.87	-\$2.89
Investment by CDS system (annualised)	\$0.00	\$1.20	\$3.00	\$0.00	\$0.00	\$0.00	\$2.00
Change in annualised costs for scheme admin - product	\$0.00	\$0.00	\$0.90	\$0.00	\$0.00	\$0.00	\$0.00
Change in annualised costs for scheme admin - govt	\$0.00	\$10.11	\$0.004	\$0.00	\$0.05	\$0.05	\$0.05
Total costs	\$7.04	\$36.09	-\$28.28	-\$1.79	-\$1.17	-\$1.59	-\$0.47
Net Annualised Benefits	\$85.69	\$58.41	\$86.19	\$55.73	\$49.81	\$53.52	\$75.84
Ranking of Net Benefit Outcome	2	4	1	5	7	6	3

In summary, the above modelled benefit cost outcomes measure the estimated unrealised value in the South Australian CDS associated with the range of options available to improve the scheme. While these estimates are assumption dependent, and should be considered as orders of magnitude value, the options/scenarios (mutually exclusive) are ranked in order of the priority in which they could contribute increased value to the South Australian community.

5.3.2 Modelling the Increase in Deposit in Conjunction with Other Scenarios

Table 5.5 below provides a summary of the implications for the economic footprint of the sector based on an increase in the deposit to 20c in conjunction with the other scenarios. It is generally assumed these impacts are broadly additive and modelled that way, with some offsets. The proportional increases directly returned to Depots have been reduced for the increase in deposits, and the assumed proportional increases through kerbside have been reduced for the 4th bin system in the combined versus standalone, as these options will to some extent offset each other. Table 5.6 shows the modelled outcomes for tonnes of CDS related product going to landfill (including currently ineligible containers).

Table 5.5

Modelled Outcomes Relative to Current Situation of Increasing the Deposit Rate from 10c to 20c and Adopting the Other Scenarios

	4th bin kerbside system	Incorporating currently excluded containers	Single scheme coordinator	Improved dispute resolution	Enable depot owners to contract with single super collector	Additional return points
Number of eligible containers sold	776.3	903.1	776.7	776.6	776.7	775.7
# containers recycled (million) through CDS	636.2	742.8	653.5	644.0	651.2	658.9
Percentage change in containers recycled	5.1%	16.2%	8.4%	-9.2%	5.0%	7.9%
Recycling rate of eligible containers	82.0%	82.2%	84.1%	82.9%	83.8%	84.9%
Propn through depots	63.4%	64.1%	64.9%	64.3%	64.7%	65.4%
Propn other	18.6%	18.2%	19.3%	18.7%	19.1%	19.5%
Value of possible material going to landfill (\$m)	\$1.35	\$0.52	\$1.28	\$1.32	\$1.29	\$1.26
Estimated local govt waste management costs (\$m)	\$111	\$52	\$84	\$85	\$84	\$83
Employment directly in CDS (Depot/Supercollectors)	420	479	406	401	404	441

Table 5.6
Modelled Outcomes Relative to Current Situation of Increasing the Deposit Rate from 10c to 20c
and Adopting the Other Scenarios
Tonnes of CDS Product Going to Landfill (Including Currently Non-Eligible Containers)

	4th bin kerbside system	Incorporating currently excluded containers	Single scheme coordinator	Improved dispute resolution	Enable depot owners to contract with single super collector	Additional return points
Aluminium	111	87	80	94	83	67
Glass -currently eligible	465	373	322	425	348	275
Glass- wine	5,808	1,149	5,808	5,808	5,808	5,808
Glass - other current non-eligible	636	626	636	636	636	636
HDPE	273	-65	270	272	271	269
LPB	262	213	257	260	257	254
PET	450	411	442	452	444	439
Total	8,006	2,793	7,814	7,947	7,847	7,748

Table 5.7 below extends the modelling results to a more holistic view of impact on the State's economic activity. These impacts are modelled with the additional assumptions as in Table 5.3.

Table 5.7**Summary of Modelled Economic Impact Across Scenarios in Conjunction with Increasing the Deposit Rate from 10c to 20c**

	4th bin kerbside system	Incorporating currently excluded containers	Single scheme coordinator	Improved dispute resolution	Enable depot owners to contract with single super collector	Additional return points
Employment (FTEs)						
Direct						
In CDS system (Depots and Superco	18.2	77.5	4.5	-0.6	2.5	39.1
Local Government funded services	61.9	-141.9	-27.5	-24.8	-26.8	-30.5
Product Suppliers and trade	-64.7	-69.4	-63.0	-63.8	-63.8	-65.7
MRFs	43.7	-17.9	37.7	37.5	37.6	42.6
In processing opportunities	192.6	274.3	204.7	200.6	203.7	208.4
<i>Direct</i>	251.8	122.5	156.4	148.9	153.2	193.9
Induced	399.5	193.2	251.2	239.3	246.2	309.8
Total Employment	651.2	315.8	407.6	388.2	399.4	503.7
Incomes (\$ million)						
Direct						
Wages and Salaries	\$54.85	\$26.45	\$34.38	\$32.80	\$33.76	\$42.20
Increased GoS	\$14.71	\$10.31	\$13.21	\$12.67	\$12.94	\$14.93
Impact on Taxes	\$1.58	\$0.84	\$1.08	\$1.03	\$1.06	\$1.30
<i>Direct Impact on GSP</i>	\$71.14	\$37.59	\$48.68	\$46.50	\$47.76	\$58.43
Induced GSP Impact	\$63.80	\$50.32	\$44.06	\$41.84	\$43.19	\$55.21
Total GSP Impact	\$134.95	\$87.92	\$92.74	\$88.34	\$90.95	\$113.64

Table 5.8 converts the outcomes in Tables 5.5 and 5.7 to a benefit cost comparison of introducing the various scenarios and the deposit increase relative to the base case of doing nothing. The additional assumptions detailed in section 5.3.1 are used to generate this table:

Table 5.8
Summary of Modelled Benefit Cost Outcomes – Increase in Deposit Rate from 10c to 20c
and Additional Scenarios

	4th bin kerbside system	Incorporating currently excluded containers	Single scheme coordinator	Improved dispute resolution	Enable depot owners to contract with single super collector	Additional return points
Benefits						
Local Government savings on reduced landfill	\$0.54	\$1.37	\$0.61	\$0.57	\$0.60	\$0.64
Income generated from increased return rate	\$50.22	\$58.22	\$51.52	\$50.81	\$51.35	\$51.93
Net change in incomes through economic activity	\$134.95	\$87.92	\$92.74	\$88.34	\$90.95	\$113.64
Value of Environmental Benefits	\$1.51	\$3.14	\$1.79	\$1.65	\$1.76	\$1.90
Total benefits	\$187.23	\$150.64	\$146.67	\$141.37	\$144.66	\$168.10
Costs						
Change in consumer surplus on consumption	\$12.56	\$14.55	\$12.88	\$12.70	\$12.84	\$12.98
Direct local government costs	\$19.26	-\$39.69	-\$7.63	-\$6.88	-\$7.45	-\$8.46
Investment by CDS system (annualised)	\$1.20	\$3.00	\$0.00	\$0.00	\$0.00	\$2.00
Change in annualised costs for scheme admin - product supplier	\$0.00	\$0.90	\$0.00	\$0.00	\$0.00	\$0.00
Change in annualised costs for scheme admin - govt	\$10.11	\$0.004	\$0.00	\$0.05	\$0.05	\$0.05
Total costs	\$43.12	-\$21.24	\$5.25	\$5.87	\$5.44	\$6.57
Net Annualised Benefits	\$144.10	\$171.88	\$141.42	\$135.50	\$139.21	\$161.53
Ranking of Net Benefit Outcome	3	1	4	6	5	2

The above modelled benefit cost outcomes measure the **estimated unrealised value** in the South Australian CDS associated with the range of options available to improve the scheme. The options/scenarios (**not mutually exclusive**) are ranked in order of the priority in which they could contribute increased value to the South Australian community.

5.3.3 Sensitivity Analysis

As noted above there are a number of assumptions made that drive the modelling that are behavioural in nature, with evidence being limited or even not available as to how people will behave in the current situation within South Australia. Therefore, the modelled outcomes were tested for alternative values of these variables as indicated in Table 5.9. The base value reflects the initial assumptions, while a low value is a value of the assumed parameter that results in a reduced value of the estimated benefits of the CDS scheme, and the high a greater value.

Table 5.9
Values Used in Sensitivity Analysis of Major Behavioural Variables

	Base	Low	High
Product Elasticity of Demand	-0.5	-1.0	-0.1
Consumer surplus on lost consumption	25%	50%	12.5%
Opportunity cost of time	25%	50%	0%
Environmental variables			
Carbon	\$121.43	\$15.75	\$182.14
Electricity	\$24.90	\$12.45	\$37.35
Water	\$6.00	\$3.00	\$9.00
Elasticity of supply re processors	1.5	1	2
Cost change assumptions (relative to base)	1	0.5	1.5
Return Response Rate (relative to base)	1	0.5	1.5
# of wine bottles in scope (million)	55	30	55

Table 5.10 provides the outcomes of the benefit cost analysis with respect to sensitivities on each of these variables. The core conclusions are:

- None of the scenarios are sensitive to the assumed parameters re environmental values, the cost reductions in Depots and Super Collectors or number of wine bottles in scope.
- The increased deposit rate outcomes are sensitive to the assumptions regarding the elasticity of demand, and the opportunity cost of time, while other scenarios are not sensitive to this variable. With lower values of this variable the increased deposit rate outcome is still a positive net benefit, but the option is lower in the rankings of the possible scenarios. Elasticity of demand is the major driver of varying implications of increasing the deposit rate from 10 to 20 cents due to the impact on product sales. The assumption used (elasticity of -0.5) drives down the number of eligible containers sold (789 million to 776 million).
- All scenarios are extremely sensitive to the assumptions regarding elasticity of supply in terms of processing. The opportunities to increase the level of processing, resulting from the greater segregation of recyclables materials and increased focus on circular economy opportunities, is essential to achieving the economic outcomes. However, the net benefit remains quite positive for the low estimate of elasticity for increasing the deposit rate, incorporating currently excluded containers and additional return points but low for the other scenarios.
- All scenarios are somewhat sensitive to the assumptions regarding return response rates, with increasing the deposit rate and the 4th bin scenarios the most sensitive. The way in which consumers respond to the scheme changes is important to the outcomes. However, the net benefit remains highly positive for all scenarios for the lower values assumed, and it does not alter the broad level ranking of the scenarios.

Table 5.10
Sensitivity Analysis of Outcomes Relative to Major Behavioural Variables (\$m)

	Increase deposit rate from 10c to 20c	4th bin kerbside system	Incorporating currently excluded containers	Single scheme coordinator	Improved dispute resolution	Enable depot owners to contract with single super collector	Additional return points
Elasticity of Demand							
Elasticity of demand assumed = -0.5	\$85.69	\$58.41	\$86.19	\$55.73	\$49.81	\$53.52	\$75.84
Elasticity of demand assumed = -1	\$46.22	\$57.81	\$83.59	\$56.27	\$49.94	\$53.70	\$74.57
Elasticity of demand assumed = -0.1	\$117.27	\$58.89	\$88.27	\$55.30	\$49.70	\$53.38	\$76.86
Consumer surplus on lost consumption							
Consumer surplus ratio assumed = 0.25	\$85.69	\$58.41	\$86.19	\$55.73	\$49.81	\$53.52	\$75.84
Consumer surplus ratio assumed = 0.5	\$73.08	\$58.46	\$84.25	\$55.46	\$49.71	\$53.29	\$75.47
Consumer surplus ratio assumed = 0.125	\$92.00	\$58.38	\$87.16	\$55.86	\$49.85	\$53.63	\$76.03
Opportunity Cost of time							
Opportunity cost of time assumed = 0.25	\$85.69	\$58.41	\$86.19	\$55.73	\$49.81	\$53.52	\$75.84
Opportunity cost of time assumed = 0.5	\$73.08	\$58.46	\$84.25	\$55.46	\$49.71	\$53.29	\$75.47
Opportunity cost of time assumed = 0	\$98.30	\$58.36	\$88.13	\$56.00	\$49.90	\$53.75	\$76.21
Environmental Values							
Core values	\$85.69	\$58.41	\$86.19	\$55.73	\$49.81	\$53.52	\$75.84
Low values (current market prices)	\$85.05	\$58.22	\$85.04	\$55.37	\$49.53	\$53.18	\$75.42
High values (50% increase)	\$86.26	\$58.60	\$87.19	\$56.06	\$50.06	\$53.83	\$76.22
Elasticity of Supply re Processors							
Elasticity of supply assumed = 1.5	\$85.69	\$58.41	\$86.19	\$55.73	\$49.81	\$53.52	\$75.84
Elasticity of supply assumed = 1	\$35.17	\$10.13	\$22.27	\$4.82	-\$0.34	\$2.81	\$24.26
Elasticity of supply assumed = 2	\$136.22	\$106.69	\$150.11	\$106.63	\$99.96	\$104.24	\$127.43
Cost change assumptions							
Core values	\$85.69	\$58.41	\$86.19	\$55.73	\$49.81	\$53.52	\$75.84
Low values	\$88.42	\$57.31	\$87.61	\$60.38	\$54.47	\$58.53	\$72.87
High values	\$82.97	\$59.51	\$84.77	\$51.10	\$45.16	\$48.53	\$78.81
Return Response Rate							
Core values	\$85.69	\$58.41	\$86.19	\$55.73	\$49.81	\$53.52	\$75.84
Low values	\$69.58	\$54.24	\$81.42	\$50.73	\$47.67	\$49.25	\$68.55
High values	\$101.70	\$62.60	\$90.96	\$60.73	\$51.95	\$57.79	\$83.13
# of wine bottles in scope							
Core values	\$85.69	\$58.41	\$86.19	\$55.73	\$49.81	\$53.52	\$75.84
Low values	\$84.02	\$57.99	\$71.14	\$53.82	\$47.90	\$51.61	\$73.92
High values	\$85.69	\$58.41	\$86.19	\$55.73	\$49.81	\$53.52	\$75.84

6 SUMMARY AND RECOMMENDATIONS

The major objectives of this review were to:

- Determine the value of SA's Container Deposit Scheme (CDS).
- Determine the extent to which there is unrealised value within SA's Container Deposit Scheme.

In summary, based on the CDS economic footprint detailed in this review, economic modelling estimates the following South Australian economic impacts associated with current CDS activities (in terms of CDS related activity at Collection Depots, Super Collectors and MRFs):

- Direct Impact
 - Employment (FTE's) - 469
 - Gross State Product/Value Added (\$m) - \$47.6
- Induced (or Multiplier) Impact
 - Employment (FTE's) - 914
 - Gross State Product/Value Added (\$m) - \$110.0
- Total Impact
 - Employment (FTE's) – 1,383
 - Gross State Product/Value Added (\$m) - \$157.6

Section 5 contains the results of the **detailed economic modelling** of the above scenarios and is undertaken and presented at three scenario impact levels as follows:

1. The impact of each scenario on the CDS supply chain including:
 - Number of eligible containers sold.
 - Number of containers recycled.
 - Recycling rate of eligible containers.
 - Proportion processed via Depots.
 - Proportion processed via other facilities.
 - The value of materials going to landfill.
 - Estimated local government waste disposal costs.
 - Employment directly supported in the CDS.
2. The impact of each scenario on the above State (SA) economic impacts including:
 - Employment – CDS; Local Government; Product Suppliers; MRFs; Processing.
 - Gross State Product (GSP) – Salaries and Wages; Gross Operating Surplus; Taxes

3. Community Benefit Cost Outcomes include both the economic outcomes as included above, and:
- Reduced landfill.
 - Return rate increased income.
 - Economic activity increased incomes.
 - Environmental benefits.
 - Change in consumer surplus.
 - Local government costs.
 - New transactional costs and investment in the CDS.
 - Increased scheme administrative costs – product suppliers and government.

The economic modelling is undertaken on a **mutually exclusive basis** – i.e. each scenario being implemented without the other scenarios, plus on a **non-mutually exclusive basis** whereby the above impacts are modelled for each scenario including the refund/deposit per container increasing to 20c across all State/Territory jurisdictions that currently have or intend to have a CDS including SA.

Key findings in relation to the mutually exclusive supply chain analysis include:

- Elasticity of demand is the major driver of implications of increasing the deposit rate from 10 to 20 cents⁹. The base assumption used (elasticity of -0.5) causes the number of eligible containers sold to decline from 789.3 million to 776.3 million, but the assumed increase in return rate of 10% directly to Depots is partially offset by a reduced return through recycling bins noting that there is a loss of recoverable material in kerbside recycling bins due to contamination and breakage, resulting in an overall return rate increase from 76.7 % to 82.3%. This is greater than historical rates of 81% achieved from 2011 to 2013.
- All scenarios if implemented would make a contribution to the **Circular Economy** via increased recycling rates and total numbers of containers recycled with a non-contamination advantage and the processing opportunities potentially generated. The most significant contribution to the volume of recycling would come from *incorporating currently excluded containers* (an additional 127 million containers) followed by *increasing the deposit rate from 10 to 20 cents* (an additional 34 million containers).
- One of the key objectives of the CDS is to reduce the loss of resources to landfill and the broader environment, thereby achieving cost savings and environmental benefits. Under the assumptions used in the economic modelling, this is achieved for all scenarios except for *improved dispute resolution* where the change is marginal. Clearly *incorporating currently*

⁹ The modelling does not consider the income elasticity impact.

excluded containers has the biggest impact on achieving this outcome, followed again by *increasing the deposit rate*.

- Direct economic impact, as measured by jobs created within depots and Super Collectors, is greatest for incorporating currently excluded containers (an extra 63 full time equivalent employees) but is mostly small for all other scenarios, and actually declines in some due to the improved efficiency of the system. When taking into account jobs changes at MRFs – increasing the deposit rate from 10¢ to 20¢ and additional return points results in the best job outcomes in the system (as for the scenario of incorporating currently excluded containers has offsetting job losses in the MRFs)
- While there was good stakeholder support (50%) for a change from the current multiple Super Collectors system to a single scheme coordinator, such a move might challenge the **workable competition principles** (e.g. some market control over handling fees vested in one Super Collector) with others citing there will be no impact on South Australia's rate of recycling and litter reduction as Super Collectors already coordinate the next step in the process after the material is returned from the consumer.
- Finally, in considering increasing the deposit rate from 10 to 20 cents there needs to be consideration of other States have only recently introduced, or are about to introduce, similar schemes at 10c.

In terms of State economic impacts, all scenarios result in increased contributions to SA employment and GSP - with much of this increase arising from increased processing opportunities.

In relation to overall community benefit cost outcomes, the mutually exclusive modelled benefit cost outcomes measure the estimated **unrealised value in the South Australian CDS** associated with the range of options available to improve the scheme. The options/scenarios (again mutually exclusive) which are modelled as best contributing unrealised value to the South Australian community are:

- Incorporating Currently Excluded Containers (up to 3L - plain milk; glass wine/spirit bottles; fruit juice over 1L; flavoured milk over 1L) - \$86.19 million.
- Increase the Deposit Rate from 10 to 20 cents – \$85.69 million.
- Additional Return Points - \$75.84 million.
- 4th bin Kerbside System - \$58.41 million.
- Single Scheme Coordinator - \$55.73 million.
- Enable Depot Owners to Contract with a Single Super Collector – 53.52 million.
- Improved Dispute Resolution - \$49.81 million.

As noted above, the full economic modelling has also been undertaken on a **non-mutually exclusive basis** whereby the above impacts are modelled for each scenario **including the refund/deposit per**

container increasing to 20c across all State/Territory jurisdictions that currently have or intend to have a CDS including SA. The modelled benefit cost outcomes measure the **estimated unrealised value** in the South Australian CDS associated with the range of options available to improve the scheme. The options/scenarios (**not mutually exclusive**) are ranked below in order of the priority in which they could contribute unrealised value to the South Australian community;

- Incorporating Currently Excluded Containers (up to 3L - plain milk; glass wine/spirit bottles; fruit juice over 1L; flavoured milk over 1L) - \$171.88 million.
- Additional Return Points - \$161.53 million.
- 4th bin Kerbside System - \$144.10 million.
- Single Scheme Coordinator - \$141.42 million.
- Enable Depot Owners to Contract with a Single Super Collector - \$139.21 million.
- Improved Dispute Resolution - \$135.50 million.

In summary, while there are identified winners and losers associated with the adoption of all scenarios, all scenarios will deliver a positive benefit cost to the South Australian community and warrant serious consideration for implementation from a South Australian perspective, with *incorporating currently excluded containers* clearly having the greatest potential to capture unrealised CDS value (separately or in conjunction with a rate increase to 20c). However, this is in the context that the majority of other States and Territories have only recently introduced, or are about to introduce, similar schemes at a 10c deposit making harmonisation initiatives across the scenarios important.

The 4th bin kerbside scenario includes an assumption of the need to invest in a glass optical sorting plant (to be established within a dedicated facility) at an assumed capital cost of \$12 million. There are also significant **transition costs** associated with the *incorporating currently excluded containers* and *additional return points* scenarios (estimated at an ongoing annualised rate of \$3 million and \$2 million respectively) built into the estimates and impacting existing industry participants (notwithstanding the overall benefits that will accrue to the SA community).

As part of this review and based on the modelled economic benefits, the EPA has sought recommendations in relation to changes to SA's CDS and harmonisation of the CDS scope across all State and Territory jurisdictions.

The modelled economic outcomes measured as contributions to the formal Circular Economy, indicate priorities for implementation in SA. The results indicate that the 4th bin kerbside system has the greatest impact on job creation through additional employment within local government and material recover facilities, followed by *incorporating currently excluded containers (up to 3L - plain*

milk; glass wine/spirit bottles; fruit juice over 1L; flavoured milk over 1L). The 4th bin kerbside system produces its benefits through increased formal employment in the locally government coordinated collection process rather than the other scenarios which are more oriented towards inducing increased volunteer labour). However, *incorporating currently excluded containers* provides the largest increase in volume of lower contaminated recycled containers providing more by way of processing opportunities funded directly by the CDS. Again, it is noted that achieving these outcomes will require a positive market and community commitment in terms of investing in and financing the opportunities for processing.

It is therefore **recommended** to prioritise the inclusion of *incorporating currently excluded containers (up to 3L - plain milk; glass wine/spirit bottles; fruit juice over 1L; flavoured milk over 1L)* in SA's CDS and increase the deposit rate from 10 to 20 cents subject to the commissioning and review of national consumer based research to determine elasticities of demand across all container types and a review of our economic modelling which has been based on an overall elasticity of -0.5. It is noted that using an elasticity of demand of -1 (more elastic consumer demand and greater response to a price increase) produces a net benefit/unrealised value of only \$49.2 million (compared with \$85.7 million at -0.5 elasticity) for increasing the deposit to 20 cents, which would see *increase the deposit rate from 10 to 20 cents* ranked low in priority order for capturing unrealised value, contribution to the Circular Economy and implementation. In relation to deposit harmonisation, we note that this is a national issue for container deposit schemes and deposit harmonisation and would benefit from the recommended national approach and research.

In relation to national harmonisation of regulatory and labelling matters, the economic modelling indicates only modest benefits to SA (mainly in reduced costs incurred by national suppliers) and it is again highlighted that the majority of other States and Territories have only recently introduced, or are about to introduce, similar schemes. It is therefore **recommended** that such initiatives be deferred until the successful transition of *incorporating currently excluded containers (up to 3L - plain milk; glass wine/spirit bottles; fruit juice over 1L; flavoured milk over 1L)* in SA's CDS and increase the deposit rate from 10 to 20 cents. These changes to SA's CDS will reinforce SA's leading position in its contribution to CDS objectives and the Circular Economy and will place it well to lead national harmonisation at an appropriate time in the future.

The modelled economic impact results detailed in this review highlight the financial and economic outcomes for the considered scenarios. However, the **distribution of benefits and costs** will vary across all stakeholders including the consumer, industry (e.g. manufacturers) and government (e.g. local government).

Finally, there are some much broader CDS issues we **recommend** that further evaluation and consideration is given to:

- Labelling approval costs and any opportunities to reduce these costs especially should additional containers be introduced to the CDS.
- The importance of potential new entrants such as the wine, spirit and dairy industries to the South Australian economy (production and tourism) - there is benefit to undertaking further independent evaluation of the sectoral financial impacts of extending the containers in the scheme. While our modelling indicates price induced impacts on demand, and small financial cost associated with labelling, the substantial benefits associated with including these containers in the CDS significantly outweigh these costs.
- The review and modelling highlight the importance of consumer convenience (e.g. additional return points) as a means to realising value in the CDS. Combined with improved public awareness of the CDS through branding, promotion and education, this can achieve an excellent positive benefit cost outcome without disruption to the current system. While not able to realise the higher benefits of incorporating currently excluded containers (up to 3L - plain milk; glass wine/spirit bottles; fruit juice over 1L; flavoured milk over 1L) in the CDS, it offers a lower risk option to realise value.

APPENDIX 1 - STAKEHOLDER CONSULTATION

This section of the report contains the detailed findings of the stakeholder consultation and follows the sequence of the approved consultation template.

Responses were received from 3 Super Collectors, 12 depots, Scouts SA (representing 10 depots) and Recyclers of South Australia (representing 107 depots).

The information and data gathered via this stakeholder consultation has been used to inform the assumptions underpinning the economic analysis and modelling. Aggregated responses to the consultation questions follow:

1. How many employees currently work in your CDS business?

Following are the average responses of the SA Depots:

- Number of Employees (including part time and casual) - 6
- Number of Full Time Equivalent Employees – 3.1 FTEs

2. Based on your latest data, please estimate the value of refunds per annum that you provided to customers (if relevant) and/or your estimated annual business turnover.

Following are the average responses of the SA Depots:

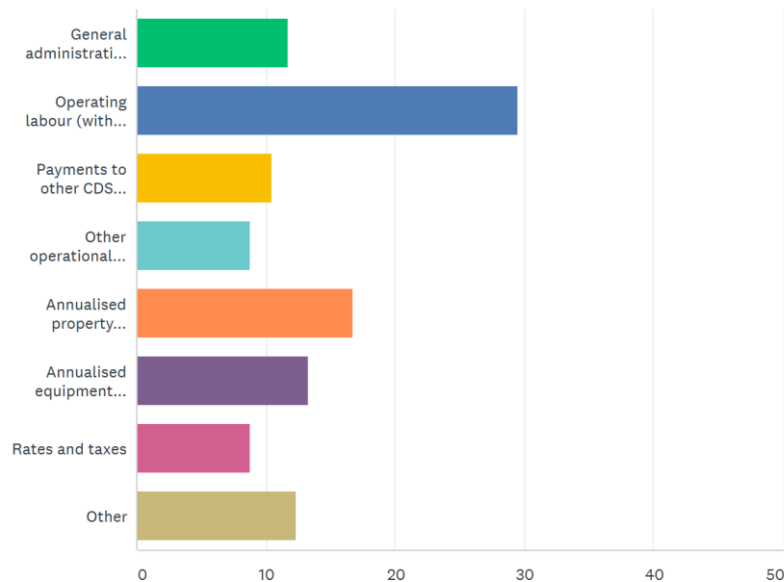
- Value of Refunds Per Annum - \$642,000
- Annual Sales Turnover (including the handling fee payment by Super Collectors to Depots where relevant) - \$1.25 million

3. Please provide an indicative breakdown of your costs into the following categories:

- General administration (including salaries with on-costs)
- Operating labour (with on-costs)
- Payments to other CDS entities
- Other operational costs
- Annualised property (including maintenance and repairs and depreciation)
- Annualised equipment (including maintenance and repairs and depreciation)
- Rates and taxes

- Other

The 4 Depots that responded via Hudson Howells' Online Survey Monkey facility provided the following average results:



The remainder of the survey responses validate the above findings for Depots generally with Operating Labour representing the major cost component at around 30% and combined Annualised Property and Equipment Costs around the same percentage. So, in terms of variable operating costs, Operating Labour represents 40 to 50% of variable costs.

4. What do you consider to be the major strengths and weaknesses of the current South Australian Container Deposit Scheme?

Strengths

- Culture in South Australia of using the container deposit scheme – evidence supports that culture is a significant factor in return rates.
- High return rates in SA and high recycling rates of CDS material are aligned to the highest global standards for CDS.
- Established network of Depots.
- Quality of material collected is superior to other states. Material is manually sorted, for example glass separated by colour increasing value and recyclability.
- Producer responsibility - Super Collectors coordinate the scheme efficiently and effectively, on behalf of the manufacturers who fund the scheme.
- The longevity of the scheme.

- The infrastructure in place to be able to recycle.
- It makes people want to recycle because they get something back for it.
- Having the refund reduces the number of containers being littered as well as going to landfill, whilst the handling fee allows for separation of product, therefore increasing end value.
- Majority of public aware and utilise the scheme.
- Depots are readily found in regions.
- SA Scheme the best.
- Works very well therefore be careful of tweaking.
- Happy with the way the system is working.
- More progressive than other states.
- Coverage. The SA Scheme provides for a very good coverage of Depots in relation to the catchment areas. Members of Public do not need to drive far to recycle (generally).
- Maturity. The SA Scheme has been operating for some 42 years. It is a mature operation well known to most South Australians. Consequently the 'take-up' is high (80%+).
- The DEPOT Level Operators are well entrenched, and expert in what they do. Customer Service and immediate payouts are the keys to Depot success in a competitive environment.
- GLASS. There is a glass beneficiation Plant in Adelaide. If it were not for this plant, most non-redeemable glass would be returned to landfill. This augments Depot level income, and if lost, would result in Depots operators leaving the system.
- The current 10c redemption is just maintaining the incentive for the public to recycle. This needs to go to 20c in 6 to 12 months to ensure the Scheme remains relevant.
- There is much good-will at Depot Level Operations towards the system and the environmental outcomes, however, operators will leave quickly once they generate consecutive financial deficits through inadequate returns.
- Great to see SA look so clean compared to other states.

Weaknesses

- No scheme branding or advertising.
- Lack of awareness from general public on how the scheme works and the benefits in terms of recycling over kerbside methods.
- Convenience – Significant factor in terms of return rates. No alternatives to the collection depot network which can be difficult to access, can have limited hours and excessive wait times. Some people also do not like to stockpile material. Community feedback supports this.
- Lack of technology used, at collection Depots or as alternatives to collection Depots – pay by weight is an accurate form of determining returns despite this.
- Limited support for coordinating and improving the scheme. Limited support for monitoring compliance.

- MRFs operate through collection Depots, with no direct route to Super Collectors. Unnecessary step in the process.
- Alternative operators to Collection Depots also have difficulties and restrictions to entering the scheme
- Cannot donate refunds directly to charity.
- Lack of harmonisation with other schemes.
- There has been no change to the items introduced to the scheme by successive governments.
- Too much management weighing the industry down. A lot of people want the pay, but don't want to do anything for it.
- Confusion as to what containers are included in the CDS.
- Not having a refund on all drink containers.
- Having 2 Super Collectors handling the cans.
- 10c gives small incentive for people to recycle.
- Too many splits with the plastic containers.
- Allowing drink manufacturers to use containers that are not recyclable.
- Paid by weight for glass and cans, should be paid by count.
- Country Depots have to pay high freight cost to transport recyclables e.g. glass and cardboard.
- Cardboard at the moment is worth next to nothing due to a glut in the markets. Would like to see Green Industries SA subsidise freight costs for country Depots. Currently we process approximately 700 tonnes of cardboard per year.
- Lack of consistency with containers i.e. small apricot nectar tin has deposit but not a large one.
- Lack of security for current Depots.
- EPA needs to be more responsible for actions of Super Collectors. Assisting with contracts, disputes etc.
- A lot of time is wasted for staff to check where the 10 c refund emblem is and then sometimes it is printed as SA approved when it actually is not. Penalties should be made. Very time consuming.
- Need to streamline better. We need to sort too much.
- Time consuming process for collection Depots, very labour intensive.
- Handling fees aren't high enough given the time it takes, and physical effort taken.
- Nature of the job (unhygienic/dirty).
- Limited customers for small rural Depots and quite seasonal.
- Not enough profit to update equipment to improve efficiency. Also, not enough to hire staff.

- The Scheme coverage is a little weighted to the metropolitan areas and north of Adelaide. A better, more even spread would improve general public access.
- Notwithstanding the high take-up, South Australians need to be provided incentive to recycle. That financial and/or emotional incentive needs to be reminded and updated to keep pace with expectations and motive (relevance).
- The current scheme does not index (correctly) for rising costs. Of course, cost of business rises by greater than Adelaide CPI each year. WHS compliance alone has cost Scout SA in the order of hundreds of thousands of dollars per annum, with little to no recognition of the rising costs of operations by the manufacturers, or the EPA. The 'Handling Fee' (depot net profit) has not risen to compensate for actuals for many years. This has led to an inability by Depot Operators to invest in their business for efficiency gains (automation) or take any more business risk than they already carry.
- There is little scope for Depot Operators to present cases for increases to the 'Handling Fee' as this is largely controlled by the manufacturers themselves and not the State Government or the EPA that is supposed to be overseeing the System. If the fee 'stagnates' and operating costs continue to rise (which they will) Depot operators will be forced from the system.
- The current handling fee of approx. 6c is just enough for a very large operator (Scouts SA) to stay in business in SA. We have dropped just under \$500,000 in net profit pa over the last two years as WHS & HR compliance costs as well as Trucking/Wages/Energy/Leasing costs rise at levels well above the very gratuitous and incremental CDS 'Handling Fee' increases from the manufacturer. This must be corrected for the scheme to flourish (or even survive) into the future.
- More items need to be included in the system.

5. What changes to the CDS do you believe would increase the current rates of participation in the scheme and associated litter reduction and recycling of beverage container materials?.

- Increased public awareness of benefits of the scheme beyond receiving a deposit through branding and education. People still use the kerbside bins due to convenience or because they believe it to be as effective method of recycling, whereas returning through the CDS can improve recycling rates.
- More convenient options for returning containers required, including use of technology.
- Increased reporting of MRF material would highlight actual return rates are higher than currently reported, by 3-5%.
- Allow for more alternative options for entry into the collection network including social enterprise.
- Increasing the range of items in the CDS. Why does it only have to be beverage containers? Why is it only some of the beverage containers?

- Force all the states and territories to have a deposit on containers. What is sold for deposit in SA and NT will then not be affected by "over the border" containers.
- Increase the refund to 20 cents. Increasing the CDS to all drink containers regardless of size or type (e.g. plain & flavoured milk, wine & spirits, fruit juice as well as drink cups from takeaway outlets). Forcing drink manufacturers to use materials which are recyclable.
- Introducing deposits on wine bottles, all fruit juice containers, plain milk bottles and water bottles up to 20 litres.
- Increase to 20c to make it more viable for people to utilise (especially country people that need to travel up to 50kms to cash in their product).
- Wine and spirit bottles be approved containers.
- More containers such as milk bottles be approved, all beverage containers.
- Look at identical containers – milk; flavoured milk (big)
- Anything that goes into the Yellow Bin! Shampoo bottles; fly spray; etc.
- An increase in the refund from 10c to 20c and including all beverage containers (the handling fees paid would have to be increased to assist Depots, especially the rural ones who can't afford decent equipment).
- Government assistance to provide separated waste bins would assist with litter reduction, especially to public venues such as sporting bodies etc.

6. When considering the following scenarios, what impact do you believe they will have on South Australia's rate of recycling and litter reduction (please tick one box for each scenario)?

Respondent notes are highlighted under each scenario.

Scenario	Positive Impact	No Impact	Negative Impact	Unsure
<p>An increase to a four-bin kerbside system, incorporating a glass waste bin.</p> <p><i>Stakeholders comments:</i></p> <ul style="list-style-type: none"> • <i>Note that SA has the lowest glass in bin rates in Australia.</i> • <i>This depends on how glass in the 4th bin is processed prior to beneficiation. While the contamination of paper & cardboard may reduce, it is likely that CDS glass will be contaminated by non-recyclable glass material, increasing losses and reducing the return rate. Depot / CDS throughput would reduce.</i> • <i>Glass collected in kerbside trials is normally used as road base.</i> 	4	1	4	3

Scenario	Positive Impact	No Impact	Negative Impact	Unsure
<p>Incorporation of the currently excluded beverage containers up to 3L (plain milk; glass wine/spirit bottles; fruit juice over 1L; flavoured milk over 1L).</p> <p><i>Stakeholder comments:</i></p> <ul style="list-style-type: none"> <i>Majority of this material would be collected in kerbside bins. Therefore, it is not likely that these materials make up the % of the recycling rate not achieved in South Australia and would require a significant investment to manage and coordinate the additional manufacturers. Focus would be better in other areas.</i> 	10	1	0	1
<p>Increasing the refund/deposit per container from 10c to 20c.</p> <p><i>Stakeholder comments:</i></p> <ul style="list-style-type: none"> <i>Our research confirms that the South Australian return rates are aligned to global standards and that an increased deposit rate would not result in increased return rates. Other factors such as public bins, improved reporting of glass mixed with non-CDS, export %, increased servicing of remote areas and targeting of people's behaviours, all need to be addressed first.</i> <i>Increase of the deposit/refund is not a balanced approach for CDS with negative implications such as increased cost to consumers, cash flow, entry to market restrictions, risk of theft, etc. Therefore, will not be a sustainable or successful solution to capture the remaining % of material.</i> 	10	1	1	0
<p>Change from the current multiple Super Collectors system to a single scheme coordinator.</p> <p><i>Stakeholder comments:</i></p> <ul style="list-style-type: none"> <i>This will have no impact on South Australia's rate of recycling and litter reduction. Super Collectors coordinate the next step in the process after the material is returned from the consumer.</i> 	6	2	2	2

Scenario	Positive Impact	No Impact	Negative Impact	Unsure
<p>Change from the current multiple Super Collectors system to a single scheme coordinator, and existing collection Depots collaborating with a network coordinator in regions that currently have a low return rate or limited accessible return options (e.g. remote regions of SA).</p> <p><i>Stakeholder comments:</i></p> <ul style="list-style-type: none"> <i>This would have negative outcomes for the scheme when used as part of a single coordinator model. In addition to the increased cost and governance requirements of an additional layer, use of a network coordinator will dilute the line of responsibility from the proposed scheme coordinator.</i> <i>Coverage and return targets for a single scheme coordinator would be more beneficial to the scheme.</i> 	5	1	2	4
<p>Altered governance arrangement to improve dispute resolution.</p> <p><i>Stakeholder comments:</i></p> <ul style="list-style-type: none"> <i>This will have NO impact on South Australia's rate of recycling and litter reduction.</i> <i>Q. How does dispute resolution impact rate of recycling?</i> 	5	4	0	4
<p>Enable depot owners to contract with a single Super Collector of their choosing.</p> <p><i>Stakeholder comments:</i></p> <ul style="list-style-type: none"> <i>This is similar to the existing NT model, which is less effective and less efficient with several administration issues and reporting problems.</i> <i>In addition, this will have no impact on South Australia's rate of recycling and litter reduction.</i> 	6	2	2	2

7. By container type, what percentage changes to your business throughput, revenues and costs (e.g. new equipment, additional employees; maintenance costs, etc.) do you believe these scenarios will have on your business? Respondent notes are highlighted under each scenario.

An increase to a four bin kerbside system, incorporating a glass waste bin				
	<p><i>Stakeholder comments:</i></p> <ul style="list-style-type: none"> • <i>Could reduce glass throughput and revenue at collection Depots. Processing costs of glass could increase as it would require sorting prior to beneficiation.</i> • <i>Impact on Super Collector throughput would depend on how this impacts consumer behaviour and how the 4th bin is processed, including MRF protocols.</i> 			
Aluminium	Throughput (containers or tonnes)	Revenue	Labour costs	Other costs
Glass	<ul style="list-style-type: none"> • <i>Glass throughput will reduce</i> 			
HDPE	<ul style="list-style-type: none"> • -20% 	(\$108,000)	(\$49,000)	(\$41,000)
LPB				
PET				
Combined	Not Required	Not Required		

Incorporation of the currently excluded beverage containers up to 3L (plain milk; glass wine/spirit bottles; fruit juice over 1L; flavoured milk over 1L				
	<p><i>Stakeholder comments:</i></p> <ul style="list-style-type: none"> • <i>Increased costs without any increase to recycle rates, due to the significant increase in manufacturers, contracts, processing, compliance checks, etc.</i> • <i>Diversion from kerbside bins may also impact MRF revenue, reducing their ability to invest in their plant / sorting technology / labour.</i> 			
Aluminium	Throughput (containers or tonnes)	Revenue	Labour costs	Other costs
Glass	<ul style="list-style-type: none"> • <i>Increase throughput, but no change to recycling rates</i> 	No Change	Increase	Increase
HDPE	<ul style="list-style-type: none"> • 5% 	\$941,000	\$94,000	\$19,900
LPB				
PET				
Combined	Not Required	Not Required		

Increasing the refund/deposit per container from 10c to 20c				
	<p>Stakeholder comments:</p> <ul style="list-style-type: none"> Increased cost to consumers and manufacturers of CDS products. Increases gap between CDS and non-CDS products. Increases cash flow requirements for scheme operators / Depots. Despite the increased cost, the data suggests no positive impact on return rates. Community responses also supports this with over 60% of the public supporting the 10c deposit remaining as is. 			
		Throughput (containers or tonnes)	Revenue	Labour costs
Aluminium	• 5%	\$316,000	\$39,000	\$4,500
Glass				
HDPE				
LPB				
PET				
Combined				

Change from the current multiple Super Collectors system to a single scheme coordinator				
	<p>Stakeholder comments:</p> <ul style="list-style-type: none"> Beyond reducing depot splits by one (1), single coordinator model is unlikely to have any cost advantage over multiple Super Collectors. Setup cost will be significant (estimated at \$30M to \$45M) and other schemes with single coordinator model operate additional resources with higher labour costs. 			
		Throughput (containers or tonnes)	Revenue	Labour costs
Aluminium	• No Change	• No Change	• Increase	• Setup
Glass				• \$30M to \$45M
HDPE				
LPB				
PET				
Combined	Not Required	Not Required		

Stakeholder comments:				
	<ul style="list-style-type: none"> • Network coordinator would significantly increase cost and governance requirements of the scheme; additional layer is unnecessary. • Makes sense to target regional areas, but scheme coordinator could achieve this without the requirement for a network coordinator. 			
	Throughput (containers or tonnes)	Revenue	Labour costs	Other costs
Aluminium	<ul style="list-style-type: none"> • Increase in Regional Areas over current. But no increase in Regional areas over Single Coordinator 			<ul style="list-style-type: none"> • Increased over Single Coordinator model
Glass				
HDPE				
LPB				
PET				
Combined				

Altered governance arrangement to improve dispute resolution				
	<p>Stakeholder comments:</p> <ul style="list-style-type: none"> • Unclear on why this is included in the review stakeholder consultation. • Will have no impact on South Australia's rate of recycling and litter reduction. 			
	Throughput (containers or tonnes)	Revenue	Labour costs	Other costs
Aluminium	<ul style="list-style-type: none"> • No impact on throughput 		<ul style="list-style-type: none"> • Increased admin costs 	<ul style="list-style-type: none"> • Extra costs
Glass				
HDPE				
LPB				
PET				
Combined	Not Required	Not Required		

Enable depot owners to contract with a single Super Collector				
	<i>No stakeholder comments</i>			
	Throughput (containers or tonnes)	Revenue	Labour costs	Other costs
Aluminium				
Glass				
HDPE				
LPB				
PET				
Combined				

Establishment of additional depot return points				
	<i>Stakeholder comments:</i>			
	<ul style="list-style-type: none"> • <i>Potential to increase logistics /transport costs but should also increase return rates if convenience for consumer is achieved.</i> 			
	Throughput (containers or tonnes)	Revenue	Labour costs	Other costs
Aluminium	• <i>Increased</i>			• <i>Increase in transport costs</i>
Glass				
HDPE				
LPB				
PET	• <i>-5%</i>	(\$316,000)	(\$39,000)	(\$4,500)
Combined	Not Required	Not Required		

Implementation of reverse vending machines				
	<p>Stakeholder comments:</p> <ul style="list-style-type: none"> • Potential to increase setup costs, logistics/transport costs and processing costs (if additional sorting is required) but should also increase return rates if convenience for consumer is achieved. • Scheme coordinator: supports the use of RVMs, provided setup correctly and machines have capability to sort and accurately count. 			
	<p>Throughput (containers or tonnes)</p> <ul style="list-style-type: none"> • Increased 	<p>Revenue</p>	<p>Labour costs</p>	<p>Other costs</p> <ul style="list-style-type: none"> • Increased setup and transport costs
Aluminium				
Glass				
HDPE				
LPB				
PET	<ul style="list-style-type: none"> • -1% 	(\$64,300)		
Combined				

Other Please specify				
	<p>Stakeholder comments:</p> <ul style="list-style-type: none"> • Public awareness through scheme branding and education would increase return rates and reduce litter – would come at a cost but the cost would be significantly less than other proposals such as increasing the deposit amount. • Detailed material flow study, including behavioural analysis of consumers – would require funding to perform but would be significantly less than other proposals and ensure that decisions on next steps are well educated. • Investment in the resource recovery element of the scheme – with already high return rates, more work is needed in ensuring the recovered material gets efficiently and effectively processed within a circular economy. 			
	<p>Throughput (containers or tonnes)</p> <ul style="list-style-type: none"> • All could result in increase 	<p>Revenue</p>	<p>Labour costs</p>	<p>Other costs</p>
Aluminium				
Glass				
HDPE				
LPB				
PET				
Combined	Not Required	Not Required		

8. Do you believe there are any other areas of unrealised value within the SA CDS and, if addressed, what do you believe would be the implications for current rates of recycling and litter reduction and your business?

Other Areas of Unrealised Value	Implications for Current Rates of Recycling and Litter Reduction	Implications for Your Business
Better public awareness of scheme through branding and education	Likely to increase	Support such an initiative.
Determine from a detailed material flow study in South Australia. Could highlight opportunities such as <ul style="list-style-type: none"> - Public bins - Remote Areas - MRFs - Mixing of CDS and non-CDS - Consumer behaviour 	Likely to increase if the right areas are targeted	Welcome more detailed research ahead of many of the current initiatives proposed.
Target back-end of scheme, material processing	Return rates are high, focus on ensuring effective and efficient recycling of this material returned	Better market for material returned
Increasing the handling fee will allow operators to provide a far more professional service, achieve industry compliance (many in the current system do not) and allow the owner to reinvest in the network.	Depots that are financially healthy will be far more user friendly, safer, and perhaps even be able to afford the technology to enhance the system's transparency and accuracy.	We could return more net profit and take up areas and responsibilities that have otherwise been unprofitable.
Develop a Decision Making structure that involves the Minister and major Depot Operators.		

Give the Minister the power to arbitrate handling fee stalemates. To date the manufacturers have been able to set the level of return to Depots. This is considered a conflict of interest (from a Scheme perspective). Of course, this is NOT the case from the Manufacturers perspective.		
Cartons – Beer; Soft Drink	Significant Increase	
Electronics and Small Appliances	Greatly increase recycling	

9. Finally, do you have any other comments or suggestions regarding this CDS review?

- Scope of the CDS review still appears to include non-relevant items. Review targets increased recycling and litter reduction but then references areas such as dispute resolution. Would prefer to see more focus on ensuring that the already high return rates are effectively recycled (back-end), and the public (front-end) is made aware that by utilising CDS they are then increasing the recycling rates of the materials they use.
- Many of the proposed changes to date will add significant cost to the scheme which will ultimately end up with the consumer. It is therefore critical that the objectives of the review are clear and the correlation between a proposed change and how it delivers on an objective outlined.
- The Northern Territory EPA has also recently conducted a CDS review. These reviews should be considered in conjunction as there are existing services that cover both jurisdictions and may not be able to do so if any changes are not aligned. As a scheme coordinator our view is that it would support greater harmonisation in general across the participating states to the extent possible.
- As a scheme coordinator our view is that the existing 10c refund is appropriate and should not be increased. This refund strikes the right balance between achieving high collection rates and managing the costs for consumers. Other ways of maintaining and increasing returns should be explored an exhausted first.
- In coordinating the scheme, we see ourselves as a community business, supporting local sporting clubs and other local events by supplying recycling bins for the collection of CDS product. We drop off and collect the bins at no charge and the money raised goes directly to

the Club/event. From time to time we also have a donation “cage” where people donate their CDS product for a charity.

- The last twelve months loads seem to have been getting slightly bigger and further apart due to fuel costs in regional areas. Rural people seem to be waiting for a more financially viable load.
- The irregularity of freight to our Regional Collector as organised by Regional Collector/Super Collectors is a huge major issue at our Depot. Often costing the Depot money due to collection after our trading hours and therefore having to pay a staff member to load the truck, limited personnel are able to load the truck due to weights of bales, at a designated day of the week it would be ideal to have a maximum number of bales left in the yard. Sometimes treatment by Regional Collector is questionable when querying when a load can be collected.
- Quality of bales as supplied by Super Collectors is often very average, once again a cost is incurred by our Depot for the extra bale hooks required to hold bales together (sounds petty but it adds up, with the profit base is so low).
- We have only been doing this for three months but we heavily underestimated how labour intensive it actually is. We are a depot in a small rural community, the handling fees paid do not reflect how much ‘HANDLING’ is involved. Our small Depots will never make enough profit to upgrade our equipment to improve efficiency so we don’t see this changing at all unless the handling fees increase. We fear that if this is not re-evaluated then small rural Depots will cease to exist eventually as the profits will never be high enough to justify the amount of time and level of output required.
- We believe a huge increase in people recycling will occur if both the refund is put up to 20c and all beverage containers are included. Recycling should be something rewarded and is an important aspect of our future, so small changes need to be made to increase the level being recycled and to assist the Depots so they can improve efficiencies and therefore increase the volume recycled.
- Differences between country and city – rents/Freight etc.
- Needs to be practical achievable sustainable etc.
- Higher price means you need more cash flow.
- Don’t open Saturday afternoon/Sunday – staff costs.
- Turnover only went up 2% when 5 cents went to 10 cents.
- Manufacturers will get richer – load price and only pay on returns.
- RV Machines - Machines made to handle cans. Wet? Would work after hours; Bunnings.
- Need 8 super yards – degassing white goods etc.
- 10 to 20 cents will bring some on board but what about coffee cups, Maccas, etc.
- Against 4th bin – glass – has potential. Needs to be sorted.

- Agree to a single Super Collector but what about competition?
- Turn 10 cents into 15 cents.
- RV to catch other stuff that others throw out.
- Service Stations should have RV Machines. Get stuff off the roads.
- Single coordinator will be better with only one return point.
- Subsidy and grants needed for country Depots to purchase equipment or improve infrastructure.
- Overall, the whole system needs to be simplified and all anomalies removed. I think some of the ideas in the system were developed before the wheel ... if you know what I mean.
- With SA having the best recycling in the country we should be moving forward to eliminate even more items from landfill.
- Raising the return to 20 cents would be fantastic.

In addition to the above, Hudson Howells received a submission from Recyclers of SA (RSA) representing the consolidated views of its 107 collection depot operators. RSA prepared a discussion paper and questionnaire for its members regarding the CDS Review and provided a summary of the results and a collated summary of members responses.

APPENDIX 2 - MODELLING TECHNICAL REPORT

Economic Footprint of the CDS System

The economic modelling for this assessment has been based on separate sets of data collected across various platforms. The three major sources of data include:

- EPA published reports.
- Data from Hudson Howells' survey of depot owners/operators.
- Data from the Rawtec SA EPS Kerbside Audit Report (February 2020) and updated data on Glass, HDPE and PET flows (September 2020 and November 2020).

Based on these data and a number of assumptions following, Table A.2.1 below summarises the modelled current level of activity associated with the South Australian CDS containers.

Table A.2.1: Estimated CDS Return Characteristics – 2019/20

	# of possible containers sold (million)	# of eligible containers sold (million)	Return Rate - Total	Propn returned through Kerbside/ Other	Proportion returned directly through depots	Total returns for deposit	
						Containers (million)	Tonnes
Aluminium	340.2	340.2	82.2%	6.8%	75.3%	279.5	3,818
Glass -currently eligible	178.6	178.6	87.8%	27.0%	60.9%	156.9	32,286
Glass- wine	55.0	0.0	0.0%	0.0%	0.0%	0.0	0
Glass - other current non-eligible	7.8	0.0	0.0%	0.0%	0.0%	0.0	0
HDPE	71.8	20.2	62.3%	14.8%	47.5%	12.6	252
LPB	58.5	50.5	52.6%	13.3%	39.4%	26.6	483
PET	204.3	199.8	65.1%	25.8%	39.3%	130.1	3,515
Total	916.1	789.3	76.7%	16.8%	59.9%	605.6	40,355

Table A.2.1 is created from available data with the following assumptions:

- Return rates and volumes have been provided by the EPA.
- The proportion returned through kerbside is based on the Rawtec data re collections from households (SA EPA – CDS Review: Household Bin Audit Report May 2020, and depot data). Kerbside collection of CDS eligible material refunds are assumed to be returned through an MRF to Depots (while the material itself flows to the processor). A Rawtec survey of licenced establishments (SA EPA - CDS Review Collection Depot Consultation & Licenced Establishment Survey Report, June 2020) indicates that a large number of these

establishments have pick up arrangements (e.g. mainly contracts with Depots), with much smaller amounts deposited into kerbside pickup). The modelling considers only the material currently or potentially eligible under the CDS scheme, so jam and food jars are not included – as the scheme covers only beverage containers. Table A.2.2 provides estimates of collection of CDS related material through Local Government contracted kerbside services – sourced from a Rawtec May 2020 report, with glass collection and HDPE and PET data as advised by the EPA.

- Possible containers sold exceeds eligible containers sold due to containers in the category that are not included in the CDS. The proportional increase for plastics materials is based on the ratio of other to eligible containers as identified in Table A.2.2 - with the amount of possible HDPE and PET containers based on the ratios identified in the Rawtec November data, and an assumption that 100% of current ineligible HDPE milk containers would become in scope and 50% of juice containers).
- Product suppliers are impacted through the CDS scheme in terms of the impact on underlying prices. The deposit and an agreed handling/administration fee per container are budgeted and paid to Super Collectors based on the previous year return rate with an adjustment payment determined on the current year return rate once finalised.

Table A.2.2: Estimated Materials Collected through Household Kerbside Collection 2019/20

	CDS Containers		Other Containers		Total	
	tonnes	# (million)	tonnes	# (million)	tonnes	# (m)
General Waste Bin						
Metal	158	11.25	4	0.07	162	11.31
Glass						
CDS	1,945	9.35			1,945	9.35
Wine			1,064	2.01	1,064	2.01
Spirit/Beverage			290	0.56	290	0.56
Other			3,238	12.83	3,238	12.83
HDPE	48	2.19	240	4.30	288	6.49
LPB Containers	127	6.59	186	4.83	312	11.42
PET	322	10.19	26	0.45	347	10.64
Other CDS Plastic	1	0.32			1	0.32
Other non CDS Plastic			11	0.16	11	0.16
Single use plastic containers			2,972	67.44	2,972	67.44
Total	2,601	39.89	8,030	92.66	10,631	132.55
Recycling Bin						
Metal	162	11.59	0	0.00	162	11.59
Glass						
CDS	5,099	24.08			5,099	24.08
Wine			19,278	36.64	19,278	36.64
Spirit/Beverage			2,879	5.28	2,879	5.28
Other			8,256	32.83	8,256	32.83
HDPE	53	1.50	2,193	44.38	2,246	45.88
LPB Containers	72	3.35	728	18.70	800	22.05
PET	766	25.77	362	5.82	1,128	31.59
Other CDS Plastic	1	0.16			1	0.16
Other non CDS Plastic			55	0.82	55	0.82
Single use plastic containers			2,543	57.69	2,543	57.69
Total	6,153	66.45	36,294	202.17	42,447	268.61
Grand Total	8,753	106.34	44,325	294.83	53,078	401.17

Source: Rawtec, SA EPA – CDS Review: Household Bin Audit Report, May 2020, with glass, HDPE and PET updated with November 2020 data.

Table A.2.3 illustrates a modelled outcome for the economic footprint of Depots based on the above data, and assumptions that Depots recover the 10¢ deposit for all containers that pass through them, and on average (depending on the negotiated contract with Super Collectors) a 5.5¢ handling fee (sourced from the Rawtec survey of Depots, and compares to 4¢ identified in the 2013 Hudson Howells anomaly study. The cost structure applied is broadly based on the Hudson Howells' survey responses regarding cost structures for Depots.

Table A.2.3 – Modelled Economic Footprint of Depots

	Depots					
	Revenue (\$m)	Costs (\$m)				Annualised infrastructure (inc GoS)
		Refunds paid	Labour	Other operating	Rates and Taxes	
Aluminium	\$43.32	\$27.95	\$6.26	\$1.63	\$1.23	\$6.26
Glass -currently eligible	\$24.31	\$15.69	\$3.51	\$0.91	\$0.69	\$3.51
Glass- wine	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Glass - other current non-eligible	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
HDPE	\$1.95	\$1.26	\$0.28	\$0.07	\$0.06	\$0.28
LPB	\$4.12	\$2.66	\$0.59	\$0.15	\$0.12	\$0.59
PET	\$20.16	\$13.01	\$2.91	\$0.76	\$0.57	\$2.91
Total	\$93.86	\$60.56	\$13.56	\$3.53	\$2.66	\$13.56

Source: Modelling based on assumptions.

Table A.2.4 illustrates a modelled outcome for the economic footprint of Super Collectors, based on the above data, and assumptions that Super Collectors recover the 10¢ deposit on containers returned to them (e.g. from the waste collectors through the kerbside bin), and on average depending on the negotiated contracts, a 2¢ administration fee (relative to 5.5¢ for Depots) and sales of materials.

The Super Collectors and MRF's are assumed to sell the product generated to processors as discussed above. Glass is processed through two facilities in South Australia and sold locally, while the other product is sold and transported interstate and overseas. The value achieved by Super Collectors for uncontaminated materials per tonne are assumed as follows based on feedback through from the Rawtec survey and workshop and data provided by the EPA:

- Aluminium - \$1,500
- Glass - currently eligible - \$120
- Glass – wine, spirit and other current non-eligible - \$120
- HDPE - \$600
- LPB - \$50
- PET - \$400

The value of glass materials disposed of through kerbside recycling bins is estimated as a weighted average of the amount returned for deposit (as above), sent to civil uses and to landfill (assumed to be zero). It is noted that MRFs pay civil contractors (estimated at \$80 per tonne) for taking glass fines, while disposal to landfill costs \$200 in gate fees (in metropolitan areas). These payments are included

in MRF cost assumptions rather than negative values. Materials other than glass are assumed to achieve 1/3 of the above values in the mixed bin context.

The cost structure for Super Collectors is assumed to be 40% labour, 40% other operating costs and 20% other.

Table A.2.4 – Modelled Economic Footprint of Super Collectors and MRFs

	Supercollector					Tonnes "sold" by MRF's	Value of total CDS possible revenue -MRF's (\$m)
	Revenues (\$m)		Costs (\$m)				
	From containers through depots	Sales of material (\$m)	Labour	Other operating	Annualised infra-structure		
Aluminium	\$5.59	\$5.73	\$4.53	\$4.53	\$2.26	664	2.00
Glass -currently eligible	\$3.14	\$3.87	\$2.80	\$2.80	\$1.40	3,442	3.19
Glass- wine	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	20,592	1.38
Glass - other current non-eligible	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	2,254	0.15
HDPE	\$0.25	\$0.15	\$0.16	\$0.16	\$0.08	296	0.25
LPB	\$0.53	\$0.02	\$0.22	\$0.22	\$0.11	290	0.26
PET	\$2.60	\$1.41	\$1.60	\$1.60	\$0.80	1,504	2.75
Total	\$12.11	\$11.18	\$9.32	\$9.32	\$4.66	29,041	9.97

Source: Modelling based on assumptions.

ABS Census data indicate that the 800 people employed in the 'Waste Remediation and Materials Recovery Services' sector (Depots and Super Collectors would fall within this sector) have an average salary of \$69,000, or \$85,000 adjusted to 2019/20 dollars and full time jobs, if it is assumed that there are 0.85 FTEs for every job. It is assumed that salaries of employees in Depots represent 70% of this amount (generally lower skilled). Further, as many of the people working in Depots are owner operators, 20% of estimated Gross Operating Surplus (GOS) is assumed to be owner wages equivalent (at the higher salary equivalent). With these assumptions the modelling suggests a total of 292 FTE jobs in Depots, or 2.2 FTEs per depot (compared with 2.1 from the survey), and 110 FTE's in the Super Collectors.

MRF's are assumed to manage the kerbside co-mingled recyclables, supplying eligible containers to the recycling market and accessing the deposit and handling fee through an arrangement with Depots. MRF's also dispose of other non-eligible and lower quality recovered material on the market, but at a 'contamination' rate. Modelling estimates the sales of materials sold by MRFs amounts to be 29,041 tonnes. The gap between the uncontaminated and contaminated market prices for the materials is potentially unrealised value that is escaping the system. It is estimated that the activities in the MRFs related to CDS related (eligible and possibly eligible) product only (sorting, returning for deposit collection and sale of remaining materials) employs 68 people. MRF's employ more than that as they also handle other (i.e. non CDS) materials.

Therefore, the direct economic contribution of the CDS system is 469 employees as a base, with the following induced (multiplier) impacts derived from application of a 2020 South Australian Input Output Table. A 28 sector input output table for South Australia (specified for energy and renewables projects) has been developed for this study based in the 2016/17 Australian Input Output tables as produced by the ABS, and using a location quotient method with superior addition of Labour Force Survey data, 2016 census data and national accounts data.

- Direct Impact
 - Employment (FTE's) - 469
 - Gross State Product/Value Added (\$m) - \$47.6
- Induced (or Multiplier) Impact
 - Employment (FTE's) – 914
 - Gross State Product/Value Added (\$m) - \$110.0
- Total Impact
 - Employment (FTE's) – 1,383
 - Gross State Product/Value Added (\$m) - \$157.6

In addition to this specific economic impact, the complete CDS system also includes:

- **Local Government waste collection activity.** It is estimated that Local Government currently spends in the order of \$220 million annually¹⁰ on waste collection, of which \$91 million is related to the collection of metals, glass and plastics supporting 345 FTE's in kerbside related waste collection of CDS related materials in South Australia. Rawtec data indicates that 106.3 million eligible containers are disposed of annually through kerbside collection from households (66.5 through the recycling bin, and 39.9 million through the general waste bin) weighing 8,753 tonnes. In addition, there is an estimated 41,736 tonnes of metal, glass and plastic material that flows through the kerbside general waste and recycling bins (8,030 through the general waste bin, and 33,705 million through the recycling bins). The recycling bin constitutes 80% of collected waste by weight and 15% of this is CDS eligible containers.
- **Materials Processing.** There are two glass processing facilities in South Australia which process recovered glass material and there are proposals for processing plants relating to other CDS and non-CDS materials (especially given the recent cessation of disposal offshore). There are also a number of other processing facilities emerging as people identify opportunities emerging from recycling. For the purposes of broad-level quantification of the extent of reprocessing activities it is assumed that:

¹⁰ See footnote 2.

- 100% of eligible glass containers, and wine bottles recovered, 60% of other glass and 10% of other materials recovered for processing are processed in SA. These assumptions are based on the broadly identified flows from the CDS Gap Analysis Report (Preliminary Analysis of Material Flows through the South Australia Container Deposit Scheme: Current Understanding, Data Limitations and Data Gaps” – but updated for latter investments). The remainder is sent out of the State or out of the country for processing.
- The amount paid for material by the processor is assumed to represent 10% of production value to the processor, and in terms of value to user of the reprocessed material through reduced costs, and wages 40%, with an average wage based on the wage in the sector from the SA Input Output tables.

Using value added and employment ratios from SA Input Output tables this implies that processing of CDS eligible materials in the State contribute in the order of 269 FTE jobs, generate wages of \$17.5 million dollars and contribute \$28.0 million annually to Gross State Product. Without the lower costs associated with having clean uncontaminated material which is a consequence of the CDS system, this level of processing would be highly unlikely.

- Waste disposal. The balance of uncollected and unsold CDS related materials is assumed to go to landfill and to a lesser extent the environment as litter. There is estimated to be 9,317 tonnes of current CDS or currently excluded (e.g. anomalies) containers with a value of \$1.9 million (valued as if it could be recovered so as to capture full re-use value).

Modelling Alternative Scenarios on the Economic Footprint

General assumptions across all scenarios being modelled include:

- For comparison purposes, the modelling framework is consistent with the discussions above in terms of modelling the base economic footprint.
- Assumptions about changes in variable cost per unit are core drivers of changes in the modelling. The specific assumptions are detailed above and under each scenario as below.
- Reductions (and increases) in per unit costs are assumed to be partially allocated back to support a reduction (increase) in the handling fee under each scenario. This will not be automatic but will depend on negotiation. The change in fee impacts the total amount of produce sold depending on the elasticity of demand, with the following assumptions. It is assumed for the base case modelling that the elasticity of demand is on average -0.5 and that the average price per container is \$3 generally and \$15 for wine bottles (this will in reality vary based on point of sale). That is, a 10 cent increase on a \$3 container (3.33%) would see demand reduced by 1.67% while on a higher priced container (e.g. wine bottle at \$15) would decline by a much smaller amount of 0.33%. The research indicates varying estimates and therefore this a critical uncertain variable, which the modelling tests with alternative scenarios. University of Melbourne research indicates that price elasticities for sugar-sweetened beverages in Australia range from -0.83 to -0.94¹¹ while international studies provide estimates as high as -1.39. As there are more substitutes for the smaller group of beverages (sugar sweetened) from within the group, the elasticity for all beverages in containers will be lower). Using -0.5 is a relatively neutral assumption as a more inelastic assumption will result in a lower decline in sales (but a bigger income effect on consumers), and vice versa.

Scenario 1 - Increase deposit rate from 10c to 20c

The underlying assumptions for this scenario include:

- The increase in price is factored into the price of products using a base elasticity assumption of -0.5 applied to discretionary consumer items. While this is the case for all scenarios, it is especially important in this scenario.
- There is increased incentive for households to return containers to Depots directly and not place in kerbside bins, thereby reducing MRF volumes, and resulting in higher value recovered beverage container materials.

¹¹ <https://melbourneinstitute.unimelb.edu.au/downloads/working-paper-series/wp2016n25.pdf>

The following tables summarise the core change assumptions for this scenario along with the:

- Modelled return characteristics.
- Modelled economic footprint of Depots.
- Modelled economic footprint of Super Collectors.

Table A.2.5 shows the core drivers of changes assumed for Scenario 1. In summary:

- It is assumed that the increase in deposit creates an incentive for more households to return the container to a depot and receive the deposit (10% to 20%). It is assumed the incentive impact is greater for HDPE, LPB and PET (20%) as they are starting from a lower base.
- The increased throughput brought about by the increased volume creates some economies of scale, and as such reduced variable cost per unit for both Depots and Super Collectors. This results in increased operating surplus that will fund investment in equipment to manage increased flows, but it is further assumed that some will benefit consumers as a small reduction in the handling fee for both Depots and Super Collectors (3% in each case).
- The increase in the deposit is passed fully on to consumers, and as such results in a decline in the number of eligible containers sold based on the elasticity assumption applied (highlighted column). This is partially offset by the offsetting reduction in the handling fee.
- There is a reduction in co-mingled recyclable bin contents requiring processing at MRFs and a reduction in processing costs and waste disposed to landfill. The volume, processing costs and sale price of non-CDS materials remains unchanged.

Assumptions of cost changes in this and the other scenarios are assumptions with little evidence available, though broadly based on the quantitative and qualitative information from the surveys, and by assessing the implied outcome – with the assumptions chosen generally to be on the conservative side.

Table A.2.5: Core Change Assumptions for Scenario 1 - Increase Deposit Rate From 10c to 20c

	# of eligible containers sold (million)	Returned through Kerbside	Proportion returned through depots	Depots Costs (\$m)		Supercollector Costs (\$m)	
				Labour	Other operating	Labour	Other operating
Aluminium	-1.64%	-10%	10%	-2.5%	-2.5%	-2.5%	-2.5%
Glass -currently eligible	-1.64%	-10%	10%	-2.5%	-2.5%	-2.5%	-2.5%
Glass- wine bottles	0.00%	0%	0%	-2.5%	-2.5%	-2.5%	-2.5%
Glass - other current non-eligible	0.00%	0%	0%	-2.5%	-2.5%	-2.5%	-2.5%
HDPE	-1.64%	-20%	20%	-5.0%	-5.0%	-2.5%	-2.5%
LPB	-1.64%	-20%	20%	-5.0%	-5.0%	-2.5%	-2.5%
PET	-1.64%	-20%	20%	-5.0%	-5.0%	-2.5%	-2.5%

The elasticity assumption of -0.5% applied to a 10c price increase on a container with average retail price of \$3 would lead to a 1.67% reduction in sales, but there is a slightly offsetting effect of economies of scale in throughput at depots and Super Collectors resulting in an assumed small reduction in handling fees and therefore resulting in 1.64% reduction in sales.

Table A.2.6 provides the results for Scenario 1 (Increase Deposit Rate From 10c to 20c) for overall outcomes. The modelling indicates that the overall return increasing by 5.6%age points (from 76.7% to 82.3%, with more of the increase being coordinated directly though Depots). Because of the assumptions applied, the increase is greater for HDPE, LPB and PET than for aluminium and glass).

**Table A.2.6: Modelled Return Characteristics Under Scenario 1 –
Increase Deposit Rate From 10c to 20c**

	# of possible containers sold (million)	# of eligible containers sold (million)	Return Rate - Total	Returned through Kerbside/ Other	Proportion returned through depots	Total returns	
						Containers (million)	Tonnes
Aluminium	334.6	334.6	89.0%	6.1%	82.9%	298	4,069
Glass -currently eligible	175.6	175.6	94.3%	24.3%	70.0%	166	34,082
Glass- wine	55.0	0.0	0.0%	0.0%	0.0%	0	0
Glass - other current non-eligible	7.8	0.0	0.0%	0.0%	0.0%	0	0
HDPE	70.6	19.9	68.9%	11.8%	57.0%	14	274
LPB	57.5	49.7	57.8%	10.6%	47.2%	29	522
PET	200.9	196.5	67.8%	20.6%	47.2%	133	3,600
Total	902.1	776.3	82.3%	14.3%	68.0%	639	42,548

Table A.2.7 indicates the modelled economic footprint for Depots while A.2.8 provides the results for Super Collectors and the modelled outcomes for MRF's in terms of tonnes sold. The economic footprint for the sector grows with the increase in return rate.

**Table A.2.7: Modelled Economic Footprint of Depots under Scenario 1 –
Increase Deposit Rate From 10c to 20c**

	Depots					
	Revenue (\$m)	Refunds paid	Labour	Other operating	Rates and Taxes	Annualised infrastructure (inc GoS)
Aluminium	\$75.60	\$59.56	\$6.50	\$1.69	\$1.23	\$6.62
Glass -currently eligible	\$42.03	\$33.12	\$3.61	\$0.94	\$0.69	\$3.67
Glass- wine	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Glass - other current non-eligible	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
HDPE	\$3.48	\$2.74	\$0.29	\$0.08	\$0.06	\$0.32
LPB	\$7.30	\$5.75	\$0.61	\$0.16	\$0.12	\$0.66
PET	\$33.82	\$26.64	\$2.83	\$0.74	\$0.57	\$3.03
Total	\$162.23	\$127.81	\$13.85	\$3.61	\$2.66	\$14.30

Table A.2.8 – Modelled Economic Footprint of Super Collectors and MRF's (CDS activity) under Scenario 1 – Increase Deposit Rate From 10c to 20c

	Supercollector					Tonnes "sold" by MRF's/Other	Value of sales by MRF's/Other
	Revenues (\$m)		Costs (\$m)				
	From containers through depots	Revenue from sales of material (\$m)	Labour	Other operating	Annualised infrastructure (inc CoS)		
Aluminium	\$5.86	\$6.10	\$4.67	\$4.74	\$2.56	402.2	\$4.10
Glass -currently eligible	\$3.26	\$4.09	\$2.87	\$2.91	\$1.57	1,594.1	\$8.16
Glass- wine	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	20,592.0	\$1.52
Glass - other current non-eligible	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	2,254.0	\$0.17
HDPE	\$0.27	\$0.16	\$0.17	\$0.17	\$0.09	568.9	\$0.57
LPB	\$0.57	\$0.03	\$0.23	\$0.23	\$0.13	261.8	\$0.62
PET	\$2.62	\$1.44	\$1.58	\$1.61	\$0.87	1372.0	\$5.90
Total	\$12.57	\$11.82	\$9.51	\$9.66	\$5.22	27,045	\$21.03

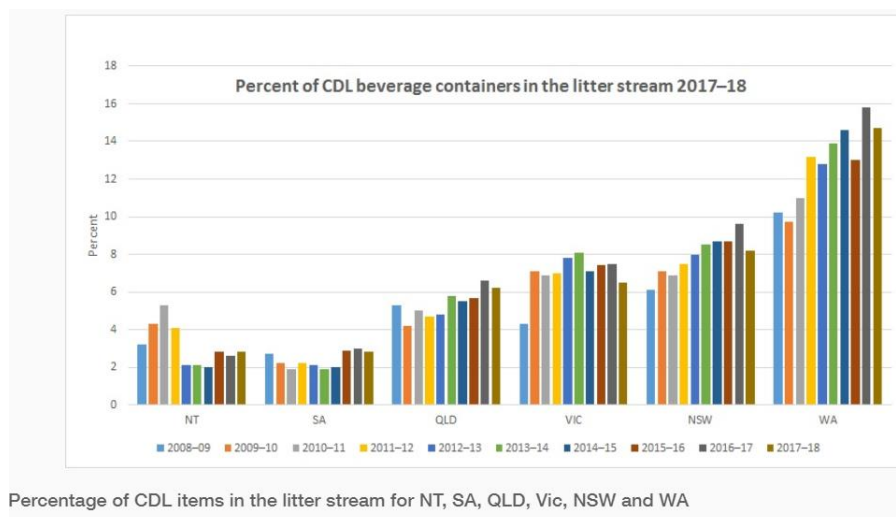
Local Government experiences reduced costs from reduced tonnages in the recycling bin. Further the amount of product going to landfill will be the difference between the tonnage of possible containers sold, the proportion returned (and sold by the Super Collectors), the tonnage sold by MRFs (including the current sales of excluded product) and in this scenario amounts to 8,308tonnes – mostly comprising glass product (and especially wine bottles). This compares to 9,316 tonnes under the current situation as modelled.

A variation on this scenario is taking this step in a coordinated way with other States and Territories that have, or will in the near future, introduce a variation of a Container Deposit Scheme. Some aspects of variations across regions are discussed above, but in summary there has been a growing momentum of state-based operated container deposit schemes. Currently all states are expected to have a state-based container deposit scheme operating within the next 2 years.

- Northern Territory introduced a container deposit scheme in 2012. A 10-cent refundable deposit is charged on all beverage containers with the exception of unflavoured milk, soy milk, cordial bottles (undiluted), concentrated fruit/vegetable juice intended to be diluted before consumption, and still or sparkling wine (in glass bottles). Unredeemed deposits remain with the producer/filler.
- The State of New South Wales adopted a 10-cent deposit scheme on December 1, 2017.
- The Queensland government introduced a container deposit scheme on November 1, 2018. A 10-cent refund is provided for empty drink containers between 150ml and 3L.
- The State of Western Australia has announced the start date of a state-based scheme commencing in 2020. The scheme will apply to certain empty drink containers ranging in size from 150ml to 3L and will exclude domestically consumed drink containers such as wine and spirit bottles, milk and juice containers. The amount of the deposit/refund will be 10 cents.

- Tasmania has announced it will have a scheme in place by 2022.
- Victoria has also announced it will have a scheme in place in 2022/23.

Return rates are based on eligible CDS containers and as a consequence there is considerable variation in the CDL base between States which means that comparisons across states (as in the following KESAB graph of CDL items in the litter stream) can be impacted by differences in what items are eligible.



There will be benefits of having greater consistency between States and Territories in the way CDS schemes are implemented, and especially with respect to the amount of the deposit. These include:

- Greater clarity and ease of explanation for consumers.
- Reduced complexity in terms of incentive to send containers across State borders to gain higher return amounts.
- Reduced transaction costs for the product suppliers in terms of label printing, general administration (approval costs for new beverages) etc.

These benefits are not expected to have major implications for the modelling in Tables A.2.3 to A.2.6 above, other than the transaction costs potentially being a little lower, which would be passed on through reduced prices. However, as above this is considered to be a minimal benefit.

Scenario 2 – 4th bin Kerbside System

The underlying assumptions for the modelling in this scenario include:

- There is investment in a dedicated glass beneficiation plant that is able to remove contamination from the 4th bin, colour and size sort and remove ceramics, stone and porcelain from the glass stream. This will require an optical sorting machine with an assumed investment cost of \$12 million.
- There are lower sorting volumes outside of this plant (i.e., other MRFs) as glass is separated from the co-mingled kerbside bin and taken to the dedicated facility.
- There will be extra costs to Local Government assumed to be the cost of additional equipment for collection, the cost of an extra collection per household per fortnight or month and the associated 4th bin MRF gate fees.

The following tables summarise the core change assumptions for this scenario along with the:

- Modelled return characteristics.
- Modelled economic footprint of Depots.
- Modelled economic footprint of Super Collectors.

Table A.2.9 shows the core drivers of changes assumed for Scenario 2. In summary:

- The provision of an extra bin, along with promotion and information about the bin access encourages households to think more about putting eligible containers into the appropriate bin and not into general waste (5% increase).
- The extra bin results in a significant increase in the glass recovery from the kerbside system but with an offsetting reduction in returns through depots. It is assumed that this applies to plastics and aluminium as well, in that where depot returns are motivated by a contribution to environmental depots rather than the pure cash value, the fourth bin will send a message that there is improved focus through the kerbside collection process.
- Depots and Super Collectors will experience reduced glass container returns direct to depots resulting in reduced economies of scale and profitability, some of which will result in small increases in the handling fee (based on the assumptions re costs savings, this is estimated to be 1%).

Table A.2.9: Core Change Assumptions for Scenario 2 - 4th bin Kerbside System

	# of eligible containers sold (million)	Returned through Kerbside	Proportion returned through depots	Depots Costs (\$m)		Supercollector Costs (\$m)	
				Labour	Other operating	Labour	Other operating
Aluminium	-0.01%	5%	-2%	1.0%	1.0%	1.0%	1.0%
Glass -currently eligible	-0.01%	5%	-2%	1.0%	1.0%	1.0%	1.0%
Glass- wine bottles	0.00%	5%	0%	1.0%	1.0%	1.0%	1.0%
Glass - other current non-eligible	0.00%	5%	0%	1.0%	1.0%	1.0%	1.0%
HDPE	-0.01%	5%	-2%	1.0%	1.0%	1.0%	1.0%
LPB	-0.01%	5%	-2%	1.0%	1.0%	1.0%	1.0%
PET	-0.01%	5%	-2%	1.0%	1.0%	1.0%	1.0%

Table A.2.10 provides the results for Scenario 2 for overall outcomes. The overall return is modelled to decrease the total return rate by 0.6%age points (from 76.7 to 76.1%). The decrease is driven by the expected (from industry feedback) diversion of containers from depot return to return through the bin system, although in the base case this assumed to be quite mild.

Table A.2.10: Modelled Return Characteristics Under Scenario 2 – 4th bin Kerbside System

	# of possible containers sold (million)	# of eligible containers sold (million)	Return Rate -		Proportion returned through depots	Total returns	
			Total	Returned through Kerbside/ Other		Containers (million)	Tonnes
Aluminium	340.2	340.2	81.0%	7.2%	73.8%	275	3,764
Glass -currently eligible	178.6	178.6	88.0%	28.3%	59.7%	157	32,332
Glass- wine	55.0	0.0	0.0%	0.0%	0.0%	0	0
Glass - other current non-eligible	7.8	0.0	0.0%	0.0%	0.0%	0	0
HDPE	71.8	20.2	62.1%	15.5%	46.6%	13	251
LPB	58.5	50.5	52.5%	13.9%	38.6%	27	482
PET	204.2	199.8	65.6%	27.1%	38.5%	131	3,542
Total	916.0	789.2	76.4%	17.6%	58.7%	603	40,371

The return rate of 0% of wine is related to the return of CDS eligible material through Depots, and while wine bottles and other currently ineligible materials are (in small numbers) returned to depots, it is not for deposit and as the calculations above relate to employment at Depots related to CDS materials and under this scenario these are not included in the above (but it should be noted that they do represent revenue to the system in the modelling through the sale of these returned bottles, which is captured in the sales of MRFs).

Table A.2.11 indicates the modelled economic footprint for Depots while A.2.12 provides the results for Super Collectors and the modelled outcomes for MRF's in terms of tonnes sold. The economic footprint for the sector remains relatively unaffected.

Table A.2.11 – Modelled Economic Footprint of Depots Under Scenario 2 – 4th bin Kerbside System

	Depots					
	Revenue (\$m)	Refunds paid	Labour	Other operating	Rates and Taxes	Annualised infrastructure (inc GoS)
Aluminium	\$42.80	\$27.55	\$6.23	\$1.62	\$1.23	\$6.17
Glass -currently eligible	\$24.40	\$15.71	\$3.74	\$0.92	\$0.69	\$3.34
Glass- wine	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Glass - other current non-eligible	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
HDPE	\$1.95	\$1.26	\$0.31	\$0.07	\$0.06	\$0.26
LPB	\$4.12	\$2.65	\$0.60	\$0.16	\$0.12	\$0.60
PET	\$20.36	\$13.10	\$2.96	\$0.77	\$0.57	\$2.95
Total	\$93.63	\$60.27	\$13.84	\$3.55	\$2.66	\$13.31

Table A.2.12 – Modelled Economic Footprint of Super Collectors and MRF's (CDS activity) under Scenario 2 – 4th bin Kerbside System

	Supercollector					Tonnes "sold" by MRF's/Other	Value of sales by MRF's/Other
	Revenues (\$m)		Costs (\$m)				
	From containers through depots	Revenue from sales of material (\$m)	Labour	Other operating	Annualised infrastructure (inc GoS)		
Aluminium	\$5.55	\$5.65	\$4.52	\$4.43	\$2.24	707.0	\$2.75
Glass -currently eligible	\$3.16	\$3.88	\$2.84	\$2.79	\$1.41	3,404.2	\$4.70
Glass- wine	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	20,592.0	\$1.52
Glass - other current non-eligible	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	2,254.0	\$0.17
HDPE	\$0.25	\$0.15	\$0.16	\$0.16	\$0.08	592.0	\$0.46
LPB	\$0.53	\$0.02	\$0.23	\$0.22	\$0.11	290.7	\$0.38
PET	\$2.64	\$1.42	\$1.64	\$1.61	\$0.81	1483.7	\$3.98
Total	\$12.13	\$11.12	\$9.39	\$9.21	\$4.65	29,324	\$13.95

There is an increase in the tonnes of recovered glass that is returned by the kerbside systems and a decrease in the eligible glass containers returned via the CDS. The recovery of high value colour sorted glass cullet is reduced as a result of the co-mingling of glass containers by consumers within the 4th bin leading to an increase in the generation of low value glass fines for recycling. In the base assumptions this is fairly small, but would be more significant if there was a greater degree of diversion (analysed in the sensitivity analysis) but this would also require further investment in processing facilities.

In addition, this scenario has a significant implication in terms of the cost of eligible beverage container collections borne by Local Government, and ultimately covered in rates paid by rate payers. It is presumed that this scenario will require one extra bin collection run per fortnight and a change in cost attributed to the processing of the 4th bin. The increased costs are discussed in the main report. The tonnage that goes to landfill in this scenario is modelled as being 9,015 tonnes (similar to the base level).

Scenario 3 - Incorporating Currently Excluded Containers

The underlying assumptions for the modelling in this scenario include:

- The estimated proportions for currently excluded containers are added into the modelling, broadly estimated as identified in the Rawtec data for HDPE and PET becoming included.
- It is assumed that there will be an economies of scale benefit from increased throughput which will result in small reductions in handling fees for both Depots and Super Collectors.

Table A.2.13 shows the core drivers of changes assumed for Scenario 3. In summary:

- The deposit creates an incentive for households to return the newly eligible containers to a depot and receive the deposit.
- The increased throughput brought about by the increased volume creates some economies of scale, and as such reduced variable cost for both Depots and Super Collectors. This results in increased operating surplus that will fund investment in equipment to manage increased flows, but it is further assumed that some will benefit consumers as a small reduction in the handling fee for both Depots and Super Collectors (3% in each case, as in Scenario 1).
- The number of newly eligible containers sold will fall based on the elasticity assumption applied for discretionary products. This is partially offset by the offsetting reduction in the handling fee, which also benefits consumers of other products.

Table A.2.13: Core Change Assumptions for Scenario 3 - Incorporating Currently Excluded Containers

	# of eligible containers sold (million)	Returned through Kerbside	Proportion returned through depots	Depots Costs (\$m)		Supercollector Costs (\$m)	
				Labour	Other operating	Labour	Other operating
Aluminium	0.02%	0%	2%	-2.5%	-2.5%	-2.5%	-2.5%
Glass -currently eligible	0.02%	0%	2%	-2.5%	-2.5%	-2.5%	-2.5%
Glass- wine bottles	-0.33%	-5%	5%	-2.5%	-2.5%	-2.5%	-2.5%
Glass - other current non-eligible	-0.17%	-5%	5%	-2.5%	-2.5%	-2.5%	-2.5%
HDPE	0.02%	0%	5%	-2.5%	-2.5%	-2.5%	-2.5%
LPB	0.02%	0%	5%	-2.5%	-2.5%	-2.5%	-2.5%
PET	0.02%	0%	5%	-2.5%	-2.5%	-2.5%	-2.5%

Table A.2.14 provides the results for Scenario 3 for overall outcomes. The overall return is modelled to increase by 1.5%age points, but this is over a much broader base of product, and as such there is a 17.1% modelled increased in total container return (and significantly greater weight increase).

**Table A.2.14: Modelled Return Characteristics under Scenario 3 –
Incorporating Currently Excluded Containers**

	# of possible containers sold (million)	# of eligible containers sold (million)	Return Rate - Total	Returned through Kerbside/ Other	Proportion returned through depots	Total returns	
						Containers (million)	Tonnes
Aluminium	340.3	340.3	83.7%	6.8%	76.8%	285	3,889
Glass -currently eligible	178.6	178.6	89.1%	27.0%	62.1%	159	32,739
Glass- wine	54.8	54.8	80.2%	25.6%	54.5%	44	21,090
Glass - other current non-eligible	7.8	7.8	80.2%	24.3%	55.8%	6	1,812
HDPE	71.8	71.8	64.7%	14.8%	49.9%	46	929
LPB	58.5	58.5	54.6%	13.3%	41.3%	32	581
PET	204.3	204.3	67.1%	25.8%	41.3%	137	3,703
Total	916.1	916.1	77.4%	17.3%	60.1%	709	64,743

Table A.2.15 indicates the modelled economic footprint for Depots while A.2.16 provides the results for Super Collectors and the modelled outcomes for MRF's in terms of tonnes sold. The economic footprint for the sector grows with the increase in return rate.

**Table A.2.15 – Modelled Economic Footprint of Depots under Scenario 3 –
Incorporating Currently Excluded Containers**

	Depots					
	Revenue (\$m)	Refunds paid	Labour	Other operating	Rates and Taxes	Annualised infrastructure (inc GoS)
Aluminium	\$43.93	\$28.47	\$6.21	\$1.57	\$1.23	\$6.45
Glass -currently eligible	\$24.54	\$15.91	\$3.47	\$0.89	\$0.69	\$3.58
Glass- wine	\$6.78	\$4.39	\$2.45	\$0.70	\$0.00	-\$0.76
Glass - other current non-eligible	\$0.96	\$0.62	\$0.35	\$0.66	\$0.00	-\$0.67
HDPE	\$7.17	\$4.64	\$0.91	\$0.24	\$0.06	\$1.32
LPB	\$4.93	\$3.19	\$0.70	\$0.18	\$0.12	\$0.74
PET	\$21.14	\$13.70	\$2.69	\$0.70	\$0.57	\$3.48
Total	\$109.45	\$70.93	\$16.78	\$4.94	\$2.66	\$14.13

Table A.2.16 – Modelled Economic Footprint of Super Collectors and MRF's (CDS activity) under Scenario 3 – Incorporating Currently Excluded Containers

	Supercollector					Tonnes "sold" by MRF's/Other	Value of sales by MRF's/Other
	Revenues (\$m)		Costs (\$m)				
	From containers through depots	Revenue from sales of material (\$m)	Labour	Other operating	Annualised infrastructure (inc CoS)		
Aluminium	\$5.62	\$5.83	\$4.47	\$4.54	\$2.45	607.8	\$2.49
Glass -currently eligible	\$3.14	\$3.93	\$2.76	\$2.80	\$1.51	3,097.5	\$4.48
Glass- wine	\$0.87	\$2.53	\$1.33	\$1.35	\$0.73	4,073.7	\$1.37
Glass - other current non-eligible	\$0.12	\$0.22	\$0.13	\$0.14	\$0.07	446.6	\$0.18
HDPE	\$0.92	\$0.56	\$0.58	\$0.58	\$0.32	253.3	\$0.75
LPB	\$0.63	\$0.03	\$0.26	\$0.26	\$0.14	241.6	\$0.43
PET	\$2.71	\$1.48	\$1.63	\$1.66	\$0.90	1363.8	\$3.76
Total	\$14.01	\$14.58	\$11.15	\$11.32	\$6.12	10,084	\$13.46

There is a significant reduction in the product sold by MRF's as they now return the currently non-eligible product to depots, and therefore the product is sold by Super Collectors. There are benefits in terms of lower Local Government costs and diversion of product from general waste and/or being contaminated, increasing recovery and value. The modelling produces a significant decrease in the amount of underlying product going to landfill – falling from 9,317 to less than half that amount at 3,802 tonnes, with a value of \$1.00 million.

As well as these modelled changes, this scenario has some further implications in terms of costs for beverage suppliers being the additional transaction costs for the approval system, and additional costs in the regulatory process. As discussed under the summary of the Hudson Howells 2013 review, these costs include:

- An increase for the currently non-eligible containers of between 2¢ and 5¢ per container in labelling and administration.
- A once off fee of \$26,500 for additional labelling application fees.

These costs have been included in the cost benefit evaluation using assumptions discussed in the main report. These are transactional costs associated with moving to the new system, and after that would be relatively marginal.

Scenario 4 - Single Scheme Coordinator

The underlying assumptions for the modelling in this scenario include:

- Assumed to be reduced costs for Depots and Super Collectors due to efficiencies, which lead to small decreases in handling fees. The cost benefits in this scenario are assumed to be primarily focussed on Super Collectors due the economies of scale they will achieve, but Depots are assumed to have reduced negotiation and administration costs as well. Again, the major benefit this generates is the assumption that the lower costs will be passed on due to competitive forces and is assumed to lead to reduced handling fees (2% for Depots and 2% for Super Collectors).
- It is assumed that the extra effort on marketing leads to higher return rates through Depots (replacing depositing in general waste).

Table A.2.17: Core Change Assumptions for Scenario 4 - Single Scheme Coordinator

	# of eligible containers sold (million)	Returned through Kerbside	Proportion returned through depots	Depots Costs (\$m)		Supercollector Costs (\$m)	
				Labour	Other operating	Labour	Other operating
Aluminium	0.04%	0%	3%	-5%	-5%	-5%	-7.5%
Glass -currently eligible	0.04%	0%	3%	-5%	-5%	-5%	-7.5%
Glass- wine bottles	0.00%	0%	3%	-5%	-5%	-5%	-7.5%
Glass - other current non-eligible	0.00%	0%	3%	-5%	-5%	-5%	-7.5%
HDPE	0.04%	0%	3%	-5%	-5%	-5%	-7.5%
LPB	0.04%	0%	3%	-5%	-5%	-5%	-7.5%
PET	0.04%	0%	3%	-5%	-5%	-5%	-7.5%

Table A.2.18 provides the results for Scenario 4 for overall outcomes. The overall return is modelled to increase by 2.0%age points driven primarily by improved marketing efforts generated though the new relationships.

Table A.2.18: Modelled Return Characteristics under Scenario 4 - Single Scheme Coordinator

	# of possible containers sold (million)	# of eligible containers sold (million)	Return Rate -		Proportion returned through depots	Total returns	
			Total	Returned through Kerbside/ Other		Containers (million)	Tonnes
Aluminium	340.4	340.4	84.4%	6.8%	77.6%	287	3,925
Glass -currently eligible	178.6	178.6	89.7%	27.0%	62.7%	160	32,972
Glass- wine	55.0	0.0	0.0%	0.0%	0.0%	0	0
Glass - other current non-eligible	7.8	0.0	0.0%	0.0%	0.0%	0	0
HDPE	71.8	20.2	63.8%	14.8%	49.0%	13	258
LPB	58.5	50.5	53.8%	13.3%	40.5%	27	494
PET	204.4	199.9	66.3%	25.8%	40.5%	132	3,580
Total	916.5	789.6	78.5%	16.8%	61.7%	620	41,229

Table A.2.19 indicates the modelled economic footprint for Depots while A.2.20 provides the results for Super Collectors and the modelled outcomes for MRF's in terms of tonnes sold. The economic footprint for the sector grows with the increase in return rate.

Table A.2.19 – Modelled Economic Footprint of Depots under Scenario 4 - Single Scheme

	Coordinator					
	Revenue (\$m)	Refunds paid	Labour	Other operating	Rates and Taxes	Annualised infrastructure (inc GoS)
Aluminium	\$44.02	\$28.73	\$6.11	\$1.59	\$1.23	\$6.36
Glass -currently eligible	\$24.54	\$16.02	\$3.52	\$0.89	\$0.69	\$3.43
Glass- wine	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Glass - other current non-eligible	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
HDPE	\$1.98	\$1.29	\$0.29	\$0.07	\$0.06	\$0.27
LPB	\$4.17	\$2.72	\$0.58	\$0.15	\$0.12	\$0.60
PET	\$20.29	\$13.25	\$2.82	\$0.73	\$0.57	\$2.93
Total	\$95.00	\$62.00	\$13.32	\$3.43	\$2.66	\$13.58

Table A.2.20 – Modelled Economic Footprint of Super Collectors and MRF's (CDS activity) under

Scenario 4 –

Single Scheme Coordinator

	Supercollector						Tonnes "sold" by MRF's	Value of sales by MRF's (\$m)
	Revenues (\$m)		Costs (\$m)					
	From containers through depots	Revenue from sales of material (\$m)	Labour	Other operating	Annualised infrastructure (inc GoS)			
Aluminium	\$5.51	\$5.89	\$4.33	\$4.51	\$2.55	579.9	\$2.60	
Glass -currently eligible	\$3.07	\$3.96	\$2.67	\$2.78	\$1.57	2,926.0	\$4.54	
Glass- wine	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	20,592.0	\$1.52	
Glass - other current non-eligible	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	2,254.0	\$0.17	
HDPE	\$0.25	\$0.15	\$0.15	\$0.16	\$0.09	589.0	\$0.45	
LPB	\$0.52	\$0.02	\$0.21	\$0.22	\$0.12	284.8	\$0.37	
PET	\$2.54	\$1.43	\$1.51	\$1.57	\$0.89	1457.1	\$3.84	
Total	\$11.90	\$11.46	\$8.87	\$9.25	\$5.23	28,683	\$13.48	

The major benefit of this scheme is that it makes the operations more efficient, and this is passed on throughout the system – both to consumers and product users.

Scenario 5 - Improved Dispute Resolution

The underlying assumptions for the modelling in this scenario include:

- There are assumed to be reduced costs for Depots and Super Collectors due to reduced time lost in resolving disputes, which lead to small decreases in handling fees. The cost reduction can be achieved in multiple ways – including a shift to repayment by count and not weight, by use of technology and by improved operating mechanisms. It is assumed that Depots in particular benefit in this context, and for both it is passed on in reduced handling fees (6% for Depots and 3% for Super Collectors).

Table A.2.21: Core Change Assumptions for Scenario 5 - Improved Dispute Resolution

	# of eligible containers sold (million)	Returned through Kerbside	Proportion returned through depots	Depots Costs (\$m)		Supercollector Costs (\$m)	
				Labour	Other operating	Labour	Other operating
Aluminium	0.04%	0%	1%	-5%	-5%	-5%	-5%
Glass -currently eligible	0.04%	0%	1%	-5%	-5%	-5%	-5%
Glass- wine bottles	0.00%	0%	1%	-5%	-5%	-5%	-5%
Glass - other current non-eligible	0.00%	0%	1%	-5%	-5%	-5%	-5%
HDPE	0.04%	0%	1%	-5%	-5%	-5%	-5%
LPB	0.04%	0%	1%	-5%	-5%	-5%	-5%
PET	0.04%	0%	1%	-5%	-5%	-5%	-5%

Table A.2.22 provides the results for the scenario for overall outcomes. There are minimal changes to the return rates, with the major benefits being at the customer level due to slight reductions in the price of product.

Table A.2.22: Modelled Return Characteristics under Scenario 5 - Improved Dispute Resolution

	# of possible containers sold (million)	# of eligible containers sold (million)	Return Rate - Total	Returned through Kerbside/ Other	Proportion returned through depots	Total returns	
						Containers (million)	Tonnes
Aluminium	340.3	340.3	82.9%	6.8%	76.1%	282	3,855
Glass -currently eligible	178.6	178.6	88.4%	27.0%	61.5%	158	32,523
Glass- wine	55.0	0.0	0.0%	0.0%	0.0%	0	0
Glass - other current non-eligible	7.8	0.0	0.0%	0.0%	0.0%	0	0
HDPE	71.8	20.2	62.8%	14.8%	48.0%	13	254
LPB	58.5	50.5	53.0%	13.3%	39.7%	27	487
PET	204.3	199.9	65.5%	25.8%	39.7%	131	3,537
Total	916.5	789.6	77.3%	16.8%	60.5%	611	40,657

Table A.2.23 indicates the modelled economic footprint for Depots while A.2.24 provides the results for Super Collectors and the modelled outcomes for MRF's in terms of tonnes sold. The economic footprint is slightly smaller in this scenario due to the increased efficiencies in the system.

**Table A.2.23 – Modelled Economic Footprint of Depots Under Scenario 5 –
Improved Dispute Resolution**

	Depots					
	Revenue (\$m)	Refunds paid	Labour	Other operating	Rates and Taxes	Annualised infrastructure (inc GoS)
Aluminium	\$43.23	\$28.22	\$6.00	\$1.56	\$1.23	\$6.22
Glass -currently eligible	\$24.21	\$15.80	\$3.52	\$0.88	\$0.69	\$3.32
Glass- wine	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Glass - other current non-eligible	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
HDPE	\$1.95	\$1.27	\$0.29	\$0.07	\$0.06	\$0.26
LPB	\$4.10	\$2.68	\$0.57	\$0.15	\$0.12	\$0.59
PET	\$20.05	\$13.09	\$2.78	\$0.72	\$0.57	\$2.88
Total	\$93.54	\$61.05	\$13.17	\$3.38	\$2.66	\$13.28

**Table A.2.24 – Modelled Economic Footprint of Super Collectors and MRF's (CDS activity) under
Scenario 5 –
Improved Dispute Resolution**

	Supercollector					Tonnes "sold" by MRF's	Value of sales by MRF's (\$m)
	Revenues (\$m)		Costs (\$m)				
	From containers through depots	Revenue from sales of material (\$m)	Labour	Other operating	Annualised infrastructure (inc GoS)		
Aluminium	\$5.46	\$5.78	\$4.27	\$4.45	\$2.52	636.0	\$2.62
Glass -currently eligible	\$3.06	\$3.90	\$2.64	\$2.76	\$1.56	3,270.6	\$4.50
Glass- wine	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	20,592.0	\$1.52
Glass - other current non-eligible	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	2,254.0	\$0.17
HDPE	\$0.25	\$0.15	\$0.15	\$0.16	\$0.09	590.9	\$0.45
LPB	\$0.52	\$0.02	\$0.21	\$0.21	\$0.12	288.5	\$0.37
PET	\$2.53	\$1.41	\$1.50	\$1.56	\$0.88	1488.9	\$3.81
Total	\$11.81	\$11.28	\$8.77	\$9.14	\$5.17	29,121	\$13.44

Scenario 6 - Enable Depot Owners to Contract with a Single Super Collector

The underlying assumptions for the modelling in this scenario are similar to the scenario of moving to a single Super Collector. It is assumed that Depots can achieve slightly greater cost savings than in Scenario 4, but there will be slightly fewer cost savings for Super Collectors who will not achieve the same economies of scale, and this will be passed on to handling fees proportionally. Again, it is assumed here that there is a slight increase in return rates as the competitive arrangements are likely to lead to more promotion and marketing in support of the program – but not as much as in Scenario 4.

Table A.2.25: Core Change Assumptions for Scenario 6 - Enable Depot Owners to Contract with a Single Super Collector

	# of eligible containers sold (million)	Returned through Kerbside	Proportion returned through depots	Depots Costs (\$m)		Supercollector Costs (\$m)	
				Labour	Other operating	Labour	Other operating
Aluminium	0.04%	0%	3%	-6%	-6%	-4%	-4%
Glass -currently eligible	0.04%	0%	3%	-6%	-6%	-4%	-4%
Glass- wine bottles	0.00%	0%	3%	-6%	-6%	-4%	-4%
Glass - other current non-eligible	0.00%	0%	3%	-6%	-6%	-4%	-4%
HDPE	0.04%	0%	3%	-6%	-6%	-4%	-4%
LPB	0.04%	0%	3%	-6%	-6%	-4%	-4%
PET	0.04%	0%	3%	-6%	-6%	-4%	-4%

Table A.2.26 provides the results for core outcomes. There is a slight increase in return rates overall.

Table A.2.26: Modelled Return Characteristics under Scenario 6 - Enable Depot Owners to Contract with a Single Super Collector

	# of possible containers sold (million)	# of eligible containers sold (million)	Return Rate -		Proportion returned through depots	Total returns	
			Total	Returned through Kerbside/ Other		Containers (million)	Tonnes
Aluminium	340.4	340.4	84.0%	6.8%	77.2%	286	3,908
Glass -currently eligible	178.6	178.6	89.4%	27.0%	62.4%	160	32,860
Glass- wine	55.0	0.0	0.0%	0.0%	0.0%	0	0
Glass - other current non-eligible	7.8	0.0	0.0%	0.0%	0.0%	0	0
HDPE	71.8	20.2	63.5%	14.8%	48.7%	13	257
LPB	58.5	50.5	53.6%	13.3%	40.3%	27	493
PET	204.4	199.9	66.1%	25.8%	40.3%	132	3,569
Total	916.5	789.6	78.2%	16.8%	61.4%	618	41,087

Table A.2.27 indicates the modelled economic footprint for Depots while A.2.28 provides the results for Super Collectors and the modelled outcomes for MRF's in terms of tonnes sold. The economic footprint for the sector grows with the increase in return rate.

Table A.2.27 – Modelled Economic Footprint of Depots under Scenario 6 - Enable Depot Owners to Contract with a Single Super Collector

	Depots					
	Revenue (\$m)	Refunds paid	Labour	Other operating	Rates and Taxes	Annualised infrastructure (inc GoS)
Aluminium	\$43.72	\$28.60	\$6.02	\$1.57	\$1.23	\$6.30
Glass -currently eligible	\$24.40	\$15.96	\$3.48	\$0.87	\$0.69	\$3.39
Glass- wine	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Glass - other current non-eligible	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
HDPE	\$1.96	\$1.28	\$0.29	\$0.07	\$0.06	\$0.27
LPB	\$4.14	\$2.71	\$0.57	\$0.15	\$0.12	\$0.60
PET	\$20.19	\$13.21	\$2.78	\$0.72	\$0.57	\$2.91
Total	\$94.41	\$61.77	\$13.14	\$3.38	\$2.66	\$13.46

Table A.2.28 – Modelled Economic Footprint of Super Collectors and MRF's (CDS activity) under Scenario 6 – Enable Depot Owners to Contract with a Single Super Collector

	Supercollector					Tonnes "sold" by MRF's	Value of sales by MRF's (\$m)
	Revenues (\$m)		Costs (\$m)				
	From containers through depots	Revenue from sales of material (\$m)	Labour	Other operating	Annualised infrastructure (inc GoS)		
Aluminium	\$5.57	\$5.86	\$4.39	\$4.53	\$2.52	594.0	\$2.60
Glass -currently eligible	\$3.11	\$3.94	\$2.71	\$2.79	\$1.55	3,012.2	\$4.53
Glass- wine	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	20,592.0	\$1.52
Glass - other current non-eligible	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	2,254.0	\$0.17
HDPE	\$0.25	\$0.15	\$0.16	\$0.16	\$0.09	589.5	\$0.45
LPB	\$0.53	\$0.02	\$0.21	\$0.22	\$0.12	285.7	\$0.37
PET	\$2.57	\$1.43	\$1.54	\$1.58	\$0.88	1465.1	\$3.84
Total	\$12.03	\$11.41	\$9.00	\$9.28	\$5.16	28,792	\$13.47

Scenario 7 - Additional Return Points

This represents a somewhat different scenario relative to the others, as it is a scenario that requires some further investment by the depot operators (whereas investment in other scenarios is by government, MRF's or by processors). There are many ways in which this could occur, and the scenario brief does not define them such as:

- Current depot operators could set up new depots or automated collection points in new locations.
- Current depot operators could employ automated collection points in current locations to increase customer convenience and accessibility.

- New depots could be opened by new operators.
- Independent/new operators could set up automated collection points and take returns to Depots.

The major benefit of this is that end consumers will face reduced travel and time costs in returning containers – reducing the opportunity cost involved – and this should result in a significant increase in return rates through Depots.

However, offsetting this is that there are extra costs in setting up the extra return points. While market forces will push towards the most effective solution, for the modelling it is assumed that Depots will face extra costs of introducing return points, leading to a small increase in the handling fee. This has partly been included as extra operating costs, and allowing for higher gross operating surplus – as the new return points are likely to be more capital intensive, but a financing charge on an assumed \$20 million investment is also included in this scenario. This will be facilitated by an assumed increase in the handling fee to provide additional funds to finance the expansion. Table A.2.29 reflects the major change assumptions to reflect this.

Table A.2.29: Core Change Assumptions for Scenario 7 - Additional Return Points

	# of eligible containers sold (million)	Returned through Kerbside	Proportion returned through depots	Depots Costs (\$m)		Supercollector Costs (\$m)	
				Labour	Other operating	Labour	Other operating
Aluminium	-0.08%	-3%	5%	0%	20%	0%	0%
Glass -currently eligible	-0.08%	-3%	5%	0%	20%	0%	0%
Glass- wine bottles	0.00%	-3%	5%	0%	20%	0%	0%
Glass - other current non-eligible	0.00%	-3%	5%	0%	20%	0%	0%
HDPE	-0.08%	-3%	5%	0%	20%	0%	0%
LPB	-0.08%	-3%	5%	0%	20%	0%	0%
PET	-0.08%	-3%	5%	0%	20%	0%	0%

Table A.2.30: Modelled Return Characteristics Under Scenario 7 - Additional Return Points

	# of possible containers sold (million)	# of eligible containers sold (million)	Return Rate - Total	Returned through Kerbside/ Other	Proportion returned through depots	Total returns	
						Containers (million)	Tonnes
Aluminium	339.9	339.9	85.7%	6.6%	79.1%	291	3,982
Glass -currently eligible	178.4	178.4	90.2%	26.3%	63.9%	161	33,131
Glass- wine	55.0	0.0	0.0%	0.0%	0.0%	0	0
Glass - other current non-eligible	7.8	0.0	0.0%	0.0%	0.0%	0	0
HDPE	71.7	20.2	64.3%	14.4%	49.9%	13	260
LPB	58.5	50.5	54.2%	12.9%	41.3%	27	498
PET	204.1	199.6	66.4%	25.2%	41.3%	133	3,583
Total	915.5	788.7	79.3%	16.4%	62.9%	625	41,455

Table A.2.31 – Modelled Economic Footprint of Depots under Scenario 7 - Additional Return Points

	Depots					
	Revenue (\$m)	Refunds paid	Labour	Other operating	Rates and Taxes	Annualised infrastructure (inc GoS)
Aluminium	\$46.54	\$29.15	\$6.52	\$2.04	\$1.23	\$7.60
Glass -currently eligible	\$25.70	\$16.10	\$3.71	\$1.13	\$0.69	\$4.08
Glass- wine	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Glass - other current non-eligible	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
HDPE	\$2.08	\$1.30	\$0.31	\$0.09	\$0.06	\$0.32
LPB	\$4.37	\$2.74	\$0.61	\$0.19	\$0.12	\$0.71
PET	\$21.17	\$13.26	\$2.97	\$0.93	\$0.57	\$3.44
Total	\$99.86	\$62.54	\$14.12	\$4.38	\$2.66	\$16.16

Table A.2.32 – Modelled Economic Footprint of Super Collectors and MRF's (CDS activity) under Scenario 7 –**Additional Return Points**

	Supercollector					Tonnes "sold" by MRF's	Value of sales by MRF's (\$m)
	Revenues (\$m)		Costs (\$m)				
	From containers through depots	Revenue from sales of material (\$m)	Labour	Other operating	Annualised infrastructure (inc GoS)		
Aluminium	\$5.83	\$5.97	\$4.72	\$4.67	\$2.41	529.6	\$2.52
Glass -currently eligible	\$3.22	\$3.98	\$2.88	\$2.85	\$1.47	2,768.8	\$4.44
Glass- wine	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	20,592.0	\$1.52
Glass - other current non-eligible	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	2,254.0	\$0.17
HDPE	\$0.26	\$0.16	\$0.17	\$0.16	\$0.08	587.1	\$0.45
LPB	\$0.55	\$0.02	\$0.23	\$0.23	\$0.12	282.4	\$0.36
PET	\$2.65	\$1.43	\$1.63	\$1.62	\$0.83	1449.7	\$3.76
Total	\$12.51	\$11.56	\$9.63	\$9.53	\$4.91	28,464	\$13.21

Additional assumptions for consolidated outcomes assessment

Core Outcomes

Tables 5.1 and 5.4 in the main report provide a summary of the core outcomes across all of the scenarios. To convert the economic footprint modelling above to include some additional aspects relating to outcomes the following additional assumption are used:

- The value that processors will pay for recovered material is based on the level of segregation and the characteristics of the recovered resources. As noted throughout the report, one of the core advantages of the CDS direct return system is that it results in high value recovered materials due to low levels of contamination and high levels of segregation by material type achieving recycling market specifications. The assumed values for depot collected or high value recycling materials is indicated in Table A.2.33. The value of material potentially eligible for inclusion in the CDS scheme as modelled for the current situation and the scenarios is valued at the higher value, as this is the potential that could be reached (i.e. it represents the maximum opportunity cost of the materials being lost). The value achieved with respect to collection through the kerbside recycling bin is based on the proportion that is returned for deposit, relative to the proportion that is disposed of for civil uses or landfill (at \$0 value, but incurring a cost of disposal for the MRF).

Table A.2.33 – Indicative Value of Recycling Material per Tonne

	Depot collected	Other
Aluminium	\$1,500	\$500
Glass -currently eligible	\$120	\$14
Glass- wine	\$120	\$14
Glass - other current non-eligible	\$120	\$14
HDPE	\$600	\$200
LPB	\$50	\$17
PET	\$400	\$133

- The cost of using landfill to dispose of waste is assumed to be made up of the waste disposal fee at \$184 per tonne - calculated from 77.6% of South Australians living in greater metropolitan Adelaide (**where the gate fee is of the order of \$200 per tonne**), and the balance in non-metropolitan areas (**where the gate fee is \$130 per tonne**). In addition, it is assumed there is an equal additional amount to reflect transport, administration costs and waste disposal on costs.

Economic Impact

The economic impact of the scenarios relates to the employment outcomes and wages value added generated. It needs to be noted that this excludes a lot of informal activity that is linked to the operations of the scheme – in particular it excludes the value of time (and travel costs) incurred by consumers. Therefore, the economic impact is only a partial reflection of the level of activity. In order to present the economic impact of the system beyond the footprints for Depots and Super Collectors as described above the following assumptions are used:

- The local government savings as estimated in Table 5.1 are based on the relationships in footnotes 3 and 10. The ratio of employment to turnover for the waste collection sector, and the gross operating surplus ratio is calculated from the State Input Output Table to estimate employment, wage and gross operating surplus changes. The induced multiplier for the sector is applied to calculate the flowthrough or whole of economy impacts.
- The impact on revenue of product suppliers is calculated using the elasticity and price assumptions described above, and using the ratios of employment, gross operating surplus to turnover for the food and beverage manufacturing and wholesale trade sectors from the input output table as above.
- The impact on revenue of MRFs/waste contractors is calculated using the estimates of CDS container throughput as modelled under the above (assuming a margin of 30% being kept to operate the MRF and the remainder being passed back to local government) and the tonnages sold based on the calculations under the scenarios, and using the ratios of employment, gross operating surplus to turnover for the waste collection and management sector from the input output table as above.
- The impact on revenue for process opportunities in the current footprint is based on the tonnages coming through CDS avenues and other as in the modelling above, and is priced based on the source of the recycled material as in Table A.2.33. The current sales avenues are assumed to be as in Table A.2.34 – based on the flows as indicated in the CDS Data Gaps Analysis report, but also considering the development of new opportunities as discussed above. The purchased input is assumed to be 10% of the total value of production (in the processor and in end user of the reprocessed product, through lower prices). The calculation of employment, wages, gross operating surplus and induced impacts is based on the ratios and induced flow though impacts for the glass and polymer manufacturing sectors in the input output table.

Table A.2.34 – Indicative disposal of recycling material – 2019/20

	Disposal by tonne			
	Local Reprocessing	Inter state for Reprocessing	Export	Stock piled
Aluminium	0%	0%	100%	0%
Glass -currently eligible	100%	0%	0%	0%
Glass- wine	100%	0%	0%	0%
Glass - other current non-eligible	60%	40%	0%	0%
HDPE	10%	90%	0%	0%
LPB	10%	30%	60%	0%
PET	10%	90%	0%	0%
Total	30%	22%	47%	0%

For the scenarios provided, the modelling of changes in opportunities is derived from the increased volume and value of available supply, with local industry having a supply elasticity of 1.5 – meaning that over time, processing becomes more local and less is exported.

Benefit Cost Assessment

A benefit cost assessment of the alternative policy strategies considers the value created in the various outcomes above and are presented in Tables 5.3, 5.6, 5.7, and 5.8 in the body of the main report. This is evaluated as follows:

Benefits of the Strategy:

- The reduction in resources disposed to landfill is value in an opportunity cost context, with reduced tonnages by category as outlined above being valued at the price suppliers are willing to pay for uncontaminated resources.
- Income generated from the increased return rate is the value of deposits for returned containers. As the returnee incurs costs in returning (the use of their time, transport to the depot etc) it is assumed that there is an opportunity cost of 25% of the revenue earned.
- The incomes from economic activity are the wages, and gross operating surplus as contained in Table 6.2 and 6.4.
- The value of environmental benefits is derived from the reduced tonnes going to landfill and is based on the following factors.

Table A.2.35 – Assumed conversion factors and base values for environmental outcomes

	Environmental Values			
	GHG Emissions	Energy Saved	Water Saved	Weighted value per tonne
	Emissions factor (t CO ₂ -e/t)	Conversion Factor (GJ LHV/t)	Conversion Factor (kL/t)	
Aluminium	16.667	206.667	29.333	\$2,924
Glass -currently eligible	0.528	4.444	0.931	\$66
Glass- wine	0.528	4.444	0.931	\$66
Glass - other current non-eligible	0.528	4.444	0.931	\$66
HDPE	0.825	50	22.75	\$704
LPB	0.169	0.467	11.111	\$42
PET	1.2	55	68.75	\$910

Source: Trellis Report Green Industries South Australia – Emission Factor Review (Appendix, alternative factors)

Values are derived as follows:

- GHG emissions - \$121 In 2020 the Australian carbon market current price is \$15.75 per tonne. Indicative prices vary significantly based on method and approach that is considered. Voluntary offset issuance indicates prices of less than US\$5 in 2015. (<https://carbonpricingdashboard.worldbank.org/what-carbon-pricing>). In 2019, the NY times cited the price in Australia as US \$10 per metric ton of CO₂ (falling from \$23 under the labour government cap and trade program) - <https://www.nytimes.com/interactive/2019/04/02/climate/pricing-carbon-emissions.html>. However, The Economics of Climate Change: The Stern Review indicates a higher social cost of carbon beginning at US\$25-\$30 per tonne in 2006, but possibly at US\$85 per tonne (considered relevant if there was no policy response from that point of time). We use as the base for the evaluation prices of A\$121 per tonne (calculated as a base price of \$85 US in 2006, and adjusting for US inflation over the period 2006-2020 and using the average USD/AUS exchange rate for the same period). This could be considered conservative in that some policy changes have been implemented globally (especially an investment in renewable energy), however sensitivities have been run with alternative lower and higher values.
- Energy emissions - valued in the base at around \$25 per GJ (Source: https://cdn.aigroup.com.au/Reports/2018/AiGroup_Report_Eastern_Australian_Energy_Prices_July_2018.pdf). This is valued at the 2018 median wholesale price of electricity of \$75 per MWH and converted to price per GJ. The sensitivities are run at the long term average price (\$45 per MWH), and at a price of 50% above the current price to recognise a higher social cost.

- Water emissions - valued in the base case at \$6.00 per kl (Source: <https://www.teampoly.com.au/2018/06/15/water-prices-in-australia/>). This is the current market price, doubled to reflect longer term shortage values, and is tested with sensitivities as per energy emissions.

Costs of the Strategy:

- Higher costs to consume product, leading to lost consumer surplus. The consumer surplus rate is assumed to be 25% of the increased price paid with the higher price offset by the opportunity to have a positive impact on recycling outcomes and supporting social causes.
- Changes in costs for local government – made up of kerbside service provision, bin collection and transport costs, MRF fees to process the co-mingled recyclables bin and waste bin disposal to landfill costs (discussed in the main report).
- Investment required by the CDS system not considered in the modelling as above – assumed to be \$30 million in the first few years for the incorporating eligible containers scenario annualised using a financing cost of 10% and \$20 million in the adding additional return points (also using an interest cost of 10%). The costs for the other schemes are considered to be marginal.
- Annualised costs of the product suppliers and government - assumed to average 10c per container and an interest cost of 6% (lower due to relative borrowing capacity of organisations) to provide an annualised value, and allowing for a 5% annual turnover in these currently excluded products (i.e. some new products enter, and some drop out).