Department of Environment, Parks, Heritage and the Arts

AA002192

Feasibility Study of a Container Deposit System for Tasmania

Final Report

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Glossary

ACT	Australian Capital Territory
ADF	Advance Disposal Fee
ARF	Advance Recycling Fee
b	Billion
CAD	Canadian Dollar
CDL	Container Deposit Legislation
CDS	Container Deposit System
GHG	Greenhouse Gas
CPI	Consumer Price Index
EPR	Extended Producer Responsibility
EU	European Union
m	Million
MGB	Mobile Garbage Bin
ML	Megalitres
NEPM	National Environment Protection Measure
NGO	Non-Government Organisation
NLI	National Litter Index
NSW	New South Wales
NZ	New Zealand
OECD	Organization for Economic Co-operation and Development
p.a.	Per Annum
RVM	Reverse Vending Machine
SA	South Australia
US	United States (of America)
WA	Western Australia

1 Executive Summary

Hyder Consulting was commissioned by the Tasmanian Department of Environment, Parks, Heritage and the Arts to conduct a Feasibility Study of a Container Deposit System (CDS) for Tasmania. Simple in principle, CDS involves placing a deposit on certain non-refillable beverage containers that motivates consumers to return the containers for recycling in order to have the deposit refunded. Alternatively, for consumers that forego the deposit, councils can redeem the deposit through kerbside collections and individuals can pick up littered beverage containers to return them for the deposit.

By placing a value on certain containers, CDS can result in increased beverage container recovery and decreased beverage container litter. However, considerable debate exists over the social, economic and environmental costs and benefits of introducing CDS, and the merits of doing so compared to alternative approaches. Through analysis, literature and stakeholder consultations, this project aimed to develop the most feasible CDS for Tasmania should CDS be implemented on either a State or a national basis. It was outside the scope of this project to provide legal analysis or recommend whether Tasmania should or should not pursue CDS.

With the exception of Germany, all CDS programs in existence predated comprehensive recycling and litter management programs. Germany's program was intended more as a regulatory threat than as a workable model, and its introduction produced a wide variety of unique distortions. Therefore, there is no precedent for successfully introducing CDS on top of comprehensive recycling and litter management programs.

Introduction of CDS would have some negative financial impact on kerbside recycling, although the full extent cannot be quantified at this stage. Potential for scrap values to be diverted from kerbside recycling and impact on collection and processing contracts depends on the extent to which the deposit motivates consumers to redeem the containers, convenience of redemption options and the extent to which current recycling companies establish redemption facilities. Available data shows significant variation in existing CDS programs. Some revenue value would be lost as containers are diverted to redemption centres rather than through kerbside. Financial penalties would also apply to most if not all collection and processing contracts in Tasmania, as policy changes under CDS would affect the financial modelling on which the contracts were based. It would be necessary to use unredeemed deposits to offset these impacts. It is broadly recognised that CDS introduction would result in additional net system costs, the main question is how those costs are distributed.

In order to develop a suitable model and following analysis and consultations, Hyder developed a possible 'hybrid' CDS approach designed to deliver an optimal approach for Tasmania by learning from the strengths, weaknesses and opportunities of three principal models: 'traditional' CDS as in South Australia, a Government-driven approach as in California and a not-for-profit business-driven approach as in British Columbia.

Although additional analyses and consultations would be necessary to refine specific components, analysis indicates that the most feasible CDS for Tasmania would have the following features:

- A deposit of 20¢ per designated container applied to all beverages in liquid or "ready to drink" form intended for human consumption.
- Variable Container Recycling Fees to be paid to redemption operators to address program costs not captured in the deposit amount of unredeemed deposits.
- One designated not-for-profit business responsible for implementing the CDS system to be determined following an open, competitive process and Ministerial appointment. This

organisation would be obligated to deliver optimal coverage and convenience and maximise return rates, while minimising program costs.

- Ministerial authority to modify the scope of containers and other key program parameters as necessary.
- Regulatory provisions for addressing new beverage and packaging types as they enter the market.

A broad range of legislative arrangements and their respective costs would need to be considered prior to any introduction of CDS. Chief among these are: need for national consistency to minimise likelihood of Constitutional challenges; applicability of GST; objectives the program is intended to accomplish; robust exploration of options, specifically including an option with an advance disposal/recycling fee and a glass levy; analysis of social, economic and environmental costs and benefits; and evaluation of *Trade Practice Act* and *Mutual Recognition Act* implications. It is also essential to first understand the beverage market in greater detail than is currently available and then design CDS specifics around the market. Provisions should also be instituted to ensure that redeemed containers get recycled, including funding for local secondary market development for materials problematic in Tasmania such as glass.

Modelling was undertaken to develop indicative environmental benefits and marginal benefits for aluminium and glass, using a life-cycle assessment approach. Marginal benefits are the additional benefits resulting from CDS above and beyond assumed levels of baseline recycling activity. Although marginal impacts would result from consumers returning containers to redemption depots (whether in metropolitan or rural areas), these impacts are relatively insignificant given the environmental benefits from increased recycling that result in reduced greenhouse gas emissions and energy and water savings.

Associated environmental benefits of CDS other than reduced glass litter would likely accrue in jurisdictions other than Tasmania; benefits from reduced GHG emissions are global in nature and not likely to be credited specifically to Tasmania. Results are indicative only, are assigned broadly (i.e., not allocated to specific stakeholders) and do not include financial costs to implement CDS.

Transport of recovered materials to end use markets is likely to diminish most of the environmental benefits possible under CDS for aluminium and potentially glass. While secondary market development can offset some of the transport impacts for glass, recovered aluminium and plastics would still require shipment out of Tasmania.

2 Introduction

The Tasmanian Department of Environment, Parks, Heritage and the Arts (Department) commissioned Hyder Consulting (Hyder) to conduct a Feasibility Study of a Container Deposit System (CDS) for Tasmania. The main objective of the study was to assist the Department in making informed decisions on the implementation of CDS in the State. This project did not address whether the CDS model proposed would be on a State or national basis, but was intended to apply comparably to either approach. It was outside the scope of this project to provide legal analysis or recommend whether Tasmania should or should not pursue CDS.

The study proceeded sequentially, with an initial literature review followed by stakeholder consultations and analysis to develop a best practice CDS for Tasmania, should CDS be implemented. This report flows in a similar sequence, with an overview of CDS models and program features followed by a summary of stakeholder discussions and a discussion of Hyder's views on the most feasible CDS for Tasmania. Findings from the literature review have been incorporated throughout this report.

In the past few years, CDS has become a more common reference to container deposit systems, which may be mandatory as container deposit legislation (CDL) or voluntary. The majority of literature and stakeholders consulted refer to CDL or container deposits. While this report will use 'CDS' to refer to most systems, research focuses mainly on CDL, as voluntary systems are used only in conjunction with refillable beverage container systems and these systems are no longer used in Australia. References are provided in Appendix A.

3 CDS Overview

The premise of CDS models is that by placing a deposit on eligible beverage containers, consumers are motivated to return the containers for recycling in order to have the deposit refunded. Alternatively, for consumers that forego the deposit, councils can redeem the deposit through kerbside collections and individuals can pick up littered beverage containers to return them for the deposit. CDS systems are generally regarded as an economic instrument rather than as a tax where revenues from unredeemed deposits are retained by fillers and retailers[1], although the importance of convenient container redemption has also been highlighted as important to avoid the perception as a tax[2].

Container deposit systems are an example of deposit-refund schemes, which provide a monetary incentive for consumers to return given products to collection centres for appropriate recycling or disposal[3]. Refund values can either be for all or part of the deposit paid, as part of the refund may be used to address system costs or fund litter and recycling programs[4]. Most models also charge some sort of handling fee to help cover program costs. Several CDS models are discussed below. More detail on each of the models is provided in Appendix B.

3.1 Traditional CDS

Nine US States[i] and South Australia introduced 'traditional' CDS from the early 1970s to 1983. These systems have fairly simple deposit arrangements and were introduced when non-refillables first became available and while voluntary systems for refillables were still commonly used[5]. Litter reduction was commonly cited as a reason for introduction, although various court cases showed market protection for refillables was also a primary driver for introduction[6]. In the

[i] Connecticut, Delaware, Iowa, Maine, Massachusetts, Michigan, New York, Oregon and Vermont

past decade, attempts to introduce CDS in Australia have focused more on extended producer responsibility (EPR) and product stewardship as objectives by attempting to shift physical and financial responsibility for container waste and litter management to beverage producers and consumers, rather than addressing container recycling and litter through State and local government programs funded by ratepayers[7].

Key features of these systems include[8]:

- The deposit applies mainly to carbonated drinks (beers, waters and soft drinks) except in Maine, where still drinks are included, although wine, spirits and spirit-based drinks are also commonly included in Canadian programs and in South Australia (SA)[ii].
- There is no centralised management of the deposit and minimal government involvement in tracking and reporting program details.
- Many containers are returned in-store to retailers that are allowed to accept only containers of the types and brands that they sell.
- The deposit is typically US 5¢, except in Michigan, where it is US 10¢. In SA the deposit was recently raised to A 10¢. Deposits of US 15¢ apply to most liquor in Vermont and some wines in Maine.
- Producer/wholesalers are commonly required in the original legislation to pay handling fees from US 1¢ to 3.5¢ per container to retailers or return depots. In SA, handling fees vary from A 29¢ to 45¢ per dozen units, and are incorporated into the wholesale price.
- No return targets were established for the programs and no EPR requirements apply to packaging.
- Deposit containers must be marked (although labels have been established to address individual State requirements while allowing national distribution).

An important consideration is that in each of these jurisdictions, CDS preceded comprehensive recycling and litter prevention programs[9].

3.2 More Complex US Models

California and Hawaii introduced more complicated CDS approaches that are much more government-oriented in their approaches. California adopted their approach in 1986 and has made amendments several times since. Hawaii's approach was adopted in 2002, but did not take effect until 2005, due in part to opposition from the Governor. This delay and opposition created a variety of difficulties for Hawaii's program[10].

Key features of these systems include[11]:

- Broader scope of eligible containers than traditional CDS (section 4.2).
- Deposits are tied closely to collection and recycling arrangements.
- Deposit clearing programs are operated by State authorities rather than private companies.
- Collection and logistics are handled by private companies, with some State funding available.
- Complicated processing fees, handling fees and administration.

[ii] Wine in glass containers is not included in SA.

- Funding from unredeemed deposits is used for collection and recycling of other materials in addition to beverage container materials, plus litter control, education and administrative costs.
- Kerbside recycling of packaging materials was occurring, but under early development, as the programs were implemented.

California's approach (Figure 1) requires detailed auditing and accounting, which provides highly accurate and transparent reporting.

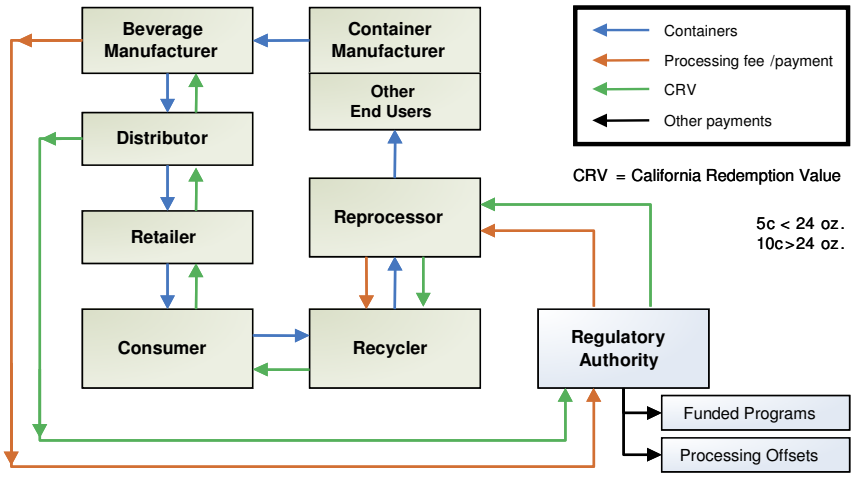

Figure 1 California Container and Financial Flows
Source: MS2 2006, updated to reflect 1 January, 2007 CRV increase

3.3 Canadian Systems

Nine of the ten Canadian provinces[iii] (all except Ontario) introduced CDS between 1970 and 1997.

Key features of these systems include[12]:

- Canadian liquor stores are predominantly government-owned, while liquor, wine and beer sales are strictly regulated.
- Three provinces (New Brunswick, Nova Scotia and Newfoundland) have "half-back" deposits, with the full deposit refunded on refillables and half of the deposit returned on non-refillables, in order to promote refillables.
- There is an emphasis on producer responsibility, with industry expected to implement CDS and bear appropriate costs to do so.

Funding arrangements vary. For example, Alberta and several other provinces impose a Container Recycling Fee to ensure each container type finances its own recovery, while Quebec does not charge a Container Recycling Fee but instead is dependent on revenues from unredeemed deposits.

In British Columbia's approach (Figure 2) an industry consortium, Encorp Pacific, is responsible for central management, and ensures that industry has reasonable flexibility in running the

[iii] Alberta, British Columbia, Manitoba, Nova Scotia, Newfoundland, New Brunswick, Prince Edward Island, Quebec and Saskatchewan.

program. In addition to the deposits, a Container Recycling Fee may be charged to help ensure the full costs of recycling each type of container are being recovered. As with California, material flows and financial flows are precisely tracked and particularly transparent[13]. Handling fees (currently C 3¢) are paid to depots in addition to deposits[14]. Given varying deposits and Container Recycling Fee values, Figure 2 is indicative only (see Appendix B for details).

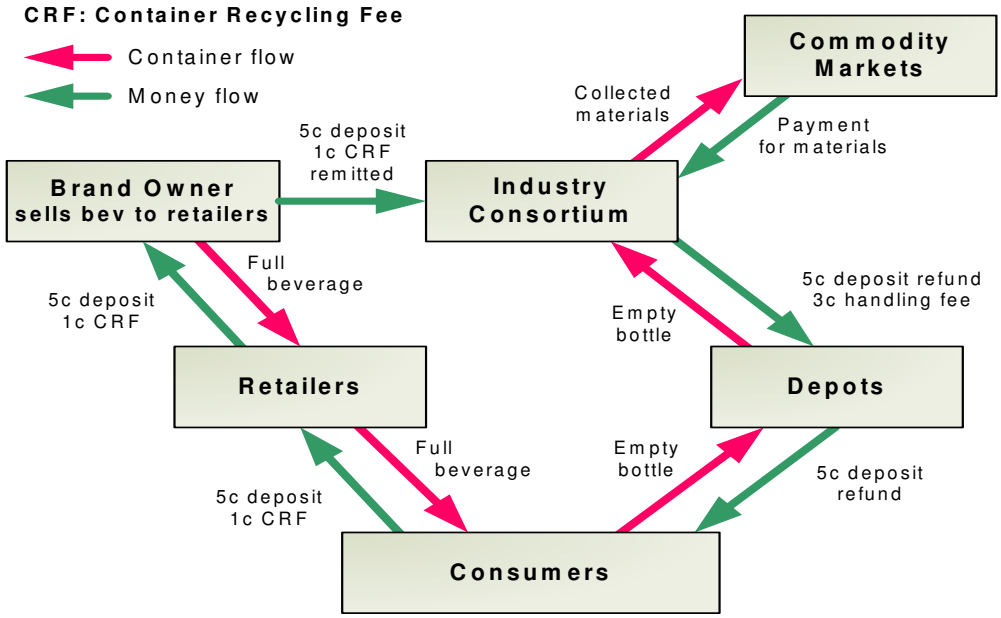

Figure 2 CDS in British Columbia
Source: MS2 2006

3.4 European CDS Models

Six European countries have mandatory deposits on non-refillable beverage containers[iv].

Key features of these systems include[15]:

- Strong preference towards refillables, although Germany encourages containers seen as "environmentally preferable" (mainly refillables). Germany used CDS as a regulatory threat to maintain a quota for refillables, while Norway and Sweden used CDS as a means of reducing beverage container waste as non-refillables were increasingly introduced to the market.
- Despite the strong policy preference towards refillables, actual operation of the European CDS models is independent of related programs in those countries such as refillable systems, EPR programs and eco-taxes.
- All European programs feature return to retail and the use of reverse vending machines (RVMs). Depots are associated with North American and South Australian, not European, programs.
- With the exception of Germany, all European CDS programs predate the implementation of comprehensive packaging recovery systems (such as the Green Dot, explained in Appendix C) for non-beverage packaging.

[iv] Denmark, Estonia, Finland, Germany, Norway and Sweden.

- The Swedish and Norwegian models are centrally managed, with private companies responsible for flows of deposits and handling fees as well as the transport and recycling of returned containers.

Germany has implemented EPR on packaging since 1991, including provisions to introduce CDS if the market share for refillables fell below established levels. The CDS introduced by Germany in 2003 contained only basic deposit obligations, not other details necessary to implement CDS effectively. German CDS resulted in a variety of distortions in part because legislators never intended that the deposit would take effect. After a successful challenge by the European Commission in the European Court of Justice, a variety of features were changed in 2006 to minimise the distortions[16].

4 Key System Features

Specifics, by jurisdiction, for the following features are in Appendix B.

4.1 Deposit Amount

Deposit amounts are the principal factor affecting recovery rates under CDS. They are usually established, and rarely increased, in enabling legislation. Deposit values are:

- US: Typically US 5¢, except in Michigan (US 10¢) (A 7¢ to 15¢). Vermont applies a US 15¢ deposit on liquor containers, with all other eligible containers having a US 5¢ deposit. Maine also applies a US 15¢ deposit on some wine containers.
- South Australia: A 10¢.
- Canada: CAD 5¢ to 20¢ (A 6¢ to 25¢), depending on beverage, container size and container material type.
- Europe: 5 to 40 eurocent (A 10¢ to 83¢).

4.2 Range and Types of Containers

Scoping of which containers are subject to CDS has a significant impact across a range of CDS-related issues, including[17]:

- Implementation costs for brand owners.
- Whether containers are redeemed through collection depots or set out for kerbside recycling.
- Impact on yield of kerbside recycling.
- Material types collected through depots.
- Need for sorting by brand.
- Volumes and revenue flows that affect viability of collection depots.
- Levels of unredeemed deposits.
- Consumer preferences and impact on market share.

CDS programs vary key provisions by beverage type and material type. In all programs examined, community awareness and education is provided on the containers covered under CDS and information is provided on where the containers may be redeemed.

In most of the traditional CDS systems, the deposit applies only to carbonated drinks (beers, waters and soft drinks, however in Maine, still drinks are also included). In European programs, containers for milk and other dairy-based drinks, juices, wines and spirits are excluded from the deposit and handled by the relevant Green Dot systems. Plain milk is exempt in Europe, SA, most US States and Canadian provinces. Fruit juices, vegetable juices and nectars are exempt from most European programs and most US States, but included in many Canadian provinces.[18]

All jurisdictions with CDS include non-refillables for beer sold through retail (mainly cans and glass, sometimes PET); water (mainly glass and PET) and carbonated soft drinks (mainly in cans, glass and PET). Most CDS programs other than those in the US have expanded their scopes to include still soft drinks such as ready-to-drink squashes, iced teas, and still fruit drinks that are not classed as juices, as these have become more dominant in beverage markets. The variety of these drinks and their wide variety of container types (including cartons and pouches) can lead to confusion and affects whether they can be redeemed through RVMs or must be returned to depots. For example, Sweden and Denmark exclude juice and milk as they are commonly supplied in cartons that are not readily handled through RVMs.

California and Hawaii include fruit juices and drinks containing dairy products that are usually excluded from European programs. Sweden excluded milk and juice for hygiene reasons (growth of mould spores) when empty containers are returned to grocery stores. This is not a significant concern for programs where containers are returned to depots or through kerbside collections.[19]

Spirits are typically only included in Canadian programs and in SA. Wine is typically only included in Canadian programs. Common reasons for excluding wine and spirits from other CDS programs include:[20]

- Less incentive to return empty containers, given relatively high retail prices.
- Generally not regarded as significant contributors to litter.
- Potentially long delays between purchase and redemption.
- Glass, the dominant container type for wine and spirits, is not included in certain CDS programs.

Most of these reasons would not apply to alcopops, and alcopops are therefore more likely to be subject to CDS.

Eligibility of containers based on beverage types can result in a variety of ‘demarcation’ issues and potential competitive distortions as the variety of beverages has expanded significantly beyond the beer and carbonated soft drinks dominant when most CDS programs were implemented. Some basic demarcation issues include carbonated soft drinks vs. still drinks, still drinks vs. juices, juices vs. milk-based drinks, carbonated water vs. still water, etc. Some programs include sports drinks and energy drinks in with carbonated soft drinks, which can result in additional demarcation issues. For example, Germany exempted drinks for special diets, which led producers of some sugar-free drinks to claim that they were suitable for diabetics, and hence exempt. Germany subsequently changed the exemption to drinks consumed “under medical supervision” [21].

California, Hawaii and Canadian programs apply deposits to a broader range of drinks and packaging types than traditional programs, in part because of a broader range of containers on the market at the time when they were implemented. These systems also subsidise kerbside collection, and the broader the scope of the deposit, the greater the revenue. A related but somewhat different characteristic is that programs with broader scopes of eligible containers tend to have lower redemption and recovery rates, due to confusion resulting from the wide

variety of product, container and packaging types and resulting recycling difficulties particularly for HDPE, PET, coloured resins and multi-layer containers. For example, California's addition in 2000 of non-alcoholic, non-carbonated containers to its law led to a sharp decline in the percentage of containers redeemed and an extensive education campaign was required to temporarily slow the decline.[22]

Glass non-refillables (mainly for beer, water and some carbonated soft drinks) are included in most CDS programs except Sweden and Norway.[23]

A 2007 report investigating best practice CDS for Western Australia (WA) recommended that CDS include the current range of CDS containers in SA as well as the additional containers covered in British Columbia, Alberta, Nova Scotia, and California, as chosen to optimise sustainability and as informed by independent economic analysis and stakeholder consultation. The report also recommended parallel recycling of deposit and non-deposit materials and the use of RVMs to expand the scope of containers.[24]

A 1997 evaluation of proposed expansion of the Massachusetts (Mass.) CDS program found that expansion to include 'new age' containers would involve roughly ten times more sorting to achieve diversion of an additional 0.5% of the waste stream. Extra costs (in 1997 US$ per ton) to achieve these results and comparison to the Vermont (Vt.) traditional CDS program are shown in Figure 3.

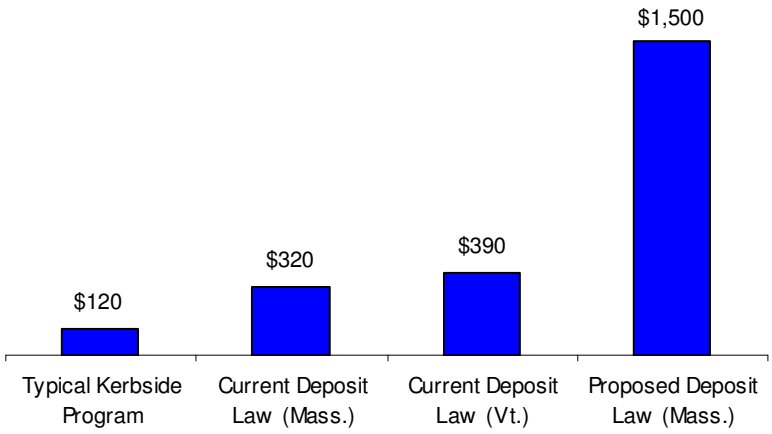

Figure 3 Comparison of US Collection and Processing Costs per Ton - Basic Kerbside, Traditional & Expanded CDS
Source: C4ES 2000 based on Northbridge 1997

4.3 Container Sorting and Transport Arrangements

For all CDS programs, the filler/importer that first places eligible drinks on the market has a legal obligation to initiate a deposit, which is charged through to the final consumer. In all CDS programs except Germany the filler/importer also pays a handling fee (sometimes called a Container Recycling Fee, as in British Columbia) per unit to retailers and depots to cover administrative and sorting costs.

European systems have industry-led centralised deposit clearing arrangements so that consumers can redeem their containers at any participating retailer. All US programs rely instead on individual operators (except California and Hawaii which have State authorities filling this role). This is likely due to the relatively low deposit amounts and the reduced need to count redeemed containers accurately due to the lack of return targets. In the US, deposit requirements are also out of line with production and distribution patterns, so clearing arrangements would likely be relatively expensive in the US.[25]

Redemption through return to point of sale (common in Europe and the US) provides high convenience and decent coverage, but tends to entail significantly higher costs. Redemption through depots (common in SA, Alberta, Nova Scotia and California) tends to be less convenient but more cost-effective. Depots also allow for larger volume returns (including from hotels, restaurants and clubs, estimated at 10-20% of depot returns in SA), offer increased convenience, potential cost savings and improved handling. RVMs can improve the efficiency of point of sale redemptions (common in Europe, California and increasingly in Hawaii). However, a number of studies have highlighted that RVMs occasionally refuse to redeem eligible containers, so alternative redemption must still be provided. A related issue is the form that can be accepted; for instance, in Hawaii flattened containers are accepted at depots but not in RVMs. Most programs involve some combination of these main redemption features.[26]

Where CDS arrangements are industry-led, this is largely seen as a demonstration of producer responsibility. However, none of the European Green Dot producer responsibility organisations run a CDS, despite some areas of overlap. This is likely due to funding from separate sources and the need to keep CDS containers distinctly separate from other packaging materials during collections.[27]

All CDS programs require that containers be kept intact until returned to a depot or scanned and crushed in an appropriate RVM in order to minimise fraud and ensure appropriate tracking. Prior littering, crushing or placement in kerbside collections results in consumers forfeiting the deposit. Some studies stress that consumers not redeeming the containers through depots or RVMs bear the cost of pollution by forgoing the value of the deposit[28], however this would not seem to address consumers that continue to use kerbside or other recycling programs.

RVMs have not been implemented in Australia apart from several demonstration machines. While some studies have highlighted relatively high implementation costs to tailor the machines to Australian conditions, recent RVM industry representations are that RVMs could provide ‘zero net system cost’ or result in a system surplus if unredeemed deposits and handling fees are used to support RVM implementation. These representatives have also flagged a potential $50 million investment in an RVM network for CDS. A ‘hub and spoke’ model of RVMs serviced by central collection points has also been proposed for Australia.[29]

Contractual arrangements for SA’s unique collection arrangements through ‘supercollectors’ result in sorting by brand, glass colour and by deposit and non-deposit containers (18-20 sorts total[30]). This results in inefficiencies and additional cost estimated at $4.1 million p.a., or $35,000 per depot.[31] Current arrangements also provide no incentive for brand owners or fillers to help increase recovery rates[32].

4.4 Container Recycling Industries and Products

‘Traditional’ CDS programs in the US and SA do not require that redeemed containers get recycled, and Germany only added this provision in 2006. Most studies that considered the issue have found that CDS programs result in ‘cleaner’ recycling streams due to the separate collection of CDS materials, especially glass. Views are however split on whether cleaner recycling streams under CDS provide significant benefits, including increased material value and improved yields. In a 2000 study for NSW, end users indicated that while recyclables would in fact be cleaner under CDS, there would be no price premium paid for such materials as material recovery facilities are designed to handle certain levels of contamination from kerbside recycling programs.[33] Ability to accommodate contamination is likely to have improved further since the study was undertaken.

A 2007 study for Queensland found it likely that where markets for recycled materials existed, kerbside recycling would have already been introduced, and that where kerbside recycling

exists, the impacts of CDS would be minimal. It is assumed that 'impacts' refers to benefits as the report notes kerbside recycling requires 'considerably less effort' than CDS[34]. Government testimony before a Parliamentary inquiry in Tasmania observed that SA actually has the lowest recycling rates in Australia for some commodities and that CDS "is of little value for waste management unless accompanied by market development to increase the demand for recycled materials, otherwise the returned materials may be landfilled"[35]. However, only California has a direct link to recycling markets, with funding from unredeemed deposits going in part to market development programs. Other CDS programs are mute on the issue.

Removal of glass from kerbside recycling should in theory reduce glass contamination and thus improve paper recycling. A 2000 study determined, however, that SA's newsprint recycling rates consistently lagged behind NSW, Victoria and the national average. Recent newsprint data from the Publishers National Environment Bureau shows that this gap has narrowed over time, with SA newsprint recycling rates generally mid-range among State recycling rates. It is therefore likely that other factors such as quality of recycling programs and proximity to end use markets are more significant contributors to paper recycling rates than the presence of CDS and the removal of glass.

In a 2009 survey of companies representing 90% of the Australian fibre recycling industry, 85% of respondents reported that glass is of no concern for paper recycling in Australia and only one fibre reprocessor, accounting for less than 6% of total industry turnover, reported problems resulting from glass contamination. The same study also found no discernible difference between states in levels of reported glass contamination and no price variation caused by glass contamination. The study noted that contamination was worse in the kitchen and hospitality sectors due to non-CDS containers for sauces, ingredients and wines.[36]

In the early 1990s, the US State of Florida repealed CDS provisions that were set to take effect due to concerns about potential impacts on the State's kerbside recycling programs and concerns that by not addressing recycling markets, CDS would simply increase the supply of recovered materials without increasing demand for those materials. Oversupply would then lower market values for recovered materials, which was already a concern for State officials. Florida replaced the deposit provisions with a market-based advance disposal fee (ADF) to create demand for recovered materials by imposing a fee of US 1-2¢ on cans, bottles, jars and beverage containers from five ounces to one gallon, then providing exemptions from the fee in order to create competitive advantages for companies that actively improved recycling markets. Material types with recycling rates greater than 50% (aluminium and steel cans) were never subject to the fee, while containers that were subject to the fee could seek exemption through demonstrated recycled content rates (25% for plastics, 30% for paper and 35% for glass) or by causing an amount equal to the recycled content targets to be removed from the Florida waste stream and recycled. The program was allowed to sunset in 1995 after two years of implementation because it had achieved its objectives.[37]

4.5 Population Catchments

32 depots are located within a 5-kilometre radius of each other in metropolitan Adelaide and these depots serve 93% of Adelaide's population. As with many Canadian and European depots, the SA depots were originally instituted to collect refillable bottles, and then ultimately transformed into CDS depots. A 2005 study for the SA Government found that given the fixed deposit amount, depot viability is largely based on geography and the depots increase consumer convenience by providing more locations where consumers can obtain refunds. The report also found that the depots were profitable under the existing arrangement, as indicated by the steady number of depots over decades[38].

Modeling for a 2000 NSW report noted that to serve the same population base per depot as SA's would require the establishment of 114 collection depots in metropolitan Sydney, with an estimated establishment cost of at least $34.2m and operations and maintenance costs of $17.1m p.a. The same report noted that 66% of the rural NSW population lived within a 20km radius of licensed Council waste facilities and that these facilities could be converted to a potential 92 depot locations. A total 493 depots would be necessary in rural NSW to have SA's coverage. However modeling showed that only 30 to 60 rural depots would be economically viable without subsidies in the form of grants or handling fees.[39]

A 2008 study provides some indicative values for population catchments in representative CDS programs[40]:

- Nova Scotia (where in-store returns are prohibited): 83 depots for 940,000 population = 1 depot per 11,325 population.
- SA: 140 depots for 1.5m population = 1 depot per 10,714 population.
- Hawaii: 99 depots (92 fixed and 7 mobile) for 1.275 million population = 1 depot per 12,879 population.

4.6 Financial Arrangements

Deposit amount has strong interaction with other key program features and system requirements. Relatively low deposits[41]:

- May not result in high return rates.
- Represent a low proportion of retail drink prices.
- Provide less incentive to redeem through depots.
- Tend to result in less distortion, as any financial impacts of CDS implementation are not as amplified when compared to identical program features coupled with a higher deposit amount.

Relatively high deposits[42]:

- Are more likely to promote container returns (in Canada 76% of the variance in recovery rates was positively correlated with deposit amounts[43]).
- Provide greater incentive for fraud, which is costly to address.
- Increase the need for a clearing arrangement to avoid individual retailers either gaining or losing significant amounts from imbalances between the amount of deposits charged and the amount refunded.
- Increase the competitive distortion with non-deposit drinks.
- Can create disincentive for producers and governments to facilitate refunds, as increased revenue is available from unredeemed deposits.
- Can foster consumer dissatisfaction if consumers feel their redemption options are being limited in order to raise revenues.

Most Australian studies have either assumed or recommended deposits in the range of 10¢ to 20¢. A report investigating CDS for NSW recommended establishing setting an initial deposit at 10¢, with Ministerial discretion to increase the deposit on certain containers[44]. A report investigating best practice CDS for WA recommended the deposit be either 10¢ or 20¢[45].

Studies have regularly reported declining recovery rates over time in CDS programs. While factors such as complacency and improvements in kerbside recycling are consistently cited, declining deposit values over time are seen as a significant factor. Most CDS programs still have their original deposit value. In 2008, SA's deposit value was raised from 5¢ to 10¢ because the container recovery rate had declined from 84% to 70%. In announcing the change, the Premier noted that the original deposit would be 32¢ in current dollar value if it had been regularly adjusted for inflation. California's Container Redemption Value was increased slightly in 2007 due to declining recovery rates.[46]

Some Canadian provinces, plus Norway, Sweden and Denmark apply different deposit amounts to different container material types and container sizes. Some of these differing amounts were established in relation to concurrent refillable programs. However, US States and Germany apply one deposit rate to all eligible containers.

Interrelated with deposit amounts, redemption rates and program costs (especially where the deposit amount is relatively high) is the issue of fraud, especially redemption of containers on which deposits have not been paid. Although these fraudulent redemptions increase container redemption rates, they also hurt program financial flows, and increase governance costs for auditing, monitoring and enforcement. For instance, when Michigan reported a 98% redemption rate in the late 1990's, audits showed that one-third of the redeemed containers were from other states, illegal redemption was costing Michigan US$16-30 million p.a. and illegal redeemers were using RVMs to redeem as many as 20,000 containers at a time for which deposits had not been paid. Maine, the most comprehensive US CDS program, has at times experienced container return rates calculated at 150% for similar reasons.[47]

It has also been noted that as containers can be redeemed for deposits until they are 'cleared' and crushed, higher deposits can require retailers to minimise fraud by staff, as staff could simply rescan returned containers[48]. Similar concerns could exist for depots. Measures to address these forms of fraud include secure storage and crushing of redeemed containers by RVMs and depots.

Given the relatively high deposits of Germany's CDS program and the identified potential for fraud, a whole new security system, including new labelling, was established in part on the belief that 'bar codes' are easy to copy if they are the only in-built security feature. The program required specially developed inks to be marked directly on eligible containers and special readers to be incorporated into RVMs.[49]

A report from the Hawaii State Auditor[50] also has some interesting lessons for Tasmania. As with Tasmania, Hawaii is an island state and therefore would have less of the fraud common with simple cross-border vehicle trips. The Hawaii Auditor consistently highlighted the need to have established policies and procedures for verifying the data and financial flows of most key stakeholders, particularly beverage distributors and depot operators. Potential for fraud was highlighted in deposits paid by distributors, handling fees paid to depots, refunds claimed by depots for payments supposedly paid to consumers and even a lack of accountability for properly crediting funds received by the State. For instance, in 15 out of 16 cases auditors claimed, and were paid for, 50 containers when in fact they only had 40. The State Auditor noted that the State could consistently be paying for nonexistent or unlabeled containers and highlighted the difficulties involved in auditing recovered material flows given stockpiling, tracking lags and the nature of recyclables as commodities.

The value of recovered materials and unredeemed deposits are commonly factored in to CDS programs to help address operational costs. However, where financial arrangements do not cover the full costs of recovering particular container or material types, handling fees ('Container Recycling Fees' in Canadian programs such as Alberta and British Columbia) may be implemented to cover remaining costs. These values are regularly reviewed. While most US

handling fees are enshrined in legislation and have not been changed since their inception, programs such as Denmark, California and British Columbia regularly revise handling fees to reflect ongoing audits of actual program costs.[51]

Linkages between handling fees and implementation/operational costs vary. In Norway, Sweden and North America, retailers are gradually compensated over time for their investments through handling fees for each returned container. Retailers with RVMs in Norway and Sweden receive slightly higher handling fees than those without RVMs. Denmark offered grants to install RVMs, but grant recipients were given lower handling fees. Danish handling fees were not available until September 2008. German retailers receive no handling fees at all.[52]

In SA, handling fees are subject to complex negotiations where the program's supercollectors yield significant influence. A review of the program found that the program's unique structure resulted in "an industry that negotiates arrangements but does not compete for business. As such, the pricing of handling fees is based on negotiations and market power, not competition. Normal industry economics do not apply.[53]„

The WA CDS inquiry recommended a container deposit and a variable resource recovery fee to be applied when recovery of certain containers is seen as uneconomical.[54]

One issue that would need to be addressed in Australia is whether council facilities are modified to include depots, as several studies have suggested, and whether such facilities are treated comparably to private facilities. It has been noted that while many council facilities in Australia are operated by private contractors, their costs under CDS would likely be borne by consumers via increased rates. This could defeat a stated aim of CDS programs to demonstrate producer responsibility by shifting recycling costs directly to the beverage industry and beverage consumers. [55] Related issues that would also need to be addressed include the extent to which contractors would be eligible to receive Container Recycling Fees or unredeemed deposits and the extent to which financial arrangements would provide incentive for contractors to offset money lost on collection contracts by setting up depots or other collection systems.

4.7 Unredeemed Deposits

Since not all containers will be returned, unredeemed deposits will always result under CDS. The allocation and use of these unredeemed deposits varies. In traditional CDS and some other models, unredeemed deposits are retained by retailers or beverage fillers to help recover program costs. These industry-led programs are generally regarded as demonstrating producer responsibility, however there is little accountability or transparency, and often uncertainty about the accuracy of redemption rates.

California and Hawaii are prime examples of the alternative, where unredeemed deposits accrue to public funds. The trade-off for the increased transparency of these programs is that implementation costs are often significantly higher.

Considerable debate on unredeemed deposits focuses around:

- Amounts and uses of resulting funds.
- Whether they should be counted as a cost, benefit or benefit transfer.
- Whether affected parties actively discourage container redemption in order to raise more revenue.
- Whether producer responsibility is still demonstrated if unredeemed deposits accrue to public funds.

The CDS inquiry for WA noted that a 'sizeable' fund from unredeemed deposits would result if CDS was introduced and supported an independent body with a representative board of directors using the funds to support resource recovery, fund social marketing and education of the program and support recycling in regional and remote communities[56].

5 Integration with other Components of the Waste Resource Management System

A key area of contention in debating the introduction of CDS in a modern context is integration with other components of the waste management system, particularly kerbside recycling.

Advocates often point to CDS programs running concurrently with kerbside recycling and highlight the potential for cleaner recovered materials under CDS to argue that CDS and kerbside recycling are complementary. However, with the exception of Germany, all CDS programs were developed and implemented prior to comprehensive recycling programs (while Hawaii had some kerbside recycling in place, the CDS was introduced because the program was immature and lagging well behind other programs). As kerbside recycling was implemented, collection and processing contracts could factor existing CDS programs into cost structures and plan accordingly.

Key questions for introducing CDS on top of comprehensive recycling include[57]:

- To what extent would consumers be motivated by the deposit to redeem containers through CDS, as opposed to forfeiting their deposits by recycling through kerbside?
- How would containers that still go through kerbside recycling programs be addressed?
- To what extent would existing public and private infrastructure be utilised?
- What would the impacts be on program yields, material value, and on CDS containers and non-CDS materials that remain in kerbside?
- Would collection efficiencies from diverted CDS containers be significant and provide cost savings?
- To what extent would collection and processing contracts be affected, and what would the costs be to renegotiate contract provisions?
- Would local government programs receive funding from unredeemed deposits to offset increased costs, or would such costs be passed along to ratepayers?

These concerns about conflicts with recycling programs caused Florida to repeal CDL provisions that were due to take effect in favour of a market-based ADF on packaging materials, with fee exemptions for recycling rates and recycled content, in the early 1990s[58].

Studies have highlighted that conflicts from CDS are likely to be less where recycling programs are non-existent or in their infancy, and where there is no 'competing' legislation addressing packaging as a whole (such as Australia's National Packaging Covenant or Green Dot programs). As program yields increase and programs are made more cost-effective, the potential conflicts from CDS introduction are higher.[59]

Overall recycling rates do not correlate with the operation of a CDS.[60] In 2008, MS2 and Perchards analysed EU recycling rates for 2005 and determined that countries with parallel systems, CDS, kerbside and bring systems for other packaging achieve lower recycling rates than comparable countries without CDS (Figure 4). Of the five EU 'deposit states', only Germany exceeded the average recycling rate in the EU-15 countries in 2005. Germany has the second highest recycling rate in Europe; however Germany's DSD/Green Dot program began in

1990 and Germany's CDS program did not begin until 2003. It seems clear that a comprehensive approach, not CDS, was responsible for Germany's high packaging recycling rates.

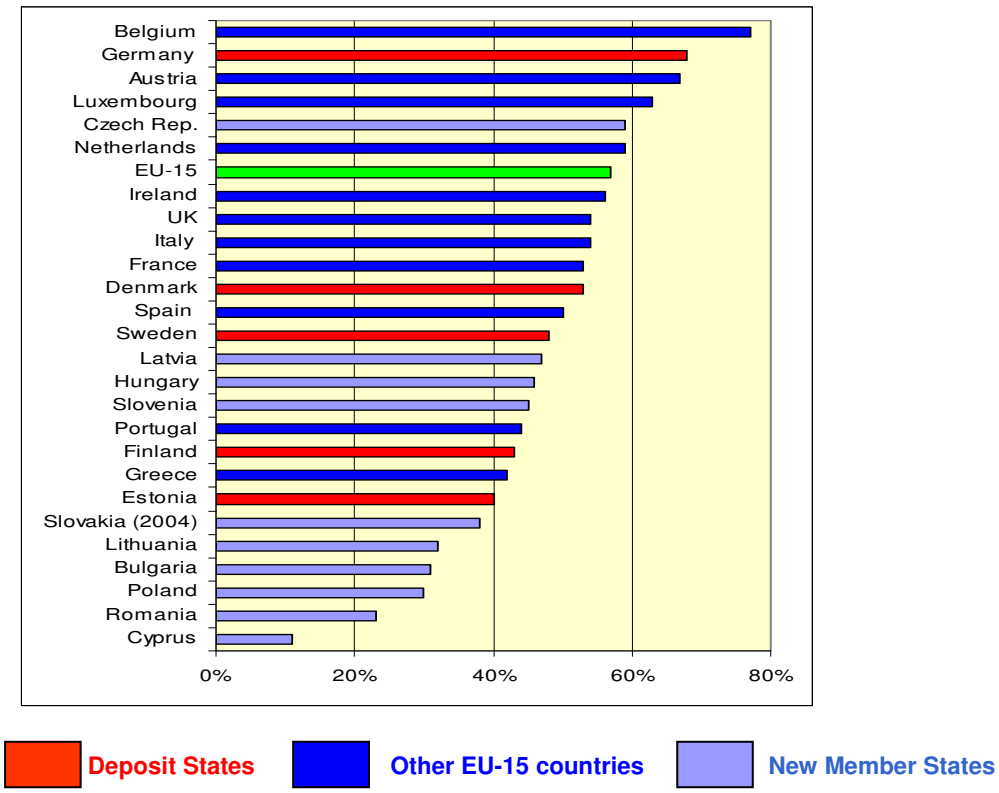

Figure 4: Container deposits and European recycling rates 2005
Source: MS2 and Perchards 2008

Debate over recycling rate comparisons highlights an important distinction between legislated CDL and CDS systems, which may be legislated or voluntary. The Boomerang Alliance disputed MS2 and Perchards' findings, arguing that some of the European countries with high recycling rates, including Austria, Luxembourg, the Czech Republic and the Netherlands indeed had deposits on beverage containers[61]. In response, Perchards reinforced that the report referred to legislated deposit systems and that voluntary CDS for refillable beverage containers was distinctly different for considering recycling rates, and was not applicable to Australia[62].

Other multi-material collection systems can also potentially be undercut by CDS introduction. For example, 20% of the German producer responsibility organisation DSD's fee income in Germany came from packaging which was ultimately diverted to CDS instead. The introduction of CDS cost DSD over €300 million in 2003. Lost DSD licensing revenues are estimated at €250 million p.a.[63] The program has also resulted in a net increase in environmental impacts and significant market distortions. To avoid the additional deposit, consumers frequently buy less expensive refillable bottles, then fail to return them. Multi-material collection costs between €320 and €770 per tonne, while combination multi-material collection and CDS systems cost between €790 and €1200 per tonne.[64]

The Institute for Sustainable Futures determined that kerbside programs could benefit from the introduction of CDS, as CDS containers represented high volume, low value materials in kerbside programs and removing those containers through CDS would improve the efficiency of kerbside recycling[65]. However, one study for Tasmania and one for Queensland reinforced that introduction of CDS on top of comprehensive recycling programs could result in significant loss

of revenue from the sale of recyclables if consumers are motivated by the deposits to take containers to depots instead of leaving the containers in their kerbside recycling programs[66].

These potential conflicts would need to be considered in evaluating alternative CDS models, along with allocation of unredeemed deposits, which could be used to help offset the conflicts and address program costs.

CDS can decrease beverage container litter, which generally accounts for 8-10% of the litter stream, but has no effect on other litter types[67]. Although in theory deposit-refund schemes such as CDS can be effective in addressing illegal disposal, they are not suited to high volume waste streams.[68]

The ability of deposit systems to provide incentives for return is debatable. For example, return rates are low for a variety of reusable agricultural and veterinary chemical containers, even though they can carry deposits of $350 or $1,000 and users can return the containers to the same stores where they purchase new supplies.[69]

6 Reported Benefits and Costs

Benefits commonly reported for CDS include[70]:

- Financial incentive for consumers to return containers.
- Increased beverage container recovery (60-80%, sometimes higher).
- Decreased beverage container litter.
- Increased recovery of CDS materials can reduce greenhouse gas emissions and provide other environmental benefits.
- Conservation of landfill space.
- Promotion of resource recovery.
- Addressing away from home (AfH) consumption of beverages, which is not addressed by kerbside recycling programs. AfH consumption was previously estimated at 50% overall, but was recently estimated at 25% for glass and aluminium beverage containers and 45% for PET beverage containers[71]).
- Reduced contamination in kerbside recycling programs.
- Shift waste and litter management costs from ratepayers and local governments to beverage producers and consumers, consistent with the 'Polluter Pays' principle.
- Can be used to establish an infrastructure network for collection of non-packaging items under product stewardship/EPR arrangements.
- Potential funding source for charities, sporting clubs, etc.
- Effective regulatory threat to compel industry to implement, expand or increase funding for reuse, recycling and litter management efforts.
- Reduced incidence of lacerations from broken glass.
- Proper design can minimise consumer inconvenience.
- Popular support, according to a variety of surveys.

Costs and drawbacks commonly reported for CDS include[72]:

- Diversion of high value materials from existing comprehensive recycling programs, particularly kerbside recycling (potentially affecting 54% of kerbside volume but 77% of material value in Tasmania[73], and 33% of kerbside volume but 59% of material value in north Queensland[74]).
- High marginal costs for recovery ($900 to $1,900 per tonne in the ACT, as opposed to $110 per tonne for kerbside recycling[75]; $1,159 to $2,219 per tonne in Victoria as opposed to $150 per tonne for kerbside recycling[76]; NZ $1,580 per tonne in New Zealand[77]).
- Potential for increased environmental impacts due to separate collection and transport.
- Simply increasing material supply without market development could reduce material values.
- A minimum doubling or tripling of existing costs for kerbside recycling ($111 to $157 per household p.a. in Victoria, up from $28.85 household p.a.)[78].
- Reduced yields in kerbside recycling programs.
- Little or no impact on non-beverage container litter and overall litter rates.
- Additional costs and inconvenience for manufacturers and retailers that are not related to core business activities.
- Expensive method for litter control.
- Street litter could increase due to scavenging.
- Inconvenience for consumers to redeem containers.
- No direct relationship with overall high recovery rates and diversion from landfill.
- Applying EPR to packaging goes against OECD and EPR principles, as beverage packaging is not hazardous or toxic, and material sales values can provide significant benefits for recycling programs.
- CDS may be an overly simplistic approach to address complex environmental aspects of packaging, and may therefore not be as effective as alternative approaches.

Some aspects are especially debated. For example, various studies highlight potential employment and economic benefits for staffing depots and sorting containers, while others say CDS simply transfers benefits from other, more productive areas of investment and represent benefits transfer rather than new benefits[79].

7 Industry, Community and Government Attitudes

7.1 Literature Review Findings

Early CDS introduction was often supported by certain groups in the North American and Australian beverage industries as a means of protecting local markets for refillable bottles. However, as non-refillables and kerbside recycling were steadily introduced and as refillable beverage systems were eliminated in the US and Australia, most beverage industry players came to oppose CDS as discriminatory against beverages. Retailers also tended to oppose CDS due to container take-back requirements and additional costs. In Australia, there has been strong opposition by the beverage and packaging industries and support for kerbside recycling and the National Packaging Covenant. However, the large beverage manufacturer Diageo has expressed support for CDS as part of the WA CDS inquiry. European industry views are more divided and depend more on the particular industry in question.

A 2004 survey of SA residents found 78% strongly supported the SA CDS scheme; 13% slightly supported the scheme; 5% did not support the scheme; and 3% did not support the scheme at all. A majority felt CDS had been effective in: encouraging and promoting the recycling and reuse of container materials (92%); reducing litter in South Australia (88%); and reducing the number of beverage containers that go into landfill (86%). 60% of respondents surveyed returned beverage containers to collection depots (80% knew depot locations); 32% used kerbside recycling without redeeming the deposits; and 4% disposed of their beverage containers in garbage bins. Of respondents surveyed, 41% returned containers to depots more than four times a year and 25% redeemed at depots 1-3 times per year.[80]

Consultations for the Queensland waste strategy showed a generally negative view on the potential introduction of CDS in the State. Apart from environment and community groups, stakeholders felt that there were 'more important' issues to address. All sectors felt that greater benefits would result from a national CDS approach than from one that was State-based.[81]

The convenience of CDS compared to kerbside recycling is likely to have a significant impact in consumer decisions to redeem containers. In a 2000 survey, 82% of SA residents surveyed said that if kerbside recycling and collection depots were equally convenient, they would recycle via kerbside collections.[82] A 2008 study on the potential introduction of CDS in Ireland found only 7% of respondents said that in-store CDS was their first choice of collection arrangement, compared with 51% that preferred kerbside collection and only 14% that preferred recycling at the equivalent of depots[83].

In Hawaii and California, audits have been used to establish redemption rates for large quantities of containers in order to facilitate redemptions. While more efficient, this can have a potentially negative impact on consumer attitudes. The State auditor in Hawaii noted that due to varying container sizes, different dollar amounts could result for the same number of containers, and many customers saw container counts as the only fair way to run redemptions.

Consumer attitudes, particularly in the US, have been heavily influenced by education efforts in CDS States to promote the programs and encourage redemption.

Government attitudes to CDS vary. Those with traditional CDS in place are usually quite supportive, and only one program, in Columbia, Missouri has been repealed (Florida repealed their CDS provisions before they could take effect). However, few new CDS programs have been introduced since more comprehensive recycling and litter control approaches have been implemented. The exceptions are Germany, which introduced CDS due to industry failure to maintain a market quota for refillables, and Hawaii, which was introduced to penalise industry for failure to more fully develop recycling infrastructure.

7.2 Stakeholder Consultations for Tasmania

During January and February 2009, Hyder conducted semi-structured interviews with key stakeholders identified in consultation with the Department. Those consulted represented local and state government, community organisations and beverage companies, plus waste management and resource recovery organisations.

Representatives from the following organisations were consulted (in alphabetical order):

- Clean Up Australia
- Cradle Coast Authority
- Fosters Group
- Keep Australia Beautiful Council (Tasmania)
- Kentish Council
- Launceston City Council

- Lion Nathan
- Local Government Association of Tasmania (LGAT)
- Northern Midlands Council
- Northern Tasmania Development
- OneSteel Recycling
- Packaging Stewardship Forum of the Australian Food and Grocery Council
- Revive Recycling (a supplier of RVMs)
- Scouts Tasmania
- Southern Waste Strategy Authority
- Tasmanian Small Business Council
- Veolia Environmental Services

Most consultations were conducted via telephone and were intended to obtain local perspectives.

Stakeholders that were contacted but did not offer comments include:

- Athena Waste Management
- Coca-Cola Amatil
- Diageo
- Hobart City Council
- Jones Waste Management
- National Association of Charitable Recycling Organisations
- Tasmanian Chamber of Commerce and Industry
- West Coast Council

Stakeholders were consulted on their views of:

- Current facilities / systems for recovering and recycling containers in Tasmania
- Current container recovery rates
- Existing markets for recovered containers
- Current performance of kerbside recycling in relation to containers
- Current cost per unit (e.g., per tonne) of recyclable material recovered
- Barriers and opportunities for increasing beverage container recovery in Tasmania
- Implementation of a CDS, including their preferred system and / or system features

Due to commercial considerations and a variety of data gaps, quantitative data was somewhat limited and a variety of views were influenced more by professional and personal experience. These consultations were supplemented with additional research, particularly with regard to publicly available data on container management in Tasmania.

A variety of views were expressed on the condition that they were not specifically attributed to those stakeholders. As these were some of the most valuable and relevant insights for this project, these views have been attributed generally (e.g., as a local government or an industry view).

CDS supporters included councils, community organisations and limited industries. Reasons cited for supporting the introduction of CDS in Tasmania by those stakeholders expressing an opinion include:

- Potential to reduce beverage container litter and increase resource recovery for beverage containers.
- Increased awareness of recycling and litter management.
- Shifting costs of recycling, litter and waste management for beverage containers from local governments to the beverage industry and beverage consumers.
- Employment opportunities.
- Funding from unredeemed deposits to fund other desired activities.

Representative comments from those supporting the introduction of CDS in Tasmania include:

- '80% recovery rates are achievable under CDS.'
- 'It is Council's belief that costs for collection and disposal of containers should be borne by the businesses that profit from selling beverage products, not by councils, community groups and individuals who are at present left to clean up roadsides. The businesses that bring thousands of empty containers to Tasmania for filling at present have no financial responsibility to see that they are returned to where the raw materials can be re-used.'
- 'The optimal approach would be to let Government set the parameters, then have one single coordinating body, such as an NGO, responsible for implementation.'
- 'In practice, there will always be some containers not returned, and therefore unreturned deposit money. These funds can eventually become available for use by the NGO supercollector to fund cleanup days, litter and education campaigns, community grants etc. In SA the unclaimed balance remains in private hands, and for products like flavoured milk paperboard cartons, e.g., iced coffee, which have less than 40% return rate, rapidly amount to huge sums.'
- 'People from SA all say the same things about their program and they have such a strong awareness of container recycling.'
- 'A properly designed system should be self-funding through material value and unredeemed deposits.'
- 'Kerbside is a net cost issue. Containers have higher collection and sorting costs due to their volume.'
- 'I simply wish to make the point that just because we are improving our kerbside collections, that is not an argument for ruling out CDL. There are still plenty of things that go in the recycle bin, AND there are still all the reasons in our Council's policy (litter, employment creation, consumer awareness, manufacturers responsibility and increased diversion from landfill) to introduce CDL. In my own family recycling bin there is practically nothing that would get a CDL refund, but we still have enough to fill an MGB (mobile garbage bin). Tasmania needs both systems.'
- 'If Tasmania collected 80% of beverage containers and they were purer, end users could locate there.'
- 'The money from recycling can be valuable for small community groups.'
- 'CDS doesn't need as much education as kerbside.'

- ‘Convenient infrastructure would raise awareness, for example if redemption opportunities were available at every store.’
- ‘The only problematic material under CDS is glass; the others can be transported far.’

Most stakeholder opposition to the introduction of CDS in Tasmania was from the beverage and packaging industries, although there was some local government opposition. Reasons cited for opposition to CDS in Tasmania by these stakeholders include:

- Potential Constitutional validity of CDS introduction and barriers to trade have not been tested.
- System improvements such as shifting from crates to mobile garbage bins would likely result in greater resource recovery than CDS would.
- Narrow focus on beverage containers, as opposed to the broader range of containers that could potentially be recovered more cost-effectively through alternative approaches including comprehensive recycling, advance recycling fees and material-specific approaches (particularly for glass).
- The National Packaging Covenant is seen as preferable by being a national approach, broader in scope of packaging covered and in addressing broader concerns such as carbon footprinting, supply chain impacts and sustainability.
- Concern about potential impacts on recycling programs, particularly kerbside programs.
- Landfill levies were seen as a more direct means of funding waste management and resource recovery, compared to using unredeemed deposits from CDS introduction.
- Several felt that recent changes to the litter act and a more comprehensive approach to litter would deliver greater litter benefits than CDS.
- Cigarette butts, fast food items, etc., would not be captured under CDS, yet they represent the majority of litter.
- Potential for container scavenging from bins.

Representative comments from those opposed to introduction of CDS in Tasmania include:

- ‘Tasmania must be prepared to defend the Constitutional validity of CDS and show effective enforcement that South Australia currently can’t show. In South Australia, beer is included and wine isn’t, yet both get littered. There are lots of basic enforcement issues that South Australia can’t answer.’
- ‘Whatever the objective sought, systems should be designed to achieve those objectives at the lowest cost possible. CDS is more expensive than other approaches for the same objectives, so it’s not in the public’s best interest.’
- ‘CDS is expensive and distortionary at the expense of efforts to improve recycling.’
- ‘The public understanding of CDS in South Australia is a lot different than what actually happens. South Australia’s system was based on refillables, and we don’t have those now. Packaging has changed dramatically.’
- ‘Why not include glass jars, which get recycled now? (Particularly with regard to glass) why put materials through an energy-intensive collection and processing approach when they could go through a different system with less impact?’

- ‘Look at materials vs. sectors – there are uniquely different problems for glass and aluminium. CDS is too generic. Go broader, more material-based, with no crazy exemptions like SA.’
- ‘CDS is a knee-jerk reaction to a litter perception problem.’
- ‘Tasmanian consumers would bear 100% of the deposits and handling fees, as well as costs to ship materials across Bass Strait. We’re still working through the South Australian deposit increase, but consumers are no longer absorbing the South Australian cost burden nationally.’
- ‘We would pay for (material) shipment to the mainland, but we wouldn’t if an approach was mandated.’
- ‘CDS was a ‘70s solution to a ‘70s problem; you can’t get more convenient than kerbside recycling.’
- ‘We see kerbside (recycling) as an efficient system. To be worthwhile, CDS would have to be at least as efficient for kilos recovered per head of population, total recovery, etc.’
- ‘CDS is seen as a panacea, perhaps without much information.’
- ‘What would be the greenhouse impacts of lots of small consumer trips to redeem containers, as opposed to sending one truck down the street to collect recyclables?’
- ‘We’ve gotten a strong kerbside system in Australia without paying people to participate. Why not focus on further improvements, when CDS could jeopardise existing programs?’
- ‘Industry would definitely try to isolate the higher system costs under CDS to Tasmania, just as with South Australia’s increase from 5¢ to 10¢ and as with industry’s stated position in Western Australia’s CDS investigation.’
- ‘If industry-run, we could make a system work by having a levy, not CDS, and could then have fewer facilities to collect more material, e.g. all glass and not just beverage containers. This would also help stop free riding by those sectors that are not threatened by CDS.’
- ‘What’s done now will be implemented in 5-10 years, so look for the scheme that would be best in 5-10 years time.’

A range of public and private stakeholders were not firmly committed either way, stating that their views would depend on the intended objectives and/or wishing to see specific models and their costs / benefits. Representative comments include:

- ‘If we could be convinced of CDS’s value on litter reduction and resource recovery (and South Australia doesn’t convince us) we’d support it.’
- ‘I’m unconvinced of its likely success and the complexity of the issue makes it hard to see a good model.’
- ‘There would be huge layers of administration to get transparency and accountability’.
- ‘It seems to be a good idea in principle, but there’s a lot more out there than just beverage containers.’
- ‘Would people really redeem containers, especially when kerbside (recycling) is available?’
- ‘CDS is popular with the community, where it is seen as a simplistic approach.’
- ‘CDS is just a throwaway line. We need to focus on substantive issues.’

- 'We haven't considered it formally; personally I think it would be a good idea if net environmental benefits resulted.'

Kentish Council is the only local government identified that has taken a formal position in favour of CDS (in October 2007). In November 2007, the Southern Waste Strategy Authority (SWSA), representing twelve Southern Tasmanian Councils, addressed CDS in SWSA's proposal on a national waste management policy. In the submission, SWSA argued against CDS in favour of other approaches.[84]

Most stakeholders were either unable or unwilling to propose specific models for introducing CDS in Tasmania, although several stakeholders raised concerns about costs and efficiencies of the SA model. Of those expressing views on possible CDS models, there was a clear preference for industry-driven approaches in order to minimise costs and increase recovery. One industry stakeholder said that California's government-driven CDS was not impressive and seemed costly. Those expressing a preference also indicated that infrastructure funding for establishing a redemption network should be provided up front by the state government, with those costs gradually repaid over time.

For those stakeholders that felt a deposit would motivate people to redeem containers through a CDS, most felt that a 10¢ deposit would provide sufficient incentive (especially if collection infrastructure was convenient). One local government representative indicated they personally would not be motivated by the deposit because at a 10¢ deposit value, they would have to redeem 40 containers to buy a cup of coffee. One industry stakeholder indicated that a 5¢ deposit would definitely be too low, and that a 20¢ deposit would still be less than many deposits in European CDS programs. This stakeholder also stated that they had not seen much evidence of fraud in those European programs.

Stakeholder views were mixed on whether CDS introduction would strengthen markets for recovered materials. While they felt that recovered materials would be cleaner under CDS, there were concerns that given existing premiums for some Tasmanian material, little benefit would result from CDS introduction. Some expressed concern that increasing the supply of recovered materials without creating greater demand for those materials could in fact worsen recycling in Tasmania by reducing the material value paid. These stakeholders also disagreed with CDS supporters' views that CDS introduction would result in new end use demand for recovered materials, citing the general lack of such demand in SA. For example, no major PET recycling facility has been located in SA, and the presence of glass recycling in SA was tied more closely with demand for bottles from the wine industry in SA than with CDS.

One stakeholder was concerned that RVMs could pose difficulties for material recovery facility recycling streams, saying that while broken glass would likely be less problematic, shredded plastic from the RVMs would be 'disastrous'.

Those stakeholders expressing a view were generally reluctant to see funds from unredeemed deposits go to the State. Most stated that the first priority should be for unredeemed deposits and handling fees to ensure the costs of parties implementing CDS were covered (various parties said costs should go to retailers, the beverage industry or an NGO responsible for implementation). Several stakeholders were concerned that revenues raised from local government programs (deposits and handling fees for containers recovered through kerbside collections) would be lost to state programs and/or be lost through consolidated revenue. Where these concerns were stated, there was often support for independent, external oversight for revenues and use of proceeds. One local government stakeholder suggested that the state government should keep the money from unredeemed deposits and use the funds for further education, cleanup days and recycling materials that are currently unprofitable, glass in particular.

Several stakeholders noted that Veolia handles most (around 90%) of the containers recovered in Tasmania and that CDS introduction could reduce critical mass to the point that Veolia's economics could be irreparably damaged, thus harming recycling in the state.

8 Container Management in Tasmania

Stakeholder views on current container management in Tasmania were included in the stakeholder discussions in section 7.2. This chapter incorporates these views, as supplemented by several publicly available reports which are referenced in Appendix A.

8.1 Current Facilities / Systems for Recovering and Recycling Containers in Tasmania

There is a general lack of comprehensive recycling data in Tasmania[85]; this applies particularly to container management. Detailed data on container flows and recycling are not readily available.

Roughly 90% of Tasmania's recovered containers are processed through material recovery facilities owned by Veolia Environmental Services. The majority of these containers are collected from councils under collection contracts, although there are some collections from various transfer stations and public place recycling bins. Last year, Veolia invested $3m in the Hobart material recovery facility, over $600,000 in the Launceston material recovery facility and several million dollars in collection vehicles. Most containers are positively sorted[v], producing a fairly clean stream of materials. Aluminium and steel are magnetically sorted, and automatic sorting is available for some materials. Tasmania has long had a reputation for producing clean recovered materials (particularly PET plastic) that often earn a premium in end use markets[86].

Currently, 25 of the 29 Tasmanian Councils provide kerbside recycling in some form, although the level of coverage may vary[87].

Containers that households regularly put out for recycling in kerbside programs are shown in Table 1.

[v] Positively sorted materials are specifically separated for recycling from commingled material collections (usually by manual sorting into dedicated bins). For example, PET plastic may be positively sorted due to its material value, while lower grade plastics may be compacted together and sold at a lower value.

Table 1: Containers Regularly Placed by Households for Kerbside Recycling – 2006

Items Put out for Kerbside Recycling (once every few weeks)	% of Households
Plastic bottles	86
Milk/juice cartons	83
Aluminium cans or items like foil	79
Steel cans	77
Glass/jars and bottles	76
Yoghurt and ice cream containers	55
Plastic margarine containers	40
Broken glass or ceramics	27

Source: SWSA 2006

Stakeholders generally felt that there is a strong 'drop-off' mentality in Tasmania for people in rural areas or locations without kerbside recycling to bring waste and recyclables to transfer stations or other waste facilities established by local governments. A 2006 survey found that 61% of households in Southern Tasmania used a local transfer station or rubbish tip[88]. One stakeholder highlighted that in areas where kerbside collections were available, residents were likely to take containers to drop-off facilities if their container volumes exceeded available crate or mobile garbage bin capacity.

One local government stakeholder indicated that unmanned transfer stations often had recyclables contaminated by general waste and even controlled wastes until a shift to a smaller number of manned transfer stations that were open for longer hours. Another local government stakeholder felt that part of the community support for drop-offs and transfer stations was due to their being available for free or relatively cheap. This stakeholder felt that use of these facilities might decrease over time as standards were raised and as the costs to operate these facilities were passed on to consumers.

For the period July 2006 to September 2007, 100% of Councils in the Southern Tasmanian region offered public place recycling facilities, while 25% of Councils in the Northern region and 22% of Councils in the North-West region offered these facilities[89]. While these facilities were not specifically described, they generally consist of sets of rubbish and recycling bins that are likely to be placed in prominent locations due to profile and traffic volumes.

Only 4% of southern Tasmanian residents surveyed in 2006 returned empty cans for cash scrap value[90].

8.2 Litter

Several stakeholders expressed the view that litter, a key driver for CDS introduction in various locations, is relatively low in Tasmania and that the operation of CDS in SA does not appear to affect overall litter rates. Several stakeholders highlighted that the National Litter Index (NLI)[91] data shows low overall rates and declining total litter in Victoria as a result of education and enforcement efforts. Those stakeholders also stated that litter in SA is higher than in Tasmania, despite the presence of CDS in SA. Several stakeholders expressed the view that by item and by volume, the NLI data reveals little substantive difference between Tasmania and SA for littered container types.

The NLI shows that for total littered items per 1,000m^2, Tasmania has among the lowest litter rates and along with Victoria is generally well below other States in litter volume (litres) per 1,000m^2 (Table 2).

Table 2: National Litter Index

	Items per 1,000m^2			Volume (litres) per 1,000m^2		
	05/ 06	06/ 07	07/08	05/ 06	06/ 07	07/08
NATIONAL	70	74	68	8.86	9.68	8.58
ACT	-	68	56	-	7.04	6.06
NSW	80	71	77	14.95	14.69	11.90
NT	-	64	60	-	5.32	7.24
QLD	89	86	76	7.66	7.59	7.44
SA	60	61	68	7.23	11.08	9.55
TAS	59	70	61	5.15	6.68	5.90
VIC	71	80	48	7.87	7.74	4.19
WA	60	83	85	8.57	12.19	13.06

Source: KAB 2008

With regard to specific littered items, including containers, NLI data for Tasmania by item count is provided in Figure 5.

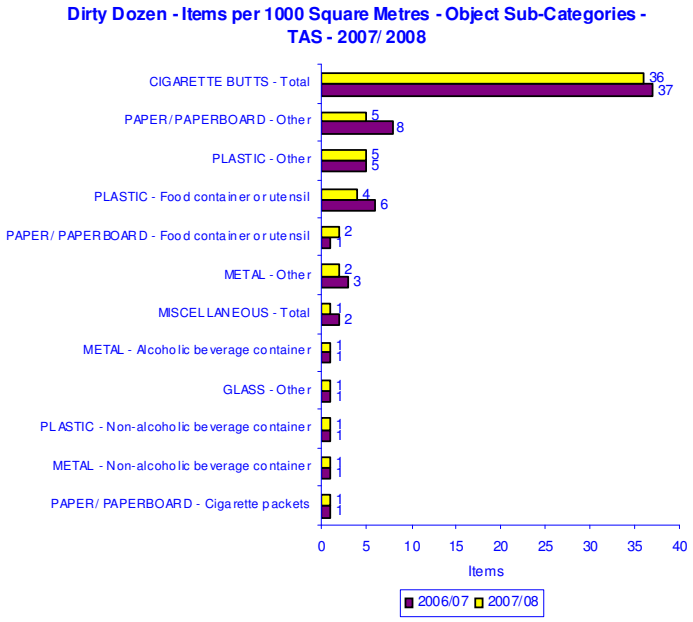

Figure 5: NLI Data for Tasmania by Item - 2007/2008
Source: KAB 2008

With regard to specific littered items, including containers, NLI data for Tasmania by volume is provided in Figure 6.

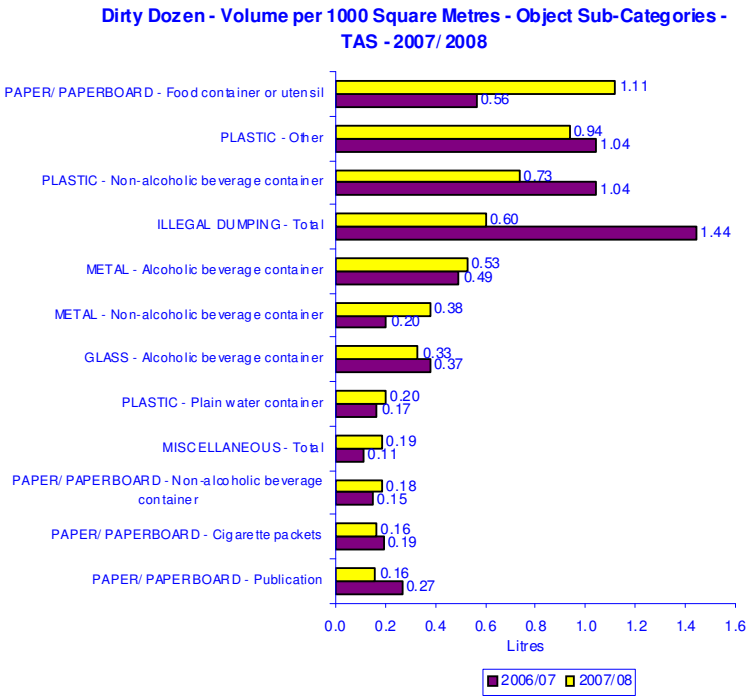

Figure 6: NLI Data for Tasmania by Volume - 2007/2008
Source: KAB 2008

8.3 Current Container Recovery Rates

Total tonnages recovered from Tasmanian material recovery facilities in 2006-2007 of material types that could be recovered under CDS (depending on how the CDS was structured) are provided in Table 3.

Table 3: Recovery from Tasmanian Material Recovery Facilities - 2006-2007

Product	Tonnes
Milk cartons	182
Glass	10,572
PET	814
HDPE	689
PVC	110
LDPE	300
PP	110
Mixed plastic	372
Steel	920
Aluminium	377

Source: Government of Tasmania 2008

Australian container material recycling rates are provided in Table 4, along with packaging consumption and recycling data. Given gaps in available data, it is not possible to determine

precise container recovery rates specifically for Tasmania or estimate how accurate the recycling rates in Table 4 would be for Tasmania.

Table 4: Australian Packaging Consumption and Recycling Data - 2007

Material Type	Total Consumption t/yr	Total Recycling t/yr	Recycling Rate %	Kg / Capita Consumption	Kg / Capita Recycling
Paper/Cardboard	2,639,000	1,720,000	65%	124	81
Glass Packaging	893,031	410,700	46%	42	19
Plastics Packaging	585,296	178,351	31%	27	8
Steel cans	92,399	34,760	38%	4	2
Aluminium beverage cans	48,791	34,300	70%	2	2
Total	**4,258,517**	**2,378,111**	**56%**	**199**	**111**

Source: MS2 and Perchards 2008

8.4 Existing Markets for Recovered Containers

Recovered materials are commodities, demand for which varies by material quality, end user demand, transport costs, the global economy and other factors. Tasmania's absence of container manufacturing facilities such as glass plants and container fibre mills means that there is no state-based demand for most recovered container material types and currently all recovered materials are shipped to the mainland or to overseas markets, apart from some newsprint that goes into insulation.

Several industry stakeholders indicated that a price premium is currently being paid for certain materials, such as PET plastic, recovered from Tasmania. Industry stakeholders report that all commodity prices had been down recently due to the global economic downturn, but had risen back to be 10-15% above the lowest rates reached in the downturn. Given the volume of containers recovered by Veolia Environmental Services, it was not possible to provide precise material values without betraying Veolia's commercially sensitive information. OneSteel, which focuses mainly on aluminium containers, indicated that aluminium values were down 60-70% over last year, noting they had paid $1.20/kg last year and pay 50-60¢/kg now.

Demand for recovered materials has a direct impact on contractor costs to provide recycling and therefore the costs passed on to consumers. Roughly 25% of Council recycling contracts in Tasmania involve benchmarking of costs (periodic review of program charges to reflect markets, material values and other factors affecting the economic viability of recycling); the remainder are fixed to CPI changes only. Most commodity price risk is therefore borne largely by recyclers. When demand and/or values paid for recovered materials are relatively low, as is currently the case for most materials, recyclers receive less in revenue for the materials and may seek to pass along higher costs. Development of local markets for the recovered materials can help recyclers minimise these costs by reducing processing and transport costs or by providing greater competition for the recovered materials.

8.5 Current Performance of Kerbside Recycling in Relation to Containers

There was strong stakeholder support for kerbside recycling, with a full range of stakeholders feeling that kerbside recycling was headed in the right direction, despite some of the difficulties faced in Tasmania. The shift currently underway from various crate-based systems (particularly along the northwest coast) to mobile garbage bins for collecting containers kerbside was seen as especially encouraging, with stakeholders highlighting the potential for additional container recovery, reduced OH&S exposure and a decrease in wind-blown litter from the crates. The Cradle Coast Authority for instance, expected that the shift from crates to mobile garbage bins would result in an improvement in yield, increasing from the current 75 kg per tenement up to around 200 to 250 kg per tenement.

One industry stakeholder supported the efficiency of kerbside recycling, and cited kerbside as a prime example of industry and governments working well together while bringing consumers along. Stakeholders referred to broad community acceptance of kerbside recycling, as reflected in the placement of containers for kerbside recycling shown in Table 1.

8.6 Current Costs of Recyclable Material Recovered

Several stakeholders felt that the low cost of disposal in Tasmania made recycling look expensive in comparison. However, one local government stakeholder disagreed, saying that collection costs for recycling and disposal were the same, but gate fees for recyclables were cheaper in most locations. One industry stakeholder expressed the view that if transport costs to mainland Australia were as high as many believed, then Tasmania would not have such a low cost per household for recycling (Table 5). Several stakeholders felt that local governments would be even more sensitive to costs and under pressure to cut costs significantly with water and sewage assets being shifted from local government to the State.

Table 5: National Cost per Premises for Recycling - 2007-2008

Jurisdiction	Average Annual Premises Fee Charged by Council for Recycling Services		Annual per Premise Cost to Council to Provide a Recycling Service	
	Residential	Non-Residential	Residential	Non-Residential
ACT	Not charged separately	Not charged separately	Not charged separately	Not charged separately
NSW	$68.80	$62.06	$214.00	$ N/A
NT	$225.75	$279.00	$ N/A	$ N/A
QLD	$35.00	$35.00	Unknown	Unknown
SA	$56.41	$55.72	$56.41	$55.72
TAS	$33.00	Unknown	Unknown	Unknown
VIC	$53.51	$61.64	$33.32	$ N/A
WA	$44.00	$ N/A	$36.00	$ N/A

Source: NEPC 2008

Costs of material collection and processing can vary significantly over time. Whilst some of these costs are addressed in long-term contracts with allowance for CPI increases, others are benchmarked and reviewed periodically. For example, in the Cradle Coast region, a processing contract tendered in July 2008 established a benchmark cost of $27 per tonne for processing, with a six-monthly periodic review to adjust the price for factors such as material values, inflation and currency fluctuations. It is expected that this rate would increase during the next review due to the global economic downturn and lower current market values for most materials.

Costs to provide kerbside recycling collections are often cited as reasons to introduce CDS, with an expectation that the beverage industry and beverage consumers should bear a greater proportion of recycling costs. Several industry stakeholders indicated that low kerbside recycling costs in Tasmania argued against a commonly stated reason for introducing CDS. An analysis was undertaken of the most recent nationally consistent data available to determine Tasmania's cost per tonne of recyclables, and enable comparison against other jurisdictions (Table 6). The results show that Tasmania has the lowest cost per tonne collected and per tonne of recyclate sold (which adjust for contamination). This may be due in part to the number of crate-based systems still in existence and is likely to change as more systems move to mobile garbage bins. However, it should be noted that mobile garbage bins would likely contribute significantly to yields, so cost impacts are not readily apparent at this time.

Table 6: National Cost Performance Data - 2007-2008

Jurisdiction	Number of Residential Premises / Households	Tonnes of Recyclables Collected	Tonnes of Recyclate sold/sent for secondary use	Cost per tonne collected	Cost per tonne recyclate sold
ACT	133,000	38,790	35,264	N/A	N/A
NSW	2,660,275	689,591	628,043	$265.41	$291.42
NT	35,098	4,794	2,233	$1,652.77	$3,548.31
QLD	1,508,257	281,516	258,297	$187.52	$204.37
SA	616,828	130,249	112,034	$267.14	$310.58
TAS	175,940	34,558	31,102	$168.01	$186.68
VIC	2,134,602	604,960	539,513	$188.81	$211.71
WA	759,193	106,123	96,475	$314.77	$346.25

Source: NEPC 2008, with cost analysis by Hyder Consulting

All jurisdictions other than WA and Tasmania reported both tonnes of recyclables collected and tonnes of recyclate sold/sent for secondary use; WA and Tasmania each reported for only one category. To enable meaningful comparison for both datasets, WA and Tasmanian data were adjusted with an assumed 10% contamination.

8.7 Barriers and Opportunities for Increasing Beverage Container Recovery in Tasmania

Barriers to increasing beverage container recovery cited by stakeholders and in background research for the State[92] include:

- Low disposal costs make resource recovery relatively expensive. Tasmanian landfills are all local government-owned and councils have traditionally subsidised landfill from general revenue. Price increases have proceeded slowly.
- Relatively low population densities and dispersed population can increase collection costs and make it difficult to collect significant volumes of containers for recycling.
- Low material quantities make economies of scale more difficult to achieve.
- Low industry base results in less local end use demand for recovered materials.

- Lack of local markets for beverage container materials, particularly glass, and distance to recycling markets on the mainland result in higher collection and recovery costs than would likely result if strong local demand was evident.
- Having to ship materials across Bass Strait to mainland end use markets can result in relatively high transport costs.
- Perception of greenhouse gas emissions involved with collecting, processing and shipping materials out of state, as opposed to local landfilling, can cause consumers to question the value of beverage container recovery in Tasmania.

Opportunities for increasing beverage container recovery cited by stakeholders include:

- The shift currently underway from crate-based systems to mobile garbage bins is expected to increase program yields for a broad range of packaging. Stakeholders also highlighted the potential benefit of decreasing windblown litter from the crate-based systems.
- Improved education on optimising current practices and new systems as they are introduced could significantly increase yields recovered.
- Local market development for recovered materials, particularly for glass, could help stabilise material markets and reduce costs for shipping to mainland and overseas markets.
- Expanded collections and collecting a broader range of materials from public places and commercial operations such as pubs and clubs could increase material volumes recovered and potentially make container recovery more viable (several stakeholders felt that low recovered volumes in Tasmania meant that recycling was often only marginally viable).
- Funding for program improvements and education through a broad-based advance disposal/recycling fee or material-specific fee, rather than specifically targeting beverage containers.
- Changing contractual arrangements to minimise compaction allowed during collection could reduce problems from glass breakage affecting other recovered materials, such as the potential for broken glass to become imbedded in recovered paper and other materials.
- One stakeholder suggested variable rate charges for waste would provide benefits by sending a price signal to encourage appropriate container recovery instead of disposal.

8.8 Implications for CDS Implementation

Some of the implications of stakeholder views for this project and for the potential introduction of CDS in Tasmania include:

- Preference for Tasmania to be part of a national approach to container management.
- Stated desires to review proposed models and understand their costs and benefits in order to better understand potential impacts and opportunities.
- Glass was consistently highlighted as a problematic material, especially with the introduction of more commingled collections. CDS could potentially result in greater quantities of cleaner, source separated glass than is currently collected. However, a variety of stakeholders highlighted the need for markets for the recovered glass and felt

that more direct means of addressing glass (such as levies or advance disposal/recycling fees) should be considered in lieu of CDS.

- Local governments and other stakeholders would seek to be compensated for any negative impacts of CDS introduction.
- Stakeholders felt strongly that unredeemed deposits should be channelled back into improved resource recovery and/or waste management efforts, including greater coverage in rural areas.
- Stakeholder preference for industry-driven and/or NGO-run systems could be accommodated in system design, however steps would have to be taken to ensure transparency and accountability.
- Deposit amount and convenient consumer returns would most likely be the greatest factors for program success.
- Encouraging container returns through depots and or returns to point of sale should seek to build on the strong 'drop-off' mentality in Tasmania and current willingness to take materials to transfer stations for resource recovery.
- Seek to optimise the roles of existing infrastructure, service providers and consumer familiarity with existing locations.
- Several stakeholders questioned whether return to retail could be implemented given likely opposition from retailers.
- Potential roles for RVMs and their impacts on markets for recovered materials would need to be examined in greater detail.
- Several stakeholders stated that if CDS were introduced, there would be a clear need for any state oversight/enforcement roles to be appropriately resourced and funded.
- Stakeholders expressing a preference indicated that the State government should provide funding up front for establishing a redemption network.
- Premiums are currently being paid for some materials recovered from Tasmania such as PET plastic, and some stakeholders questioned whether end users would in fact take any additional recovered materials. While cleaner recovered materials would likely result from CDS introduction, potential gains may not be as significant for Tasmania as they might be elsewhere. In addition, one industry stakeholder highlighted that improved technologies for minimising impacts of contaminated recyclables have been progressively rolled out in material recovery facilities since 2002.
- Composition of any advisory bodies should be representative.
- Several stakeholders viewed National Litter Index data as revealing relatively little difference between Tasmania and SA in terms of beverage container litter.
- Several stakeholders felt that introduction of CDS may not provide much substantive reduction in beverage container litter.

9 CDS Options Considered

In reviewing strengths and weaknesses of CDS approaches and considering options for Tasmania, it is important to understand the objectives of each approach as well as the factors that have affected timing and implementation. Broadly, however, some conclusions can be drawn for each of the models.

Some broad conclusions apply across all the CDS models (also refer to section 6):

- CDS is effective in addressing beverage container recovery and beverage container litter. Evidence is lacking on the contribution of CDS to broader sustainability issues such as greenhouse gas emissions and water quality.
- Effectiveness in addressing EPR and product stewardship depends to a great extent on structure (whether industry-led or government-led), integration with existing infrastructure and programs and allocation of unredeemed deposits.
- Significant unknowns include the extent to which deposits would motivate consumers to increase their recycling activity and the extent to which consumers would divert particular container streams away from existing recycling programs.
- Impacts would primarily affect Tasmanian organisations and consumers, while benefits from increased beverage container recovery would correctly be credited to the jurisdictions where the recovered materials are processed into new end uses. Therefore, environmental benefits of recycling would accrue in mainland Australia and in overseas markets. Environmental benefits of decreased beverage container litter would obviously accrue to Tasmania.
- Potential distortions if introduced on top of more comprehensive recycling, especially if deposit amounts are high or container scope is defined broadly. Distortions are less likely where unredeemed deposits are used to offset impacts and where stakeholders are more actively involved in CDS development.
- Recovery rates decline over time as deposits lose their value.
- Eliminating the need to sort by brand can significantly reduce program costs and is generally associated with more extensive use of RVMs.
- RVMs (particularly at point of sale) are generally regarded as a more cost-effective means of allowing convenient consumer redemption.
- Some form of manual handling is still necessary as RVMs sometimes fail to read eligible containers.
- The use of depots is viewed as less convenient but allows redemption of a broader range of containers and collection of non-beverage items under product stewardship schemes.
- Few programs address market development for the materials that are recovered.
- Participation rates tend to be high as programs are first implemented or modified, especially when comprehensive education and awareness programs are run.

Due to a significant lack of data on Tasmanian and national beverage container flows, it was not possible to conduct detailed quantitative modelling of alternative CDS options. Strengths and weaknesses of alternative models considered have therefore been evaluated and qualitative discussion of system features provided.

Significantly more detailed modelling of beverage container quantities and weights, by product type and by material type, will be necessary to effectively model CDS and alternative options to a standard suitable for a full Regulatory Impact Statement. All models considered would require greater definition, analysis and stakeholder consultations to refine further.

9.1 Traditional CDS

Traditional CDS, comparable to the SA model and detailed in Section 3.1, would entail a standard deposit of say 10¢ or 20¢ on designated glass, plastic and aluminium containers for beer, carbonated soft drinks and water. A limited range of containers beyond this primary scope

could be considered, but CDS programs vary this range considerably so this topic will be discussed further when evaluating the most feasible CDS for Tasmania (Section 10). Under traditional CDS, redemption could be provided through a varied mix of retail return, RVMs and depots.

Traditional CDS strengths include:

- Simplified administration and education due to narrow scope of eligible containers.
- Wide popular support.
- Basic producer responsibility as industry is expected to run the system with minimal government involvement.

Traditional CDS weaknesses include:

- Generally higher sorting and processing costs.
- Failure to amend over time as recycling options and the variety of beverage containers have expanded over time.
- Blurring of drinks categories means distortion of competition between deposit and non-deposit drinks.
- Lack of transparency about program costs and accuracy of return rates.

Objectives that a Tasmanian CDS should address have not been established by the Department for this report, so the objectives best suited for each CDS option have been considered. Traditional CDS is best suited to the objectives of increased beverage container recovery and decreased beverage container litter.

Traditional CDS tends to have relatively high implementation costs, but also higher recovery rates for the containers that are included. Traditional CDS would be a conservative approach likely to result in fewer disruptions than other approaches but also potentially less overall effect given the broad range of beverage containers currently available on the market.

Stakeholder views on traditional CDS were markedly divided, especially given SA's existence as the only active CDS model in Australia and as a prime example of some of the best and worst features of traditional CDS models (Section 7.2). South Australia's CDS model is over 30 years old and was one of the first legislated CDS programs on non-refillable beverage containers. A depot system for returning refillable containers was pre-existing and available for modification into a depot network. The unique supercollector arrangements in SA and requirements for sorting by brand and by container type under traditional CDS are generally more expensive than alternative approaches.

Businesses are effectively left on their own to implement traditional CDS and this model helps to demonstrate EPR. However, funds from unredeemed deposits are not effectively tracked or reported publicly on a regular basis. More recent CDS approaches have addressed a broader range of containers (an approach supported by Tasmanian stakeholders) and provide greater transparency and accountability (also supported by stakeholders), along with the ability to provide funding for broader litter, waste management and recycling programs. Most of SA's features (refillable container systems, existing depots, supercollector arrangements, etc.) would not be applicable to starting a CDS system in Tasmania. In addition, it seems most appropriate to design a system around Tasmania's current needs and likely needs in the near future. Traditional CDS was therefore ruled out of further consideration as the most feasible CDS model for Tasmania.

9.2 Government-driven CDS Model

A Government-driven CDS model, as in California and detailed in Section 3.2, would involve a broader scope of containers and more active Government role in program administration than evidenced in traditional CDS.

Government-driven CDS model strengths include:

- Transparency and accountability of program features including return rates.
- More money available from unredeemed deposits due to broader scope of eligible containers.

Government-driven CDS model weaknesses include:

- Higher costs and concerns about government operations due to more active government role.
- Broader scope of eligible containers can make demarcation and education efforts difficult.

Government-driven CDS models are best suited to the objective of ensuring availability of public funds for specified uses, given their strong emphasis on audits of container and financial flows.

Although Government-driven CDS helps address a number of concerns raised about traditional CDS, stakeholders expressing a view preferred industry-driven or NGO-driven approaches (see Section 9.3) as providing greater flexibility and opportunities to provide necessary services at minimal cost. Concerns were also raised in the literature review and during stakeholder consultations that where government is the principal beneficiary of funds from unredeemed deposits, higher costs are involved with accounting for public funds and a perverse incentive could be created where Government has little incentive to promote high recovery rates. A Government-driven CDS approach was therefore ruled out of further consideration as the most feasible CDS model for Tasmania.

9.3 Not-for-profit Business-driven CDS Model

A not-for-profit business-driven CDS model, as exemplified by British Columbia and detailed in Section 3.3, is often regarded as more neutral and/or independent than industry-driven or government-driven models. Several stakeholders stated a preference for an 'NGO-driven' model, however the term 'not-for-profit business-driven CDS model' has been used instead to avoid confusion with various community-based organisations.

Not-for-profit business-driven CDS strengths include:

- Relatively high link with producer responsibility efforts for non-beverage items.
- Industry is allowed a reasonable level of flexibility to keep program costs low, while still being more accountable than under traditional CDS.

Not-for-profit business-driven CDS weaknesses include:

- Potential for publicly available data on system performance to decrease over time (as evidenced in Germany's Green Dot program) unless appropriate measures or reporting requirements are instituted.

A not-for-profit business-driven approach tends toward product stewardship rather than a prescriptive EPR approach, and is also suited to an objective of balancing flexibility with accountability.

Although Government control over many features of alcoholic container sales in Canada limits direct comparisons, having one not-for-profit business (whether from industry, community

groups or some consortium) such as British Columbia's Encorp Pacific could simplify administration while still allowing for least-cost recovery to be pursued. A not-for-profit business-driven approach was preferred by various stakeholders and was not distinctly ruled out as an option, however Hyder have opted to try to build on this model for potential application in Tasmania.

9.4 Hybrid CDS Model Specifically for Tasmania

In tailoring a CDS approach to meet Tasmania's needs, Hyder sought to learn from the experience of other jurisdictions and move forward, bearing in mind the encouragement of the Tasmanian stakeholder that suggested looking for the scheme that would be best in 5-10 years time. Details of the model viewed as the most feasible CDS for Tasmania are provided in Section 10.

10 Most Feasible CDS for Tasmania

Although additional analyses will be necessary to refine specific components, analysis and stakeholder consultation indicate that the most feasible CDS for Tasmania would be composed of the features detailed in this section.

10.1 Operational Approach

Analysis indicates that a modified not-for-profit business-driven approach would be best suited for Tasmania. South Australian and European experience has shown the difficulties and additional system costs that can result when multiple organisations bear various responsibilities for system implementation. This experience, coupled with Tasmania's small market size, argue for one designated not-for-profit business to be responsible for implementing the CDS system. Both industry-driven and NGO-driven approaches were supported by stakeholders expressing a view on proposed models, but we see no particular reason to exclude either and suggest leaving open the possibility of a not-for-profit business comprising industry and/or community groups, so long as the business is held accountable to strong performance criteria and is overseen by a skills-based Board of stakeholders. An industry-based Chair with broad experience in resource recovery would also seem to be a sensible approach.

Concerns about potential CDS introduction are especially warranted in Tasmania, where various recycling programs are seen as being only marginally viable economically. In order to minimise potential impacts and encourage local engagement and participation, Hyder recommend a multi-tiered approach to develop necessary background information and to determine the business to be given responsibility for a Tasmanian CDS program.

Significantly stronger data would be necessary to conduct a fully qualitative regulatory review of the proposed CDS model. While this data is being gathered, there is an opportunity to work with potentially affected stakeholders to further clarify likely program features and performance indicators the Department would expect of the appointed business. Funding for the organisation's activities would also need to be finalised. If recovery rates are one of the principal indicators for CDS success, as is often the case, then it would seem sensible to tie most program funding to recovery rates in order to facilitate the objective of high recovery rates (such as an aspirational target of say 80% recovery).

Following a decision to proceed with CDS introduction, an initial call for Expressions of Interest could be undertaken based on selection criteria to screen potential businesses, with the Department detailing relevant background information including container and material flows, available infrastructure and expected performance indicators. The burden could be placed

squarely on candidate businesses to develop specific proposals for addressing consumer convenience, redemption features (depots, RVMs and point of sale) to capitalise on existing and proposed infrastructure, and optimising a CDS approach while minimising costs. Following appropriate considerations and consultations, the responsible business could then be selected by Ministerial appointment, subject to relevant performance indicators.

We are not aware of a precedent for such an approach in CDS programs, but it would seem an appropriate means of harnessing competition and mutual education in order to develop a more effective system.

10.2 Deposit Amount

A standard deposit of say 10¢ or 20¢ per eligible container would seem appropriate, and be consistent with CDS models in Australia and overseas. Although accounting systems could readily accommodate deposit amounts outside of standard currency units, using standard currency would assist with community education and understanding.

Where stakeholders indicated that a deposit would motivate consumers, 10¢ was seen as sufficient (especially if collection infrastructure was convenient) and 20¢ was not viewed as providing significantly stronger incentive. A 20¢ deposit would likely increase recovery rates over a 10¢ deposit, and the fact that CDS recovery rates decline over time as the deposits lose their value would argue for starting a CDS scheme at a higher deposit amount. However, a higher deposit of either 20¢ or 50¢ could also result in significant distortions and potential for fraud and resulting higher costs to minimise these impacts (Section 4.6). Given the significance of likely distortions, a 50¢ deposit was ruled out of further consideration.

In order to provide greater incentive over time while minimising fraud, Hyder recommends a 20¢ deposit with clear program guidelines and auditing and enforcement provisions established and funded in advance of implementation. Compared to a 10¢ deposit, a 20¢ deposit should provide for higher recovery rates for a comparable range of containers, but even higher funding available from unredeemed deposits so the implications of unredeemed deposits highlighted in Section 10.5 will be especially significant. Given the potential for distortions between deposit and non-deposit containers under a relatively high deposit, careful selection of container scope (Section 10.3) will also take on greater importance.

System costs encompassed in the ‘half-back’ deposits of eastern Canada (Section 3.3) are perhaps better addressed through Container Recycling Fees or handling fees, as discussed below, than in the deposit amount. A standard deposit amount paid and refunded should assist in consumer education efforts.

10.3 Scope of Containers

Any feasible CDS model for Tasmania would apply at a minimum to designated glass, plastic and aluminium containers for beer, carbonated soft drinks and water. Many key issues in the CDS debate revolve around glass, so inclusion seems paramount. Plastic, particularly PET, is a key material for takeaway sales and littered carbonated soft drinks, while aluminium is also a common material for both alcoholic and non-alcoholic beverage containers. Beer, carbonated soft drinks and water are included in all CDS programs and are a significant source of beverage containers.

Demarcation within and beyond this traditional scope of beverage containers would be necessary. Most US CDS programs do not address still or non-carbonated waters, as they were rare when the programs were implemented. However, given the significance of the still water market sector and ongoing controversy over impacts of bottled water, still waters should be included. In addition, including still waters would incorporate a significant source of clean PET.

For ease of education and comprehensiveness, categories of water such as mineral water, spring water and flavoured waters should be defined and included. One potential distortion that would need to be considered would be the potential for some beverage companies to switch production to cartons in order to avoid participation in the CDS program[93].

Standard carbonated soft drinks are included in all CDS models, and would seem essential to include for Tasmania. Related beverages such as sports drinks, energy drinks and alcopops would need to be carefully defined, evaluated and considered for inclusion as many CDS models have failed to keep pace with the significant growth in these sectors in the past few decades.

Most countries, apart from most US CDS States, have expanded CDS over time to include ready-to-drink squashes, iced teas, and still fruit drinks that are not classed as juices. A study considering CDS for Ireland has recommended including these still soft drinks in CDS in order to minimise competitive distortions and consumer confusion, despite their relatively small market share[94]. While such an approach would also seem sensible for Tasmania, there are associated difficulties that would need to be considered. For instance, if juice is excluded there would likely be confusion between fruit-based drinks subject to the deposit and exempt juice containers or confusion between ready to drink squashes and cordials diluted at home. These drinks could also be problematic for redemption through RVMs if they are packaged in cartons or laminated pouches. These concerns were specifically raised in the Ireland study.

In order to maximise equity and minimise potential distortions between beverage types, Hyder recommend that CDS apply to all beverages in liquid or “ready to drink” form intended for human consumption. Minimising potential distortions between deposit and non-deposit containers will be especially important given the relatively high 20¢ deposit recommended in Section 10.2. The broad scope of containers should also represent a more comprehensive approach to roadside litter than a narrower range of containers.

Clear Ministerial authority should be established to modify the scope of containers and other key program parameters as necessary. Regulatory provisions for addressing new beverage and packaging types as they enter the market will also need to be clearly delineated.

Recognising the potential health concerns raised particularly by Denmark and Sweden, containers for milk and juice should not be included in redemptions at point of sale, but could be redeemed at depots. Education efforts should specifically address reasons for this variability in container return options.

10.4 Redemption Features

Depots for container redemption would be necessary for any CDS program, including one where RVMs featured heavily, as RVMs are unlikely to be able to address all designated containers and sometimes refuse eligible containers. Applying the coverage rates outlined in Section 4.5 to Tasmania’s population of around 500,000[95] results in the need for an estimated 38 to 46 depots to ensure comparable coverage to current CDS programs. At an estimated cost of $250,000 to $300,000 to modify existing facilities or create new facilities to serve as depots[96], initial capital costs of $9.5m to $13.8m could be expected for depot establishment.

While it would make sense to ensure effective coverage of redemption facilities in metropolitan areas and regional centres, there is insufficient data available to effectively model such approaches in sufficient detail. In addition, it would seem sensible to leave such an approach as the responsibility of the not-for-profit business recommended in Section 10.1, who would be obligated to deliver optimal coverage and convenience and maximise return rates, while minimising program costs.

10.5 Unredeemed Deposits

As noted in Section 4.7, unredeemed deposits will always result under CDS and considerable debate on unredeemed deposits focuses around their use.

Although the full extent of beverage container sales in Australia is not readily available by beverage type and by material type, industry sources reported a total figure of 10 billion beverage containers[vi] sold in Australia in 2008[97]. Allocating these sales in proportion to a 2008 Tasmanian population of around 500,000[98] and assuming beverage containers sales in Tasmania are not significantly different from national sales, an estimated 231.5 million beverage containers were sold in Tasmania in 2008. With a 10¢ deposit and 80% return rate, annual unredeemed deposits would amount to $4.6m and rise to $6.9m under a 70% return rate. With a 20¢ deposit and 80% return rate, annual unredeemed deposits would amount to almost $9.3m and rise to $13.9m under a 70% return rate.

Whether unredeemed deposits are channelled back in to offset costs of operation has a direct impact on the cost-effectiveness of alternative CDS models (Section 11). Stakeholders were generally supportive of unredeemed deposits being used to offset these costs (whether public or private) and several stakeholders stated that if CDS were introduced, any state oversight/enforcement roles would need to be appropriately resourced and funded. We note that at a 20¢ deposit amount, annual unredeemed deposits almost exactly equal the range of initial capital costs for depot establishment. Additional programs costs such as enforcement, education and other means of providing redemption facilities would need to be addressed through material scrap values and/or through additional Container Recycling Fee or handling fee arrangements.

Of those stakeholders expressing a preference, all supported the State Government providing funding up front for establishing a redemption network in order to reduce establishment costs and encourage industry participation. This is especially relevant to address concerns of the retailers and recyclers that the Government would need to make a CDS system work. The Government could allocate the initial funding, then recoup funds over several years through Container Recycling Fees and handling fees, as was done in Denmark.

Stakeholders were generally supportive of having an independent advisory body with a representative composition to oversee uses of program funds. If any unredeemed deposit funds are available after program costs are offset, then litter and recycling programs would seem appropriate recipients of funds. Specifically, market development for recovered materials would seem appropriate to help address concerns about impacts of CDS on markets for recovered materials.

10.6 Handling Fees/ Container Recycling Fees

Handling fees in the order of 2¢ to 5¢ per container paid to redemption facilities (such as depots or RVM operators) would be consistent with SA and overseas programs, however there is insufficient data available to set appropriate fees at this time. US CDS programs, in particular, established standard handling fees in enabling legislation that in many cases has not been amended since program implementation. Such an approach would seem counterproductive for Tasmania.

Hyder recommend that enabling legislation allow for variable Container Recycling Fees, such as in British Columbia, to be paid to redemption operators for addressing program costs not

[vi] Including imports and wine containers, and excluding dairy and composite containers

captured in the deposit amount of unredeemed deposits, and that such Container Recycling Fees be regularly reviewed, revised and reported in a transparent manner.

Regular independent auditing and verification of program costs, as performed in Denmark, California and British Columbia[99], should be an integral component of the process for establishing and refining the Container Recycling Fees over time.

As indicated previously, the issue of whether redemption facilities run by or on behalf of councils are treated comparably to private facilities and the impacts of these operations on council rates will need to be considered. This could have a direct impact on any stated aims to demonstrate producer responsibility by shifting recycling costs directly to the beverage industry and beverage consumers.[100] Related issues that would also need to be addressed include the extent to which contractors would be eligible to receive Container Recycling Fees or unredeemed deposits and the extent to which financial arrangements would provide incentive for contractors to offset money lost on collection contracts by setting up depots or other collection systems.

11 Indicative Potential Costs and Benefits

As indicated in Section 2, the main objective of the study was to assist the Department in making informed decisions on the implementation of CDS in the State. It was outside the scope of this project to provide legal analysis or recommend whether Tasmania should or should not pursue CDS and there was insufficient information on several key parameters (such as container estimates by product and material types and on specific recycling activities) to conduct detailed modelling. Nevertheless, a range of indicative potential costs and benefits are identified below.

11.1 Legislative Arrangements and Related Costs

Legislative and regulatory matters that should be addressed (directly or indirectly) prior to introduction of any CDS would include[101]:

- Objectives the program is intended to accomplish.
- Robust exploration of options; analysis of social, economic and environmental costs and benefits; and evaluation of *Trade Practice Act* (particularly for collection arrangements) and *Mutual Recognition Act* implications.
- Scope of containers to be included, including product types, container material types and sizes, as well as any necessary labelling requirements.
- Deposits, handling fees and other financial components and the applicability of GST to each of these components through the distribution and redemption cycle.
- Authority to impose the deposits.
- Authority to redeem the deposits (whether for depots, point of sale or RVMs, whichever are selected).
- Process for 'clearing' containers and responsibilities of designated parties (whether public or private).
- Whether or how the deposit would be applied in pubs, clubs and similar venues given the large quantities of beverage containers involved and potential ramifications on competition and taxation.
- Appropriate roles and responsibilities for convenience stores and milk bars will need to be carefully considered from both a convenience and enforcement perspective. For instance, would any convenience requirements for retailers specifically include or exclude small

retailers below a certain turnover threshold? Sweden and Denmark, in particular, have reported difficulties enforcing CDS provisions with convenience stores[102].

- Return targets (if any) and processes for judging progress against the targets.
- Allocation of unredeemed deposits and any restrictions on their use.
- Any consumer information and education requirements.
- Regulatory process for making changes to the program over time.
- Legal authority to invoke fines for noncompliance and a fine structure that can be readily imposed.
- Key implementation timelines.
- Sunset provisions (if any).

Information on direct costs of these provisions is scarce, and could vary significantly depending on program design. Most information relates to overall governance, rather than valuing potential impacts or improvements. However, a review of collection arrangements in SA, in consultation with the Crown Solicitors Office, found that the depot system should ensure a fair price for depot operators, including reasonable returns and profits. It also found that the EPA could conduct a price review and cost determination in order to improve industry collection arrangements.[103]

A multi-stakeholder group in the US studied 1999 program costs in CDS States (traditional CDS States plus California) and non-CDS States in three alternative measures (gross costs, net costs including material sales revenue and net costs less funds from unredeemed containers). Based on typical costs per-container, exclusive of processing fees, handling fees or local funding mechanisms, the report found (all values in 1999 US$)[104]:

- Beverage container recovery has a net cost that must be covered by some type of funding mechanism. Weighted average net unit costs in CDS States are 1.53¢ per container and are 1.25¢ per container in non-CDS States.
- Traditional CDS has the highest gross cost (3.61¢ per container), but also the highest overall recovery rate (61.6%). Net costs including revenue from material sales were 2.21¢ per container.
- Manual handling and sorting by brand (by retailers and depots) are costly (with gross costs of 4.07¢ per container and 2.67¢ per container net costs including material sales).
- RVMs reduce gross cost of traditional CDS to 2.53¢ per container and net costs including material sales to 1.13¢ per container.
- CDS yields the highest quality materials with the highest market values.
- Kerbside recycling programs have the second highest gross costs (2.48¢ per container and 1.72¢ per container net costs including material sales), and the second highest overall recovery rates (18.5% in non-CDS States and 9.5% in CDS States).
- System costs of the California program were among the lowest identified (1.62¢ per container and 0.55¢ per container net costs including material sales).

The report found including unredeemed deposits as a revenue source drastically altered the comparisons, with[105]:

- Kerbside recycling programs the most costly (1.72¢ per container, with no offsetting unredeemed deposits).
- Traditional CDS with manual sorting cost 0.80¢ per container.
- Residential drop-off programs (centralised staffed or unstaffed facilities where consumers return recyclables and sometimes garbage) cost 0.30¢ per container.

- Surpluses in the California approach (0.42¢ per container) and RVM-based CDS (0.28¢ per container) when the unredeemed deposits are included.

This and similar studies are not directly comparable to Australia's current conditions, especially given age, different program features, lack of RVMs and greater development of kerbside recycling in Australia than the US, however they do provide indicative figures that correspond with trends observed elsewhere.

Regardless of specific structure, any CDS program would have establishment costs and ongoing operations and maintenance costs that will need to be funded in some manner. A 2007 study on CDS for Queensland estimated infrastructure costs alone between $37m and $59m, or $29.36 to $47.10 per household with kerbside recycling p.a. An estimated 38,900 tonnes of recyclables collected through kerbside recycling would likely be diverted under CDS, resulting in $7.9m in lost material value to kerbside recycling programs in Queensland (almost $5.6m in South-East Queensland alone). The study also found that CDS could potentially be Constitutionally invalid in the absence of national consensus.[106]

11.2 Administration and Governance

The WA CDS inquiry recommended an independent body governed by a group of representative stakeholders. The investigation also determined that transparency and auditability are more important than whether a CDS is publicly or privately owned, noting that an industry-led program could be accompanied by appropriate legal mechanisms to ensure transparency and openness[107].

A ruling by the European Court of Justice against Germany's introduction of CDS made it clear that there needs to be a sufficient transition period prior to CDS introduction to adapt production and management of eligible containers. Other lessons from Germany include[108]:

- An appropriate level of detail is necessary in the original legislation to avoid significant disruptions with CDS introduction (a finding reinforced by Hawaii's CDS introduction), particularly if the deposit amount is high.
- It is essential to first understand the beverage market and then design the CDS around the market. This is especially important given the significant changes in the market in the past few decades.
- Provisions should be instituted to ensure that redeemed containers get recycled.

A State audit of Hawaii's CDS introduction also highlighted the importance of a sufficient transition period prior to CDS introduction to establish transparent and accountable administrative and auditing procedures, commingled redemption rates for kerbside recycling, redemption procedures and a redemption network, and to train staff and educate consumers[109].

Key administrative and governance issue to address prior to introduction of any CDS in Tasmania would include[110]:

- Authority for state agency staffing and other spending necessary for ramping up.
- Approval process and labelling requirements for applicable beverage containers before they can be sold.
- Transparent and accountable procedures for managing flows of deposits, handling fees and containers to help ensure responsible management.
- Audit procedures.
- Penalties for non-compliance.

- Provisions for shutting down operators consistently flouting appropriate redemption procedures.
- Provisions for quantifying and reporting social, economic and environmental impacts.
- Provisions for reporting both redemption rates and recycling rates.
- Any consumer information and education requirements, as well as internal state agency training.

11.3 Extrapolation from South Australian Depot Data

As one of several approaches to estimate potential recovery under a CDS scheme in Tasmania, Hyder conducted a 'first blush' assessment based on publicly available data from SA's depots for 2006-2007[111]. Reported data for CDS recovery (both in tonnes and in number of units recovered) and non-CDS recovery (which may include CDS packaging recovery through non-CDS routes such as through kerbside recycling) was assessed and converted into values per capita for SA's population of 1,580,000 as of 30 June 2007[112]. Results for SA's CDS materials are provided in Table 7.

Table 7: South Australian Depot Return Data for CDS Materials 2006-2007

Material	(Units)	(%)	(Units/Capita)	(Tonnes)	(%)	(Kg/ Capita)
LPB cartons	27,812,392	6%	17.6	579	2%	0.4
Glass	122,116,000	26%	77.3	26,432	78%	16.7
PET	99,372,374	21%	62.9	3,750	11%	2.4
HDPE	4,923,967	1%	3.1	109	0.3%	0.1
Aluminium	212,742,480	46%	134.6	3,127	9%	2.0
Total	**466,967,213**	**100%**	**295.5**	**33,997**	**100%**	**21.5**

Source: Hyder Consulting 2008b, with additional analysis by Hyder Consulting

Note that only total recovery values for plastics 3-7 were included in the SA data, as these plastics are not subject to CDS in SA. Calculations on unit basis and splits between CDS and non-CDS recovery are therefore not applicable using this approach for plastics 3-7.

Per capita values from Table 7 were multiplied by Tasmania's population of 493,400 as of 30 June 2007[113] to determine the indicative potential recovery shown in Table 8. These and subsequent estimates have been rounded to address levels of uncertainty.

Table 8: Indicative Tasmanian CDS and Non-CDS Recovery Applying SA per Capita Data

	Net Recovery	CDS Recovery		Non-CDS/ Kerbside Recovery	% CDS Recovery	% non-CDS/ Kerbside Recovery
Material	(Tonnes)	(Units)	(Tonnes)	(Tonnes)	(%)	(%)
LPB cartons	429	8,685,200	181	248	42%	58%
Glass	15,608	38,134,200	8,254	7,354	53%	47%
PET	1,675	31,031,900	1,171	504	70%	30%
HDPE	557	1,537,600	34	523	6%	94%
Aluminium	2,254	66,434,900	976	1,278	43%	57%
Total	**20,523**	**145,823,800**	**10,616**	**9,907**		

With the exception of HDPE, all of the materials in Table 8 show increased recovery tonnages over the values reported in Table 3 for recycling from Tasmanian Material Recovery Facilities and could be in line with potential recovery volumes under CDS. These results will be addressed further in subsequent calculations as part of 'ground-truthing' various assumptions.

11.4 Material-Specific Calculations

Given the lack of quantification on total numbers and volumes of beverages (by material type and by container type) sold in Tasmania, Hyder attempted to derive estimates from national data for aluminium and glass. These materials were selected as they provided the greatest likelihood for accurate estimation and the most significant materials by weight and material value. Aluminium and glass are also likely to represent the most significant materials of potential net benefits. Hyder determined that estimates for other materials would be too inaccurate or imprecise for this project.

The Aluminium Can Group website reports aluminium can beverage can data on an annual basis from 1980 to 2005[114]. Deriving from this data and applying 2008 Tasmanian population data, Hyder estimated that 80 million aluminium beverage cans, equal to 1,174 tonnes of aluminium, are consumed annually in Tasmania and potentially available for recovery. This estimate is consistent with estimates based on confidential data from depots and other recyclers in SA, so a reasonable degree of confidence is available for this estimate.

Available data from Tasmanian Material Recovery Facilities (Table 3) for aluminium does not include recovery for 'door trade', aluminium purchased for scrap value from individuals and businesses and shipped directly to mainland markets. A 'low baseline' of 50% and a 'high baseline' of 70% aluminium recycling rates were assumed as potential rates for current aluminium recycling in Tasmania, based on consultations with various recyclers in Tasmania. The 2007 national aluminium recycling rate is estimated at 70%[115], so in the absence of specific data for Tasmania, 70% seems a reasonable upper baseline for aluminium in Tasmania. An upper estimate of an 85% aluminium recycling rate was assumed as possible under a Tasmanian CDS based on current SA and California data[116].

Using a life cycle assessment approach[117], Hyder estimated environmental benefits of recycling aluminium at both the 50% and 70% assumed baseline levels to reflect the benefits of aluminium recycling that may already be occurring in Tasmania. Hyder also estimated the

marginal benefits of recycling at an assumed 85% recycling rate for aluminium, compared to the estimated baseline levels. Marginal benefits represent the additional environmental benefits resulting from the higher aluminium recycling under CDS, compared to the current estimated aluminium recycling in Tasmania. Results are provided in Table 9.

Table 9: Environmental Benefits and Marginal Benefits of Recycling Aluminium at Assumed Rates

	Potential CDS 85% Recycling Rate Assumed	Low Baseline - 50% Recycling Rate Assumed		High Baseline - 70% Recycling Rate Assumed	
Aluminium	Benefits	Benefits	Marginal Benefits	Benefits	Marginal Benefits
Cans Recycled (Million Units)	68	40	28	56	12
Recycled (tonnes)	1,000	590	410	820	180
GHG Emissions Reduction (t CO2-e)	15,100	8,900	6,200	12,500	2,700
Water Savings (ML)	232.7	136.9	95.8	191.6	41.1
Energy Savings (kWH)	47,400,300	27,882,500	19,517,800	39,035,500	8,364,800

While the benefits of reduced aluminium beverage litter would clearly be in Tasmania, most environmental benefits of increased aluminium recycling under CDS in Table 9 would be correctly attributed to the jurisdictions where raw materials would otherwise have been extracted or where the recovered aluminium is processed into new cans. Reduced greenhouse gas (GHG) emissions would provide benefits best attributed globally, however from a GHG accounting perspective, these benefits would not necessarily be credited to Tasmania. Therefore, associated environmental benefits of CDS other than reduced aluminium can litter would likely accrue in jurisdictions other than Tasmania.

Hyder also estimated financial benefits of aluminium recycling (excluding externality benefits) under CDS by building on the above estimates and developing the following scenarios:

- **Low Range**: assumes a 70% baseline aluminium recycling rate, low scrap value range of $0.50 per kg, a 10¢ deposit value and a potential 85% aluminium recycling rate under CDS.
- **Moderate Range**: assumes a 60% baseline aluminium recycling rate, midpoint scrap value of $0.55 per kg, a 20¢ deposit value and a potential 85% aluminium recycling rate under CDS.
- **High Range**: assumes a 50% baseline aluminium recycling rate, high scrap value of $0.60 per kg, a 20¢ deposit value and a potential 85% aluminium recycling rate under CDS.

Results are shown in Table 10. Note that these results are indicative only, are assigned broadly (i.e., not allocated to specific stakeholders) and do not include financial costs to implement CDS.

Table 10: Marginal Financial Benefit for Aluminium

Aluminium	Low Range	Moderate Range	High Range
Marginal Financial Benefit ($ p.a.)	$6.9 million	$13.7 million	$13.8 million

The lack of significant difference between the Moderate and High Range estimates in Table 10 is due to the overwhelming significance of the assumed 20¢ deposit in both scenarios, compared to the 10¢ deposit in the Low Range estimate. Assumed values for scrap value were insignificant compared to the impact of assumptions about deposit value. Scrap values in isolation from the deposit value are provided in Table 11.

At an assumed potential recovery rate of 85% under CDS, aluminium would generate unredeemed deposits of $1.2m p.a. at a 10¢ deposit and $2.4m p.a. at a 20¢ deposit.

The marginal financial benefits shown for aluminium in Table 10 do not address the distribution of those benefits (and associated costs) or the potential impacts on kerbside recycling, both of which could be substantial. The clear majority of benefits in Table 10 results from deposit values, as initiated by fillers, passed on to consumers and redeemed through CDS. Allocation of costs and benefits from those deposits is subject to significant controversy (Section 6).

Table 11 examines potential aluminium scrap value for a range of assumed scrap values and across the baseline rates (50% and 70%) outlined above, as well as the assumed aluminium recycling rate (85%) potentially achievable under CDS.

Table 11: Aluminium Scrap Value under Various Assumed Recycling Rates

Aluminium Scrap Value	Baseline 50% Recycling Rate Assumed	Baseline 70% Recycling Rate Assumed	Potential CDS 85% Recycling Rate Assumed
Assuming $500 per tonne	$293,400	$410,800	$498,800
Assuming $600 per tonne	$352,100	$492,900	$598,500

Potential for the aluminium scrap values in Table 11 to be diverted from kerbside recycling and impact on collection and processing contracts depends on the extent to which the deposit motivates consumers to redeem the containers, convenience of redemption options and the extent to which current recycling companies establish redemption facilities. Again, available data shows significant variation.

Table 8 shows that in SA in 2006-2007, around 43% of aluminium is recovered through CDS and around 57% of aluminium is recovered through non-CDS means, namely kerbside recycling. However, California data for 2007[118] shows that 93% of aluminium returns were through CDS, only 5% was through kerbside and 2% was through community organisations.

Estimations of glass recycling could not be conducted to the same level of detail as aluminium, especially given the greater variability in glass container sizes and weights per container. Reliable estimates of the number of glass containers in Tasmania could not be determined for this report. The glass industry estimates that 90% by weight of glass packaging consumption in Australia is beverage container packaging. Applying this rate and Tasmania's population to the estimated 893,031 tonnes of glass packaging consumption in Australia in 2007[119], Tasmanian glass packaging consumption in 2006-2007 was an estimated 18,486 tonnes.

The 2007 national glass recycling rate is estimated at 46%[120]. Applying this rate to estimated Tasmanian glass packaging consumption results in an estimated 8,500 tonnes Tasmanian glass packaging recycling in 2006-2007. However, available data from Tasmanian Material Recovery Facilities (Table 3) for glass shows 10,572 tonnes of glass recycling in 2006-2007. Assuming that 90% by weight of the reported glass recovery is beverage containers, using the figure from Table 3 results in an estimate of 9,520 tonnes Tasmanian glass beverage container packaging in 2006-2007, equal to a recycling rate of 51.5%. Hyder assumed low and high baseline glass recycling rates in Tasmania as 46% and 51.5%, respectively, based on this data. An upper estimate of a 67% glass recycling rate was assumed as possible under a Tasmanian CDS based on 2007 California data[121].

Using a life cycle assessment approach, Hyder estimated environmental benefits of recycling glass at both the 46% and 51.5% assumed baseline levels to reflect the benefits of glass recycling that may already be occurring in Tasmania. Hyder also estimated the marginal benefits of recycling at an assumed 67% recycling rate for glass, compared to the estimated baseline levels. Marginal benefits represent the additional environmental benefits resulting from the higher glass recycling under CDS, compared to the current estimated glass recycling in Tasmania. Results are provided in Table 12.

Table 12: Environmental Benefits and Marginal Benefits of Recycling Glass at Assumed Rates

	Potential CDS 67% Recycling Rate Assumed	Low Baseline - 46% Recycling Rate Assumed		High Baseline - 51.5% Recycling Rate Assumed	
Glass	Benefits	Benefits	Marginal Benefits	Benefits	Marginal Benefits
Recycled (tonnes)	12,380	8,500	3,880	9,520	2,870
GHG Emissions Reduction (t CO2-e)	4,090	2,810	1,280	3,140	950
Water Savings (ML)	24.7	17.0	7.8	19.0	5.7
Energy Savings (kWH)	13,073,500	8,975,900	4,097,700	10,043,400	3,030,100

As with the estimates for aluminium recycling above, the benefits of reduced glass beverage litter would clearly be in Tasmania, while environmental benefits of increased glass recycling under CDS in Table 12 would be correctly attributed to the jurisdictions where raw materials would otherwise have been extracted or where the recovered glass is processed into new containers. Reduced GHG emissions would provide benefits best attributed globally, however from a GHG accounting perspective, these benefits would not necessarily be credited to Tasmania. Therefore, associated environmental benefits of CDS other than reduced glass litter would likely accrue in jurisdictions other than Tasmania.

The estimates of environmental benefits of aluminium and glass recycling under CDS above are net of collection and transport impacts for recovering these materials and processing them into new products. Impacts of additional consumer trips to redeem containers through depots[vii]

[vii] Redemptions at point of sale, whether through retailers or RVMs, are assumed to have no additional transport impacts as consumers are likely to return containers to point of sale in the course of other shopping, rather than making a separate trip to redeem the containers.

would on the surface appear to generate greater environmental impact than the relatively efficient collections from kerbside recycling. However, in 2000 the peer-reviewed *Independent Assessment of Kerbside Recycling in Australia*[122] determined that the environmental costs of collection and long distance hauling to end use markets were far less than the environmental benefits from recycling kerbside recyclables. Impacts associated with the collection system were estimated at only $3 per household p.a.

The *Independent Assessment of Kerbside Recycling in Australia*[123] also determined that the overall average benefit for regional areas of $29 per household p.a. for kerbside recycling would reduce to zero when the average travel distance to markets exceeds 1,300 km for the material mix collected. The report noted that viable travel distance varies by material. The average transport distance assumed for glass in the assessment was 287 km from Tasmanian regional centres and 300 km for Tasmanian rural and metro centres. For aluminium, the average transport distance assumed in the assessment was 1,320 km from Tasmanian regional centres and rural areas, and 2,100 km from Tasmanian metro areas. Transport of recovered materials to end use markets is therefore likely to diminish most of the environmental benefits possible under CDS for aluminium and potentially glass. While secondary market development can offset some of the transport impacts for glass, recovered aluminium and plastics would still require shipment out of Tasmania.

12 Conclusions

Although additional analyses and consultations would be necessary to refine specific components, analysis indicates that the most feasible CDS for Tasmania would have the following features:

- **Operational Approach**: One designated not-for-profit business responsible for implementing the CDS system. Both industry-driven and NGO-driven approaches were supported by stakeholders, but we see no particular reason to exclude either and suggest the possibility of one not-for-profit business comprising industry and/or community groups to be determined following an open, competitive process and Ministerial appointment. The selection process would involve expected performance indicators and flexibility in developing optimal consumer convenience, redemption features (depots, reverse vending machines and/or point of sale) to capitalise on existing and proposed infrastructure, and optimising a CDS approach while minimising costs. Funding could be tied to a large extent to performance indicators such as recovery rates to minimise perverse incentives.
- **Deposit:** A deposit of 20¢ per designated container is recommended. Where stakeholders indicated that a deposit would motivate consumers, 10¢ was seen as sufficient and 20¢ was not viewed as providing significantly stronger incentive. A 20¢ deposit would likely increase recovery rates and provide greater incentive over time than a 10¢ deposit, but could also result in significant distortions and potential for fraud. Enforcement efforts will need to be adequately designed and funded.
- **Container scope:** Beer, carbonated soft drinks and water are included in all CDS programs and are significant source of beverage containers. Demarcation within and beyond this traditional scope of beverage containers would be necessary to address the vast range of beverage and container types currently available and likely in the future. However, in order to maximise equity and minimise potential distortions between beverage types (especially given the relatively high recommended deposit of 20¢), it is recommended that CDS apply to all beverages in liquid or “ready to drink” form intended for human consumption.
- **Redemption Features:** An estimated 38 to 46 depots would likely be necessary to ensure comparable coverage in metropolitan areas and regional centres to current CDS programs. Initial capital costs of $9.5m to $13.8m could be expected for depot establishment. Potential roles for reverse vending machines and the possibility of point of sale returns should be considered, but the precise mix of redemption options should be the responsibility of the not-for-profit business given responsibility for implementation. The not-for-profit business would be obligated to deliver optimal coverage and convenience and maximise return rates, while minimising program costs.
- **Unredeemed Deposits:** At a 20¢ deposit amount, annual unredeemed deposits almost exactly equal the range of estimated initial capital costs for depot establishment ($9.3m at an 80% return rate and $13.9m under a 70% return rate). Additional programs costs such as enforcement, education and other means of providing redemption facilities would need to be addressed through material scrap values and/or through additional Container Recycling Fee or handling fee arrangements.
- **Handling Fees/ Container Recycling Fees:** Enabling legislation should allow for variable Container Recycling Fees to be paid to redemption operators to address program costs not captured in the deposit amount of unredeemed deposits. These Container Recycling Fees should be regularly reviewed, revised and reported in a transparent manner and underpinned by independent auditing and verification.
- **Legislative Arrangements:** A broad range of legislative arrangements and their respective costs would need to be considered prior to any introduction of CDS. Chief

among these are: need for national consistency to minimise likelihood of Constitutional challenges; applicability of GST; objectives the program is intended to accomplish; robust exploration of options, specifically including advance disposal/recycling fees and material specific fees such as a glass levy; analysis of social, economic and environmental costs and benefits; and evaluation of *Trade Practice Act* and *Mutual Recognition Act* implications.

- **Administration and Governance:** As with legislative arrangements, a broad range of administrative and governance issues and their respective costs have been identified that would need to be considered prior to any introduction of CDS and to assist transitioning into a new approach. It is essential to first understand the beverage market in far greater detail than is currently available and then design CDS specifics around the market. Provisions should also be instituted to ensure that redeemed containers get recycled, including funding for local secondary market development for materials problematic in Tasmania such as glass.

Modelling yielded the following environmental benefits and marginal benefits for aluminium (Table 13) and glass (Table 14). Marginal benefits are the additional benefits resulting from CDS above and beyond assumed levels of baseline recycling activity. Associated environmental benefits of CDS other than reduced glass litter would likely accrue in jurisdictions other than Tasmania; benefits from reduced GHG emissions are global in nature and not likely to be credited specifically to Tasmania. Results are indicative only, are assigned broadly (i.e., not allocated to specific stakeholders) and do not include financial costs to implement CDS.

Table 13: Environmental Benefits and Marginal Benefits of Recycling Aluminium at Assumed Rates

	Potential CDS 85% Recycling Rate Assumed	Low Baseline - 50% Recycling Rate Assumed		High Baseline - 70% Recycling Rate Assumed	
Aluminium	Benefits	Benefits	Marginal Benefits	Benefits	Marginal Benefits
Cans Recycled (Million Units)	68	40	28	56	12
Recycled (tonnes)	1,000	590	410	820	180
GHG Emissions Reduction (t CO2-e)	15,100	8,900	6,200	12,500	2,700
Water Savings (ML)	232.7	136.9	95.8	191.6	41.1
Energy Savings (kWH)	47,400,300	27,882,500	19,517,800	39,035,500	8,364,800

Table 14: Environmental Benefits and Marginal Benefits of Recycling Glass at Assumed Rates

	Potential CDS 67% Recycling Rate Assumed	Low Baseline - 46% Recycling Rate Assumed		High Baseline - 51.5% Recycling Rate Assumed	
Aluminium	Benefits	Benefits	Marginal Benefits	Benefits	Marginal Benefits
Recycled (tonnes)	12,380	8,500	3,880	9,520	2,870
GHG Emissions Reduction (t CO2-e)	4,090	2,810	1,280	3,140	950
Water Savings (ML)	24.7	17.0	7.8	19.0	5.7
Energy Savings (kWH)	13,073,500	8,975,900	4,097,700	10,043,400	3,030,100

Transport of recovered materials to end use markets is likely to diminish most of the environmental benefits possible under CDS for aluminium and potentially glass. While secondary market development can offset some of the transport impacts for glass, recovered aluminium and plastics would still require shipment out of Tasmania.

Endnotes

[1] EUROPEN 2007

[2] C4ES 2000, State of Hawaii 2005

[3] Franklin 1997, OECD 2005

[4] OECD 2005

[5] Perchards 2008a

[6] C4ES 2000

[7] Boomerang Alliance 2008a, Boomerang Alliance 2008b, C4ES 2000, Martin 2003, MS2 2006, West and Hogarth 2005

[8] Perchards 2008a

[9] C4ES 2000, C4ES 2002, Perchards 2008a

[10] State of Hawaii 2005

[11] Perchards 2008a, State of Hawaii 2005

[12] C4ES 2000, CJ Consulting 2003, CM Consulting 2003

[13] C4ES 2000

[14] Personal communication with Neil Hastie, CEO of Encorp Pacific

[15] EUROPEN 2007, Perchards 2008a

[16] Perchards 2008a

[17] C4ES 2000

[18] Perchards 2008a, SAG 2007

[19] Perchards 2008a, SAG 2007

[20] Perchards 2008a, SAG 2007

[21] Perchards 2008a, SAG 2007

[22] CM Consulting 2003, Perchards 2008a, RW Beck 2002, SAG 2007

[23] Perchards 2008a, SAG 2007

[24] SAG 2007

[25] Perchards 2008a

[26] EPA South Australia 2002, ISF 2001, Perchards 2008a, RW Beck 2002, SAG 2007, State of Hawaii 2005

[27] Perchards 2008a

[28] SAG 2007

[29] Boomerang Alliance 2008a, Boomerang Alliance 2008b, Boomerang Alliance 2008c, C4ES 2000, ISF 2001, SAG 2007

[30] C4ES 2000

[31] Hudson Howells 2005

[32] Covec 2008, Hudson Howells 2005

[33] Boomerang Alliance 2008a, Boomerang Alliance 2008b, Boomerang Alliance 2008c, C4ES 2000, ISF 2001, Parliament of Tasmania 2006, Perchards 2008a, SAG 2007

[34] AECgroup 2007

[35] Parliament of Tasmania 2006, p.18

[36] IndustryEdge 2009

[37] Martin 1998, Martin 2003, MS2 2006

[38] Hudson Howells 2005

[39] C4ES 2000

[40] Perchards 2008a

[41] Perchards 2008a, RW Beck 2002, SAG 2007, State of Hawaii 2005

[42] Perchards 2008a, RW Beck 2002, SAG 2007, State of Hawaii 2005

[43] CM Consulting 2003

[44] ISF 2001

[45] SAG 2007

[46] California Division of Recycling, CM Consulting 2003, Government of South Australia 2008, MS2 2006, MS2 and Perchards 2008, RW Beck 2002

[47] C4ES 2000

[48] Perchards 2008a

[49] Pintgen 2008

[50] State of Hawaii 2005

[51] DoC 2006, Perchards 2008a, SAG 2007

[52] Perchards 2008a

[53] Hudson Howells 2005, p.10

[54] SAG 2007

[55] C4ES 2000

[56] SAG 2007

[57] Boomerang Alliance 2008a, Boomerang Alliance 2008b, Boomerang Alliance 2008c, C4ES 2000, C4ES 2002, EPA South Australia 2002, ISF 2001, Martin 2005a and 2005b, Morawski 1999, MS2 2006, MS2 and Perchards 2008, Perchards 2008a, Productivity Commission 2006, Parliament of Tasmania 2006

[58] Martin 2005a, Martin 2005b, MS2 2006

[59] C4ES 2002, Perchards 2008a

[60] C4ES 2000, EUROPEN 2007, MS2 2006, MS2 and Perchards 2008, Perchards 2008a

[61] Boomerang Alliance 2008c

[62] Perchards 2008b

[63] Pintgen 2008

[64] EUROPEN 2007, Perchards *et al* 2005

[65] ISF 2001

[66] Martin 2005a, Martin 2005b, Queensland EPA 2007b

[67] MS2 2006, Perchards 2008a

[68] MMA and BDA Group 2003, Productivity Commission 2006

[69] MS2 2006

[70] Boomerang Alliance 2008a, Boomerang Alliance 2008b, Boomerang Alliance 2008c, Boomerang Alliance 2008d, C4ES 2000, C4ES 2002, CJ Consulting Inc. 2003, Covec 2007, Envision 2007, EPA Victoria 2003, EUROPEN 2004, ISF 2001, LGSA 2000, MS2 2006, Parliament of Tasmania 2006, Perchards 2008a, Perchards 2008b, Revive Recycling 2008, RW Beck 2002, SAG 2007, SRM *et al* 2005

[71] Hyder Consulting 2008a

[72] C4ES 2000, C4ES 2002, Covec 2008, EPA Victoria 2003, EUROPEN 2004, MS2 2006, Parliament of Tasmania 2006, Perchards 2008a, Perchards 2008b, Productivity Commission 2006, RW Beck 2002, Syrek 2003

[73] Martin 2005a

[74] Martin 2005b

[75] C4ES 2002

[76] EPA Victoria 2003

[77] Covec 2008

[78] EPA Victoria 2003

[79] Boomerang Alliance 2008a, Boomerang Alliance 2008b, Boomerang Alliance 2008c, Boomerang Alliance 2008d, C4ES 2000, C4ES 2002, CJ Consulting Inc. 2003, Envision 2007, EPA Victoria 2003, EUROPEN 2004, ISF 2001, LGSA 2000, MS2 2006, Parliament of Tasmania 2006, Perchards 2008a, Perchards 2008b, Revive Recycling 2008, RW Beck 2002, SAG 2007

[80] McGregor Tan Research 2004

[81] Queensland EPA 2008

[82] C4ES 2000

[83] Perchards 2008a

[84] SWSA 2007

[85] DTAE 2007

[86] C4ES 2000

[87] DTAE 2007 and NEPC 2008

[88] SWSA 2006

[89] Government of Tasmania 2008

[90] SWSA 2006

[91] KAB 2008

[92] DTAE 2007

[93] Perchards 2008a

[94] Perchards 2008a

[95] ABS 2009

[96] C4ES 2000, ISF 2001 and EPA Victoria 2003, as adjusted for inflation

[97] Pers comm. with Jenny Pickles of the Australian Food and Grocery Council's Packaging Stewardship Forum.

[98] ABS 2009

[99] DoC 2006, Perchards 2008a, SAG 2007

[100] C4ES 2000

[101] Envision 2007, Hudson Howells 2005, Perchards 2008a, SAG 2007, State of Hawaii 2005

[102] Perchards 2008a

[103] Hudson Howells 2005

[104] RW Beck 2002

[105] RW Beck 2002

[106] Queensland EPA 2007a, Queensland EPA 2007b

[107] SAG 2007

[108] Perchards 2008a

[109] Perchards 2008a, State of Hawaii 2005

[110] Envision 2007, Hudson Howells 2005, Perchards 2008a, SAG 2007, State of Hawaii 2005

[111] Hyder Consulting 2008b

[112] ABS 2008

[113] ABS 2008

[114] Available at http://esvc000061.wic032u.server-web.com/Facts2.html.

[115] Reported by the National Packaging Covenant Council in the Covenant's Mid-Term Review, end 2008 and in Hyder Consulting 2008a.

[116] Hyder Consulting 2008b, California Department of Conservation 2008

[117] For the purposes of deriving easily communicable benefits associated with container recycling, life cycle inventory (LCI) databases were used to determine the greenhouse benefits, energy savings and water savings associated with recycling glass and aluminium containers. Virgin product systems have been directly compared to recycled product systems to determine the environmental benefits associated with recycling each material type. The avoidance of impacts associated with resource extraction, materials production and manufacturing process were also included. These scientific conversion factors were derived from assessment calculations and modelling done as part of the Benefits of Recycling study and calculator prepared by Nolan ITU (now Hyder) for the New South Wales Department of Environment and Climate Change. The Benefits of Recycling study provides a detailed methodology and further information on the sources and relevant assumptions used in deriving these factors.

[118] California Department of Conservation 2008

[119] Hyder Consulting 2008c, MS2 and Perchards 2008

[120] Reported by the National Packaging Covenant Council in the Covenant's Mid-Term Review, end 2008 and in Hyder Consulting 2008a.

[121] California Department of Conservation 2008

[122] Nolan-ITU and SKM 2000

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Appendix A

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Appendix B

Programme Details

References in the following are provided at the end of this Appendix.

1 Deposit Amounts

1.1 Australia

Region	Containers Covered	Beverages Covered	Deposit Amount
South Australia	Glass, cans, PET, LPB[1]	Beer, soft drinks, water, juice and flavoured milk[2]	AUD 0.05 - 0.10[2]

1.2 Canada

Region	Containers Covered	Beverages Covered	Deposit Amount
Alberta	Aluminium, plastics, glass, polycoat, bi-metal[1]	All ready-to-drink beverages except milk[2]	CAD 0.05 Containers < 1 L CAD 0.20 Containers > 1 L CAD 0.05 Wine and Spirit Containers <501ml CAD 0.05 Wine and Spirit Containers 501ml-1 L CAD 0.20 Wine and Spirit Containers greater than 1 L CAD 0.10 Beer can CAD 0.10 Beer Bottles up to 1 L CAD 0.20 Beer Bottles greater than 1 L CAD 0.10 Refillable beer bottles[3]
British Columbia	Glass, aluminium, plastics[1]	All ready-to-drink beverages except dairy[2]	CAD 0.05 Containers < 1 L CAD 0.20 Containers > 1 L CAD 0.10 Wine and Spirit Containers <501ml CAD 0.10 Wine and Spirit Containers 501ml-1 L CAD 0.20 Wine and Spirit Containers greater than 1 L CAD 0.10 Beer can CAD 0.10 Beer Bottles up to 1 L CAD 0.20 Beer Bottles greater than 1 L CAD 0.10 Refillable beer bottles[3]
Manitoba	Containers for beer only[2]	Beer[2]	CAD 0.10[2]
New Brunswick	Glass, PET, Aluminium[1]	All ready-to-drink beverages except milk[2]	CAD 0.10 - 0.20[2]
Newfoundland	Containers for all ready-to-drink beverages except milk[2]	All ready-to-drink beverages except milk[2]	CAD 0.06 - 0.20[2]
Nova Scotia	Glass, PET, Aluminium[1]	All ready-to-drink beverages except milk[4]	Non-liquor: 10 ¢; Liquor:

			Refillable <1L: 10 ¢ Refillable >1L: 20 ¢ Non-refillable <500mL: 10 ¢ Non-refillable >500mL: 20 ¢[4]
Prince Edward Island	Containers for all ready-to-drink beverages except milk and drinks made from milk or milk substitutes[2]	All ready-to-drink beverages except dairy[2]	CAD 0.10 - 0.20[2]
Quebec	Glass, PET, Aluminium[1]	Beer and soft drinks only[2]	CAD 0.05 - 0.20[2]
Saskatchewan	Glass, PET, Aluminium, Refillable beer bottles[2]	Soft Drinks, Wine, Fruit & Vegetable Juices, Liquor, Iced Tea, Beer & Non-Alcoholic Beer, Fruit Drinks, Mineral and Table Waters[5]	CAD 0.1 Metal cans < 1L CAD 0.2 Metal cans > or equal to 1L CAD 0.1 Glass bottles < or equal to 300ml CAD 0.2 Glass bottles 301-999ml CAD 0.4 Glass bottles > or equal to 1L CAD 0.1 Plastic bottles less than 1L CAD 0.2 Plastic bottles > or equal to 1L CAD 0.05 Juice box and Gabletop Refillable beer bottles: CAD 0.1[3] CAD 0.04 [5]

1.3 Europe

Region	Containers Covered	Beverages Covered	Deposit Amount	
Denmark	Aluminium, glass and PET[2]	Beer and carbonated drinks[2]		DKK / EUR
			Aluminium 0.33L	1.00 / 0.13
			Aluminium 0.50L	1.00 / 0.13
			Steel 0.33L	1.00 / 0.13
			Steel 0.5L	1.00 / 0.13
			Plastic 0.33L	1.00 / 0.13
			Plastic 0.5L	1.50 / 0.20
			Plastic 1.5L	3.00 / 0.40
			Plastic 2L	3.00 / 0.40
			Glass 0.33L	1.00 / 0.13
			Glass 0.5L	3.00 / 0.40[2]
Estonia	Glass, metal and plastic[2]	Beer, soft drinks, water and juice[2]	EEK 0.50 - 1.00[2]	
Finland	Glass, metal and plastic containers[2]	Beer, soft drinks, water, liquor, wine[6]	EUR 0.10 - 0.40[2]	
Germany	Glass, metal and plastic[2]	Beer, soft drinks, water[2]	EUR 0.25[2]	
Norway	All containers for all beverages[2]	Beer, carbonated beverages, wine, liquor, and non-	Aluminium cans (12¢)	NOK 1.00

		carbonated beverages, milk, milk products, vegetable juices and water[7]	Steel	NOK 1.00 (12¢)
			PET < 0.5L	NOK 1.00 (12¢)
			PET 0.5-1L	NOK 2.50 (30¢)
			PET 1L	NOK 2.50 (30¢)[2]
Sweden	Cans, glass and plastic bottles[2]	Beer, soft drinks and water[2]	Aluminium cans	SEK 0.50 (5¢)
			PET ≤ 1L	SEK 1.00 (10¢)
			PET > 1L	SEK 2.00 (20¢)[2]

1.4 U.S.

Region	Containers Covered	Beverages Covered	Deposit Amount
California	Aluminium, glass, PET, HDPE, PVC, PP, Bimetal[1]	Beer, soft drinks, water and juice[2]	USD 0.05 - 0.10[8]
Connecticut	Containers for beer and carbonated drinks[2]	Beer and carbonated drinks[2]	USD 0.05[2]
Delaware	PET, glass[1]	Beer and carbonated drinks (except naturally sparkling water) [2]	USD 0.05[2]
Hawaii	Glass, PET, HDPE and metal[2]	Beer, mixed spirits, wine drinks and ready-to-drink non-alcoholic drinks except dairy[2]	USD 0.05[9]
Iowa	Glass, metal and plastic[2]	Beer, carbonated drinks and liquor [2]	USD 0.05[2]
Maine	Glass, metal and plastic[2]	Beer, soft drinks, water, wine coolers and liquor[2]	USD 0.05 - 0.15[10]
Massachusetts	Containers for beer and carbonated drinks[2]	Beer, carbonated drinks[2]	USD 0.05[2]
Michigan	Containers for beer and carbonated drinks including mixed wine and spirit drinks[2]	Beer, carbonated drinks including mixed wine and spirit drinks[2]	USD 0.10[2]
New York	Containers for beer and carbonated drinks including wine coolers[2]	Beer, carbonated drinks including wine coolers[2]	USD 0.05[11]
Oregon	Containers for beer and carbonated drinks[2]	Beer, carbonated drinks[2]	USD 0.05 [12]
Vermont	Any container composed of glass, metal, paper, plastic or any combination (biodegradables excluded) [2]	Beer, malt, carbonated soft drinks, mixed wine drinks; liquor[13]	USD 0.05 - 0.15[13]

2 Handling Fees

2.1 Australia

Region	Handling Fees
South Australia	Range from 29 to 45 ¢ per dozen, and are included into the wholesale price[14]

2.2 Canada

Region	Handling Fees
Alberta	Aluminium cans: CAD 0.028 PET 0 – 1L: CAD 0.0554 PET over 1L: CAD 0.075 PVC or HDPE 0 – 1L: CAD 0.080 HDPE over 1L: CAD 0.080 PVC over 1L: CAD 0.075 Polystyrene Cups (with sealed foil lid): CAD 0.080 Polystyrene 0 – 1L: CAD 0.080 Polystyrene over 1L: CAD 0.080 Glass up to 500ml: CAD 0.0718 Glass 501ml-1L: CAD 0.080 Glass over 1L: CAD 0.080 Drink box up to 500ml: CAD 0.053 Drink box 501ml-1L: CAD 0.053 Gabletop up to 500ml: CAD 0.080 Gabletop 501ml-1L: CAD 0.080 Bi-metal less than 1L: CAD 0.080 Bi-metal over 1L: CAD 0.080 Beer cans at Class "D" depots: CAD 0.0167 Non-refillable beer at Class "D" depots: CAD 0.0208 Refillable beer: CAD 0.0283 [3]
British Columbia	Aluminium cans: CAD 0.03 PET 0 – 1L: CAD 0.04 PET over 1L: CAD 0.07 PVC or HDPE 0 – 1L: CAD 0.08

	HDPE over 1L: CAD 0.08 PVC over 1L: CAD 0.04 Polystyrene Cups (with sealed foil lid): CAD 0.04 Polystyrene 0 – 1L: CAD 0.04 Polystyrene over 1L: CAD 0.07 Plastic <500ml: CAD 0.04 Plastic 501ml-1L: CAD 0.04 Plastic > 1L: CAD 0.07 Glass < 500ml: CAD 0.05 Glass 501ml-1L: CAD 0.05 Glass over 1L: CAD 0.05 Drink box up to 500ml: CAD 0.03 Drink box 501ml-1L: CAD 0.05 Gabletop < 1Ll: CAD 0.05 Gabletop >1L: CAD 0.05 Bi-metal < 1L: CAD 0.03 Bi-metal > 1L: CAD 0.05 Refillable beer: CAD 0.0242[3]
Manitoba	CAD 0.10[2]
New Brunswick	CAD 0.03[15]
Newfoundland	Half-back system: 3¢ is kept on the non-alcoholic bottles, 10¢ on the alcoholic [16]
Nova Scotia	CAD 0.379 [4]
Prince Edward Island	CAD 0.10 - 0.20[2]
Quebec	CAD 0.02 per container For refillable beer bottles: < 450ml CAD 0.05 > 450ml CAD 0.20 [1]
Saskatchewan	Aluminium cans: n/a PET 0 – 1L: n/a PET over 1L: n/a PVC or HDPE 0 – 1L: n/a HDPE over 1L: n/a PVC over 1L: n/a Polystyrene Cups (with sealed foil lid): n/a Polystyrene 0 – 1L: n/a Polystyrene over 1L: n/a Plastic <500ml: n/a Plastic 501ml-1L: n/a

Plastic > 1L: n/a

Glass < 500ml: n/a5

Glass 501ml-1L: n/a

Glass over 1L: n/a

Drink box up to 500ml: n/a

Drink box 501ml-1L: n/a

Gabletop < 1Ll: n/a

Gabletop >1L: n/a

Bi-metal < 1L: n/a

Bi-metal > 1L: n/a

Beer cans at Class "D" depots: n/a

Non-refillable beer at Class "D" depots: n/a

Refillable beer: 0.06 [3]

2.3 Europe

Region	Handling Fees			
Denmark	**Store Group**	**Aluminium and steel cans**	**Plastic bottles**	**Glass bottles**
	With RVMs and compactors, received investment subsidies in last 5 years	0.9 ore	1.9 ore	6 ore
	With RVMs but no compactors, received investment subsidies in last 5 years	1.5 ore	6.0 ore	7.8 ore
	With RVMs and compactors, no investment subsidies in last 5 years	0.9 ore	1.9 ore	6.0 ore
	With RVMs but no compactors, no investment subsidies in last 5 years	3.6 ore	6.0 ore	7.8 ore

	No RVMs	8.6 ore	10.3 ore	11.2 ore [2]

Estonia	Amount not known
Finland	Amount not known
Germany	n.a.
Norway	Manual handling: PET NOK 0.10, EUR 0.012 Cans NOK 0.05, EUR 0.006 Automated handling: PET < 1 litre NOK 0.25, EUR 0.030 PET > 1 litre NOK, 0.25, EUR 0.030 Cans NOK 0.20, EUR 0.025 [2]
Sweden	Manual handling: PET SEK 0.20, EUR 0.021 Cans SEK 0.00, EUR 0.000 Automated handling: PET < 1 litre SEK 0.40, EUR 0.043 PET > 1 litre SEK, 0.50, EUR 0.054 Cans SEK 0.15, EUR 0.016 [2]

2.4 U.S.

Region	Handling Fees
California	USD 0.0098 per eligible container [8]
Connecticut	CAD 0.015 for each beer container CAD 0.02 for each carbonated soft drink [1]
Delaware	USD 0.01 [1]
Hawaii	USD 0.01 [1]
Iowa	USD 0.01 [1]

Maine	In the U.S. the handling fee is about 1¢ or 2¢ in most States, the rate was set by the legislation when the deposit was introduced and not increases since.[2]
Massachusetts	USD 0.0225 [1]
Michigan	In the U.S. the handling fee is about 1¢ or 2¢ in most States, the rate was set by the legislation when the deposit was introduced and not increases since.[2]
New York	USD 0.02[11]
Oregon	In the U.S. the handling fee is about 1¢ or 2¢ in most States, the rate was set by the legislation when the deposit was introduced and not increases since.[2]
Vermont	USD 0.035 [13]

[1] SAG (2007).

[2] Perchards (2008). Personal communication.

[3] CM Consulting (2006)

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Appendix C

Green Dot Overview

In 1991 the German Packaging Ordinance was introduced to make industry responsible for handling its packaging waste. At the time, Germany was facing a severe shortage of landfill capacity and rising municipal waste management costs.[1]

German producers could either undertake direct take-back of their post-consumer packaging or join DSD, an industry producer responsibility organisation responsible for packaging waste management. Under the 'Green Dot' program that was implemented, most producers selling packaging or packaged products into Germany demonstrate that they have discharged their obligations under the Ordinance by paying licensing fees to DSD in exchange for inclusion under the DSD collection system. The Green Dot is intended to indicate on the packaging that appropriate license fees have been paid and the packaging can be collected through the DSD system or the local equivalent.

Broadly similar arrangements– with producers either paying all waste management costs for household packaging or in most cases a share of the costs – have been established in 25 European countries, although specifics of the licensing and collection systems vary significantly. DSD, owner of the Green Dot trademark, has licensed its use by similar industry-run bodies in other countries and the symbol appears on more than 460 billion packages every year.[2]

[1] MS2 2006

[2] DSD 2009