The Victorian Parliament Environment and Planning Committee
By email: recyclinginquiry@parliament.vic.gov.au
10th May 2019

Submission

Victorian Parliamentary Inquiry into Waste and Recycling

Thank you for the opportunity to comment on this Inquiry. Robert Kelman wears multiple hats within the recycling sector including;

- Executive Officer of the Australian Tyre Recyclers Association (ATRA)
- Director of EU based the Reloop Platform (https://reloopplatform.eu/) established to advance principles of a circular economy, and;
- Coordinator of the Australian Council of Recycling (ACOR) container deposit division

Terms of reference

The Environment and Planning Committee to inquire into;

1. the responsibility of the Victorian government to establish and maintain a coherent, efficient and environmentally responsible approach to solid waste management across the state, including assistance to local councils;
2. whether the China National Sword policy was anticipated and responded to properly;
3. identifying short and long-term solutions to the recycling and waste management system crisis, taking into account:
   a. the need to avoid dangerous stockpiling and ensure recyclable waste is actually being recycle
   b. the cleaning and sorting capabilities and the processing capabilities in Victoria and the potential to expand the local recycling industry
   c. how to better enable the use of recycled materials in local manufacturing;
   d. the existing business model and economic challenges facing the existing industry;
   e. the quantifiable benefits, including job creation and greenhouse gas emissions reduction, of pursuing elements of a circular economy in Victoria;
   f. the existing Sustainability Fund and how it can be used to fund solutions to the waste crisis;
4. strategies to reduce waste generation and better manage all waste such as soft plastics, compostable paper and pulp, and commercial waste, including, but not limited to:
   a. product stewardship;
   b. container deposit schemes;
   c. banning single-use plastics;
   d. government procurement policies
5. relevant reviews, inquiries and reports into the waste and recycling industry in other Australian jurisdictions and internationally;
6. any other related matters.

INTRODUCTION

It is no overstatement to say the world has and is fast catching up with Australia and Victoria's poor waste management and recycling programs and this inquiry is timely and appropriate.

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[redacted]

As China's Environment Minister stated in late 2018 as that massive market closed its gates to Australia and the worlds waste, *"I hate seeing my country as the dumpsite for the developed world … no developing nation should be the dumping site for the developed world."*[1]

And as a recent Greenpeace Asia report[2] revealed, as China shut its markets to Australia's mixed plastic and other 'recyclates' other 'less well regulated' SE Asian markets opened up and then subsequently (within 6months) followed China's lead and also shut.

Victoria is not alone in being unable to now dump its mixed and poor-quality kerbside materials onto Asian markets – though it is increasingly alone in the Australian context as the majority of states are reforming their approach through the introduction of container deposit schemes.

THE PROBLEM

The following submission is principally aimed at advocating for solutions, however a short outline of part of our historic problem may add some value.

Australia is systematically exporting its waste products to less developed Asian countries with impunity. There is simply no oversight from either State or Federal agencies to the unsustainable export of Australia's waste and no regard from either tier of government for the environmental or human health costs imposed on these recipient nations.

Victoria's used tyre market is a case in point. The Australian Tyre Recyclers Association (ATRA, www.atra.org.au) voluntarily outlaws the export of whole baled tyres from its membership criteria. ATRA members process the vast majority of Australia's used tyres at around 23Million units per annum.

An additional 5Million used tyre units however – non-ATRA companies – make their way to India and Malaysia for either open burning or unsustainable pyrolysis.

Guardian UK recently outlined the fate of these bales of whole tyres (which ATRA also tracked in 2018 using GPS satellite monitoring) from the UK and the exact same fate befalls Australia's exports of these products. (https://www.theguardian.com/commentisfree/2019/jan/30/worse-than-plastic-burning-tyres-india-george-monbiot

In summary, hundreds of noncompliant used tyre pyrolysis operations litter the Indian landscape polluting the atmosphere and causing human health problems.

Neither the Federal government or Australia's voluntary used tyre product stewardship scheme (managed by Tyre Stewardship Australia) have yet sought to curb this export activity.

Unfortunately, it's the recipient countries that are making the call and banning Australia and Victoria's dirty trade deals.

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[1] Yeo Bee Yin, whose full title is Minister for Energy, Technology, Science, Climate Change, and Environment. https://www.nationalgeographic.com/environment/2018/11/china-ban-plastic-trash-imports-shifts-waste-crisis-southeast-asia-malaysia/

[2] http://www.greenpeace.org/eastasia/Global/eastasia/publications/campaigns/toxics/GPEA%20Plastic%20waste%20trade%20-%20research%20briefing-v1.pdf

The conclusion of China Sword and all the problems it has thrown up must be that Australia has to generate clean streams of recyclate for either domestic use or export and should not rely on developing world countries (with fewer resources) to ban these imports on-our-behalf.

The following outlines the value for Victoria of a Container Deposit Scheme (CDS) in helping solve its China Sword challenges; and additionally, details recent developments in Europe with the Single Use Plastics (SUP) Directive – to which my European colleagues at the Reloop Platform have been intimately involved.

A CONTAINER DEPOSIT SCHEME FOR VICTORIA

While Victoria is clearly struggling under the weight of its kerbside recycling waste stockpiles and inability following China Sword to find markets for this material, NSW and QLD with new CD schemes in place is not.

This is no coincidence. Clean streams of plastics and other materials are finding welcome markets in these two states – as they have always out of South Australia.

Victoria's adoption of a state wide CDS is the reform its troubled kerbside program is looking for. As a recent report for Reloop (summary attached to this submission) outlines a CDS in Victoria would generate an additional $24M in value from its adoption of a CDS (NB this work was done prior to the escalation of problems in Victoria, so this figure is likely to be much higher).

South Australia's CDS has historically led Australia's container recovery – at a current 76.9% it's far superior to the no-CDS states, albeit it's an antiquated scheme in need of reform to which SA is now embarking.

We don't really know what Victoria's current container recovery rate is. For example, NSW now estimates its pre-CDS recycling rate of beverage containers at 32% (accurate supply data has now verified the relatively parlous state of pre-CDS, kerbside based recycling and these figures are likely to be reflected elsewhere.)

In NSW and in Victoria recovery doesn't mean recycling and large volumes of kerbside recovered material are non-recyclable and therefore landfilled as contaminated.

Pleasingly, NSW is now 'recycling' around 76%[3] of its used containers as that states CDS introduced in late 2017 continues to ramp up (article attached in appendices).

Even China is buying NSW plastics from the CD scheme in that state.

BEVERAGE PRODUCERS CONTROL OF CD SCHEMES – A WARNING FOR VICTORIA

The following outlines some issues for Victoria to be alert to should the state intervene and adopt a CDS.

SA's CDS could be much better both for the consumer and as a resource recovery initiative. E.g. Michigan in the US with a similar refund rate to Australian CDS states at US0.10cent (13 Australian

[3] https://www.insidewaste.com.au/index.php/2019/03/12/nsw-return-and-earn-has-doubled-container-recycling-in-the-state-according-to-acor/

cents) has a recycling rate of over 90% largely it would seem because of its high levels of consumer convenience. (A table of CDS states and their deposit and recycling rates is attached in appendices.)

Michigan like most EU states requires retailers to be part of their CDS product stewardship scheme. This results in high degrees of consumer convenience and high levels of collection point to population ratios. This will be important if Victoria is to pursue such an approach.

Beverage industry controlled super-collectors in South Australia have historically blocked the development of public facing collection facilities (e.g. automated collection points at retail outlets) and therefore consumer convenience by refusing to allow new entrants to gain a waste-management arrangement to redeem containers at either of the beverage industry controlled super collectors - Marine Stores or Statewide.

The beverage industry (unlike the environment and community) is not motivated to see the SA CDS – or QLD for that matter - increase return rates as this requires further repayment of refunds and handling fees.

Collection point to consumer ratios in Qld's scheme are around 1 per 15,000-20,000 people. In Germany its closer to 1 per 2,000 people. NSW, as it has allocated responsibility for the roll out of the collection network to the recycling industry rather than beverage producers have a much higher ratio of 1 CP per 11,000 people.

This inquiry if it is recommending a Victorian CDS should advise this scheme not be managed by beverage producers or if it is similarly obligate large retailers to be party to it.

OPPORTUNITIES FOR RECYCLED CONTENT IN A VICTORIAN CDS

As policy makers mandate / regulate the recovery of secondary materials (this is to achieve both litter reduction and resource recovery objectives) through such mechanisms as a CDS its possible governments could also use the advent of this legislation to mandate / regulate the secondary reuse of these materials.

A 'circular economy' approach (the principle being the return of materials to their original use, rather than down-cycling to low value products) sees container materials being reused in new containers. This has the co-benefit of providing better markets for recycled material and therefore promoting higher recycling rates.

Glass recovery and recycling generally, extending from the advent of CDS, particularly in NSW and QLD, is on the up. Industry sources advise that the general average quantity of recycled glass in a beer bottle is now around 37%. This recycled-content is much higher at up to 62% in QLD manufactured bottles.

So, not only are we already getting good resource savings – virgin material reductions of 37% across the board – but there are additional energy and greenhouse gas savings from glass recycling. For this reason, the glass bottle industry wants cullet (glass pieces for recycling) and glass like aluminium is endlessly recyclable. Similarly, PET bottles can be made from 100% recycled PET, yet only a fraction of recycled PET bottles are currently recycled back into bottles and overall recycled content is relatively low.

For every 10% increase in cullet going into the bottle manufacturers furnace 3% less energy and 5% less greenhouse gas emissions result. This is due to the fact the temperature of the furnace is reduced. All these savings in virgin resources, energy and greenhouse gas emissions in turn of course save producers money.

ELIGIBLE CONTAINERS

The current scope of containers eligible for a refund has simply been replicated across new jurisdictions adopting CDS, i.e. NSW, QLD, ACT and WA.

This principle of 'harmonisation' is understandable. However, the stand-out exclusion from these schemes is wine bottles. This sub category of glass packaging should be included in any CD scheme Victoria may adopt.

REFILLABLE CONTAINERS

A CDS allows refillable containers to return to the market place and Victoria could lead Australia encouraging this segment of the market. This not only reforms a possible CDS but advances the states Single Use Plastics agenda also.

Canada, with deposit schemes across all provinces, retains a 30% market share of refillable beer bottles. On average, these containers are returned for refilling 15 times. The European Union similarly retains around 32% market share in refillables, both plastic and glass; the Middle East has 21% and the Asia Pacific region market share of refillable containers is 30%.

It's estimated that Coca Cola's existing beverage supply includes 7% refillable PET and 12% refillable glass.

The U.S. state of Oregon, for example, through the Oregon Beverage Recycling Cooperative (OBRC)[4], has recently launched a multi-brand refillable beer bottle and logistics service under the existing 10-cent deposit / refund scheme. So far, the volumes are small at only around 2 million beer bottles per annum, but the resource savings are enormous and interest is growing.

SINGLE USE PLASTICS

The European Union is globally leading the issue of in SUP management, so their recent actions are instructive in helping pave the way for additional jurisdictions such as Victoria.

As has been well reported, in December 2018 the EU parliament passed a new Single Use Plastics (SUP) Directive (http://www.europarl.europa.eu/news/en/press-room/20181219IPR22301/parliament-and-council-agree-drastic-cuts-to-plastic-pollution-of-environment)

This ground-breaking initiative will now manifest (in different ways) across EU member states within the next two years. The following (from the Reloop Platform EU offices) outlines a summary of this directive and its multiple objectives and targets. Some additional commentary on Victoria mirroring this work is also contained.

The following lists various products and the approaches taken by the EU in their management. It's worth noting that some similar activities are emerging on an ad hoc and voluntary basis in Australia.

[4] https://www.obrc.com/Content/Reports/OBRC%20Quarterly%20Report%20Q2%202018.pdf

1. **PRODUCT BANS** – As per Article 5, certain SUP items like cotton bud sticks, cutlery (forks, knives, spoons, chopsticks), plates, straws, stirrers, balloon sticks, oxo-degradable plastics and expanded polystyrene (EPS) food containers and cups will be banned in the European Union from 2021.

Coca Cola in Australia has recently announced an intention to discontinue plastic straw distribution and numerous cafes etc around the country have also unilaterally moved in this direction.

There is no reason – i.e. there are existing more sustainable alternatives – Victoria could not replicate these bans. Hobart Council in Tasmania has recently unilaterally acted to ban from sale various SUP products[5].

2. **NEW COLLECTION ARRANGEMENTS - EPR SCHEMES** – As per Article 8, Member States will have to establish EPR schemes across a range of products by 2021.

Producers of SUP products including food containers, packets and wrappers, beverage containers, cups for beverages, tobacco products with filters, wet wipes, balloons, and lightweight plastic carrier bags will be expected to cover the costs of collecting waste consisting of those SUP products and its subsequent transport and treatment, including the costs of litter clean-up and awareness raising measures.

3. **DESIGN REQUIREMENTS (INCL RECYCLED CONTENT REQUIREMENTS)** – Article 6 sets out product design measures for SUP beverage containers to ensure that their caps and lids remain attached (i.e. tethered) to the container during its use stage in order to improve recyclability and ensure they do not leak into the environment. In addition, there is a 25% target for recycled content in PET bottles by 2025 and 30% in all plastic bottles by 2030.

As outlined above Victoria should it adopt a CDS could couple this reform with the inclusion of recycled content incentives and policy settings, such as mandates. Interestingly glass is reported (by industry sources) already to have an average recycled content of around 37%. This can readily be raised to well above 50%.

Also, despite the energy and cost reductions from using recycled cullet, there is insufficient market demand for recycled glass on the east coast as markets are being disrupted by the import of cheap virgin glass containers from overseas. The application of recycled content requirements will help address market demand for recycled cullet as well as incentivise local production.

4. **BEVERAGE CONTAINER COLLECTION TARGETS** – Article 9 stipulates that Member States will be required to collect 90% of single-use plastic bottles with caps and lids by 2029, with an interim target of 77% by 2025. Deposit return schemes are suggested as a method to achieve this objective.

While states such as Germany, Netherlands, Sweden etc already have CDS with recycling rates in the high 90% other states such as Portugal, Spain, Italy do not yet have CDS programs and therefore drag current average recycling across the EU down. The 77% target therefore is relatively modest allowing for these differences.

[5] https://www.abc.net.au/news/2019-03-05/hobart-to-ban-single-use-plastic/10869790

It's recently been revealed that NSW historic container collection rate was around 32% - a long way from the previously reported 50%+[6]. In a recent ABC online article[7] the NSW EPA are suggesting this rate has more than doubled to around 70% since the start of this scheme in late 2017 and the ACOR article mentioned previous puts this rate even higher.

5. **OTHER MEASURES**, include 'measurable quantitative' reduction in consumption of some single-use items (Article 4) and also labelling requirements (i.e. to inform consumers about appropriate waste disposal operations) and some additional awareness raising measures (Article 7).

Education is indeed important in the well-known waste hierarchy i.e. encouraging first 'Refuse, Reduce, Recycle' in priority. Kerbside collection education, what's in and what's out is an important example of what's required in order to help sustain the kerbside recycling system.

END

[6] 2014 Federal Decision RIS had the figure at 53.8%

[7] https://www.abc.net.au/news/2019-02-07/container-refund-scheme-cash-in-bin-chickens/10781228

Country	Population [M]	Return Rate	1. High Deposit Rate $A		2. Mandated retail participation	3Regulated target and penalty	Incumbency (CDS operating for 20-40+ yrs)
Germany	82.76	98.50%	√	0.33	√	X	√
Croatia	4.3	95%	X	0.1	√	√	X
Vermont (USA)	0.6	95%	X	0.06-0.18	√	√	√
Norway	5.2	95%	√	0.16-0.40	√	√	√
Netherlands	16.7	94.20%	√	0.33	√	X	√
Iowa (USA)	3.1	93.30%	√	0.06	√	X	√
Michigan (USA)	9.9	90%	X	0.13	√	X	√
Finland	5.5	89%	√	0.15-0.6	√	√	√
Maine (USA)	1.3	87%	—	0.06-0.18	√	X	√
Lithuania	2.85	86%	√	0.15	√	√	X
Oregon (USA)	3.9	85%	—	0.13	X	X	√
Sweden	9.98	85%	X	0.15-0.3	√	X	√
Estonia	1.32	84%	X	0.15	√	X	X
Saskatchewan (Canada)	1.13	83%	√	0.15-0.6	√	√	√
Nova Scotia (Canada)	0.9	82%	—	0.05-0.20	√	√	√
NW Territories (Canada)	0.04	82%	—	0.10-0.25	X	X	X
British Columbia (Canada)	4.4	82%	X	0.05-0.2	partial	√	√
Alberta (Canada)	3.6	81%	√	0.10-0.25	X	X	√

New Brunswick (Canada)	0.75	81%	√	0.05-0.1	√	X	√
Prince Edward Island (Canada)	0.1	79%	X	0.10-0.20	X	X	X
Manitoba (Canada)**	1.2	78%	X	0.1-0.2	√	X	X
Ontario (Canada)	12.9	77%	√	0.10-0.20	X	X	√
Yukon (Canada)	0.038	77%	—	0.10-0.35	X	X	√
Israel	8	77%	X	0.1	√	√	X
Denmark	5.75	76.50%	X	0.2-0.6	√	√	√
Hawaii (USA)	1.3	73%	X	0.06	√	X	X
South Australia	1.66	77%	X	0.1	X	X	√
California (USA)	38	70%	X	0.06-0.12	√	X	√
Quebec (Canada)	7.9	68%	—	0.05-0.20	X	√	√
Massachusetts (USA)	6.6	67%	X	0.06	√	X	√
Newfoundland (Canada)	0.5	64%	—	0.08-0.20	X	X	√
New York (USA)	19.5	61%	X	0.06	√	X	√
Connecticut (USA)	3.6	52.00%	X	0.06	√	X	√

Analysis of Container Deposit materials and reprocessing opportunities for Victoria

The following is a Victorian specific excerpt from a larger national report produced for Reloop Pacific by Marsden Jacobs and Associates in late 2018, available upon request.

This report demonstrates the value of a container deposit scheme (CDS) for Victoria in terms of increased material values and economic gains for the state stemming from increased volumes of clean, sorted packaging material for reprocessing. This report does not assess the additional benefits associated with litter reduction, clean-up cost savings, environmental returns of lower marine plastic pollution etc

The adoption of CD schemes nationally, offers the potential of an additional $100million in material value alone and additional economic benefits resulting from increased reprocessing investment, as well as circular economy policy gains stemming from closed loop recycling opportunities, not currently available from kerbside materials.

Summary

Total CD eligible[8] packaging **consumption** in 2016–17, Australia-wide, was estimate to be 939,600 tonnes or around 12 Billion units. In Victoria there are 3Billion eligible containers generated per annum at around 240,000 tonnes of material. Around 33% of CD eligible beverage containers (by unit number) are estimated to be aluminium beverage cans. This is followed by CD eligible glass bottles (29%), CD eligible PET bottles (23%) and CD eligible LPB (10%). CD eligible packaging consumption in Victoria only is outlined in the following table;

Material type CD eligible only	(tonnes)	(million units)	Material type CD eligible only	(tonnes	(million units)
Aluminium	15,200	1,015	**LPB – Aseptic**	2,700	174
Glass – Amber	94,800	438	**PET**	24,400	708
Glass – Flint	78,500	362	**HDPE – Clear**	1,800	81
Glass – Green	22,900	106	**HDPE – Coloured**	1,300	58
LPB – Gable top	3,100	151	**Total**	**244,700**	**3,093**

Total CD eligible packaging **recovery** in 2016–17 was an estimated 418,000 tonnes or 5,964 million units. Victoria recorded a total recovery of 46%. This gives an estimated recovery rate of CD eligible containers nationally in 2016–17 of 44% on a mass basis, or 50% on a unit basis. Overall therefore,

[8] NSW, QLD and SA (all with now CDS) define eligibility in terms of specific sizes and types of beverage containers, which predominantly include beer, soft drinks and water up to 3litres. Wine, spirits and plain milk are for instance excluded and therefore not defined as 'CD eligible'

we estimate that more than 520,000 tonnes of CD eligible containers (56% of total consumed) were not recovered, being either landfilled or stockpiled.

Nationally, Aluminium beverage cans have the highest estimated recovery rate (62%). This is followed by HDPE bottles (54%), PET bottles (48%), glass bottles (43%) and LPB (33%). The following outlines Victorian specific recovery rates;

Material type	Recovered		Not recovered	Material type	Recovered		Not recovered
	(tonnes)	(percent)	(tonnes)		(tonnes)	(percent)	(tonnes)
Aluminium	10,560	69%	4,640	**LPB – Aseptic**	1,027	38%	1,673
Glass – Amber	40,478	43%	54,322	**PET**	14,483	59%	9,917
Glass – Flint	33,499	43%	45,001	**HDPE – Clear**	1,173	65%	627
Glass – Green	9,771	43%	13,129	**HDPE – Coloured**	839	65%	461
LPB – Gable top	1,185	38%	1,915	**Total**	**113,015**	**46%**	**131,685**

The NSW EPA has however released data outlining pre-CDS recovery at closer to 32%, as the state now has accurate sales data with which to compare pre-CD recycling. This is likely also to apply to Victoria once accurate sales data is available via a Victorian CDS scheme coordinator.

Of the 418,000 tonnes of CD eligible material currently recovered, only around 18% are exported for reprocessing. Material exported for reprocessing is dominated by aluminium and PET beverage containers. These container types have low unit weights. Thus, an estimated 62% of the 6 billion CD eligible containers (by unit) that are currently recovered are reprocessed overseas. All recovered aluminium containers are exported for reprocessing, with an estimated 62% of recovered PET and 65-74% of recovered LPB being exported for reprocessing. No glass is exported.

CD material prices and market value

Discussions with glass reprocessors' indicates that sorted glass coming through a CDS can attract a premium up to $100/ tonne or greater.

Similarly, whereas sorted LPB currently attracts a price of about $340/ tonne for gable top and $280/ tonne for aseptic, LPB coming through a MRF will typically attract a price of only $10/ tonne for unsorted paper (typically in smaller MRFs) or $180/ tonne if sorted with cardboard.

CDS sorted plastics (PET and HDPE) are likely also to attract substantial premiums compared with unsorted 'mixed' plastics. The premium ranges from $265/ tonne for PET to $290-390/ tonne for HDPE.

Based on current values, it's estimated that the value of CDS material currently being recovered through MRF's is about $66 million/ year. With the introduction of a CDS in all jurisdictions, and a theoretical redemption rate of about 82%[9], then the estimated value of the material could in principle be as high as $168 million/ year.

The following table outlines the enhanced value of CD eligible material coming through the CD collection network.

Material type	Redemption sorted value	Typical unsorted value	Premium
	($/tonne)	($/tonne)	($/tonne)
Aluminium	$1,350	$1,350	$0
Glass – Amber	$100	$0	$100
Glass – Flint	$100	$0	$100
Glass – Green	$100	$0	$100
LPB – Gable top	$350	$10-180	$170-340
LPB – Aseptic	$280	$10-180	$100-270
PET	$375	$110	$265
HDPE – Clear	$500	$110	$390
HDPE – Coloured	$400	$110	$290

Market opportunities

Glass

Glass is endlessly recyclable and glass bottle manufacturers currently incorporate an average of 37% recycled material into their products.

However, there is significant potential for them to increase utilisation of cullet in existing capacity if they can access good quality, colour sorted cullet up to around 90% of inputs. This could be in the order of 200,000 /yr or so. This increased market is of a similar order of the likely increase in the availability of good quality colour sorted CD eligible glass should SA CD eligible glass rates be achieved nationally.

In this case glass value could rise from $0 to $100 a tonne as cleaner streams of material are available and less costs of beneficiation.

Plastics

As strong markets exist for PET and HDPE, the use of these plastics in consumer packaging, without other polymer additives, would see more packaging sold at high prices. The key to achieving this is improved sorting and overcoming processing capacity constraints.

[9] South Australia's CDS currently achieves this rate of recovery

At the sorting level, the introduction of CDS in most or all jurisdictions could improve sorting outcomes provided the schemes specify the separation of PET or HDPE streams at either the refund points or at the aggregators.

Available data suggests that CDS could produce enough material to support additional processing capacity in more than one jurisdiction. There are strong markets both locally and internationally for CD level quality processed PET and HDPE recycled flake. We do not believe there are any end-market restrictions on the sale of these high-quality processed scrap polymers, including sale into Chinese markets if the required contamination thresholds can be achieved.

LPB

There is no processing capacity for LPB in Australia. However, recovered and separated gable top containers are achieving relatively high prices in overseas markets, consistent with their relatively high fibre quality. LPB material has typically been exported at relatively low prices as part of a mixed cardboard and paper bale, which prior to the Chinese import restrictions were routinely exported to China, Indonesia, India and Thailand. In these countries the LPB is often hand-sorted and redirected for LPB specific reprocessing. Increased volumes of LPB separated at source through other CDSs are likely therefore to achieve higher export prices.

Aluminium

There is now little if any aluminium packaging scrap reprocessed in Australia, however international markets for this commodity remain strong. Increased recovery of aluminium achieved through CDSs should be able to capture this market value.

Based on these values, we estimate that the value of CDS material that is currently being recovered is about $66 million/ year, based on 2016-17 recovery rates (Table 1)[10]. If this material were to all go through a CDS system, rather than mainly through MRFs (as is the current situation), then its estimated value could in principle be as high as $104 million/ year. With the introduction of a CDS in all jurisdictions, and a theoretical redemption rate of about 82%, then the estimated value of the material could in principle be as high as $168 million/ year. Whether or not these values are realised however, will depend on a range of market factors that are discussed in section **Error! Reference source not found.**.

Table 1: Theoretical value of consumed CD eligible material if sorted and redeemed (end June 2018)

Material type	Current material value			Container deposit value			
	($/tonne) (weighted average[11])	(current tonnes recovered)	material value ($)	($/tonne)	(tonnes recovered theoretical)	material value with CDS ($) (current recovery)	material value with CDS ($) (theoretical recovery)
Aluminium	$1,350	37,053	$50,022,000	1,350	50,745	$50,022,000	$68,506,000

[10] Assuming weighted average values of $95/ tonne for LPB and $290/ tonne, $375/ tonne and $307/ tonne for PET, HDPE clear and HDPE coloured respectively.

[11] Weighted average price based on proportions of material going through MRFs getting different values depending on the MRF, the level of sorting and destination of material. In relation to recovered plastics for example, approximately 2/3 is assumed to be receiving the sorted price and 1/3 the unsorted, mixed plastics price.

Glass – Amber	$0	155,514	$0	100	308,865	$15,551,000	$30,886,000
Glass – Flint	$0	128,701	$0	100	255,612	$12,870,000	$25,561,000
Glass – Green	$0	37,538	$0	100	74,554	$3,754,000	$7,455,000
LPB – Gable top	$95	3,939	$374,000	350	8,290	$1,379,000	$2,903,000
LPB – Aseptic	$95	3,415	$324,000	280	7,187	$957,000	$2,013,000
PET	$290	45,669	$13,253,000	375	70,875	$17,126,000	$26,578,000
HDPE – Clear	$375	3,570	$1,340,000	500	5,035	$1,785,000	$2,517,000
HDPE – Coloured	$307	2,555	$785,000	400	3,603	$1,022,000	$1,441,000
Total	**$158**	**417,955**	**$66,098,000**	**$250**	**784,764**	**$104,466,000**	**$167,860,000**

Victoria, with around 25% of national consumption could realise additional material values of around $25Million and importantly generate an extra 100,000 tonnes of clean, sorted material for additional reprocessing opportunities.

CD material quality

Information on contamination rates of all material inputs to MRFs suggests an average contamination rate of about 8-10%, with contamination rates being as high as 30% (MRA, 2018).

In Victoria it has been reported by Sustainability Victoria (2014) that of total glass packaging end-of life disposal to waste and recovery streams, in 2013–14:

- 48% was recovered back into glass cullet for glass product manufacturing;
- 24% was disposed of directly to landfill;
- 26% was lost at the MRF level due to breakage and subsequently landfilled; and
- 2% was lost during beneficiation and subsequently landfilled.

So, the Victorian experience is that, of glass collected through commingled kerbside systems, around 34% is lost through collection and MRF sorting alone. This means in effect only around 20% of all glass consumed in Victoria is recycled.

Information provided by industry sources indicates that material currently going through CDSs in South Australia and NSW typically has a contamination rate (ex-refund points) of about 1% by mass for manual refund points and a similar rate for reverse vending machines (RVMs). The key sources of this contamination are labels and screw caps (in the case of glass and plastic containers)[12].

Conclusion

The adoption in Victoria of a CDS supports the states policy agenda and plan to transition to a circular economy[13]. A CDS, in contrast to kerbside recovery, provides clean streams of higher value

[12] Personal communication, confidential industry source February 2018.
[13] https://www.environment.vic.gov.au/sustainability/transitioning-victoria-to-a-circular-economy

material for reprocessing. Material than can become part of closed loop manufacturing (bottle to bottle) rather than low value aggregate, mixed plastics or cheap and now unwanted exports.

China's recent moves to ban low grade recyclate imports is a wakeup call that Australia and Victoria specifically, must start generating high value recyclate for domestic reprocessing. A CDS achieves this outcome along with capturing the additional approximately 50% of disposed container packaging material currently not available to the kerbside system (away from home consumed materials) as well as reducing beverage container marine plastic pollution.