

Deposit return systems: How they perform

- Countries, states, and provinces that have implemented deposit return systems (DRS) consistently achieve higher collection rates for drinks containers than those that rely solely on municipal kerbside collection programmes.
- In general, the higher the deposit value, the higher the return rate.
- The highest return rates can be seen in systems that use a return-to-retail approach, where retailers selling drinks are legally responsible for redeeming empty containers from consumers and refunding their deposit.

Deposit return systems achieve high recycling rates

Over the past decade, the number of jurisdictions that have implemented deposit return systems (DRSs) for the recovery of single-use drinks containers has increased dramatically. One of the main reasons for the growth of DRSs worldwide is their proven effectiveness at attaining high recycling rates; international experience consistently shows that drinks container recycling rates are significantly higher in jurisdictions with DRS than those without.

In Europe, most countries with DRSs in place achieve recycling rates above 90%, diverting significant quantities of drinks containers from disposal and keeping that material circulating in the economy (see Figures 1 and 2). And more drinks containers being recycled means less containers are going to waste. According to data in Reloop's *What We Waste* report, the number of drinks containers discarded as waste in European countries without a DRS is estimated at 39.5 million containers, compared to just 2 billion (eight times less!) across those that do have a DRS in place.¹

Figure 1 Overall Return Rates for Single-Use Drinks Containers in Deposit Return Systems in Europe, by Country



Over in North America, our analysis shows that the average return rate in US states with DRS is approximately 65%, with Oregon having the highest rate at 81% (see Figure 2). If we look at material-specific return rates, analysis by the Container Recycling Institute² (CRI) reveals that more than three quarters (77%) of aluminium cans with a deposit were returned nationwide in 2019, compared to 36% of cans lacking a deposit. And according to CRI, the differences for bottles are even more pronounced: 57% for PET bottles on deposit vs. 17% for non-deposit PET plastic, and 66% vs. 22% for non-deposit glass containers.

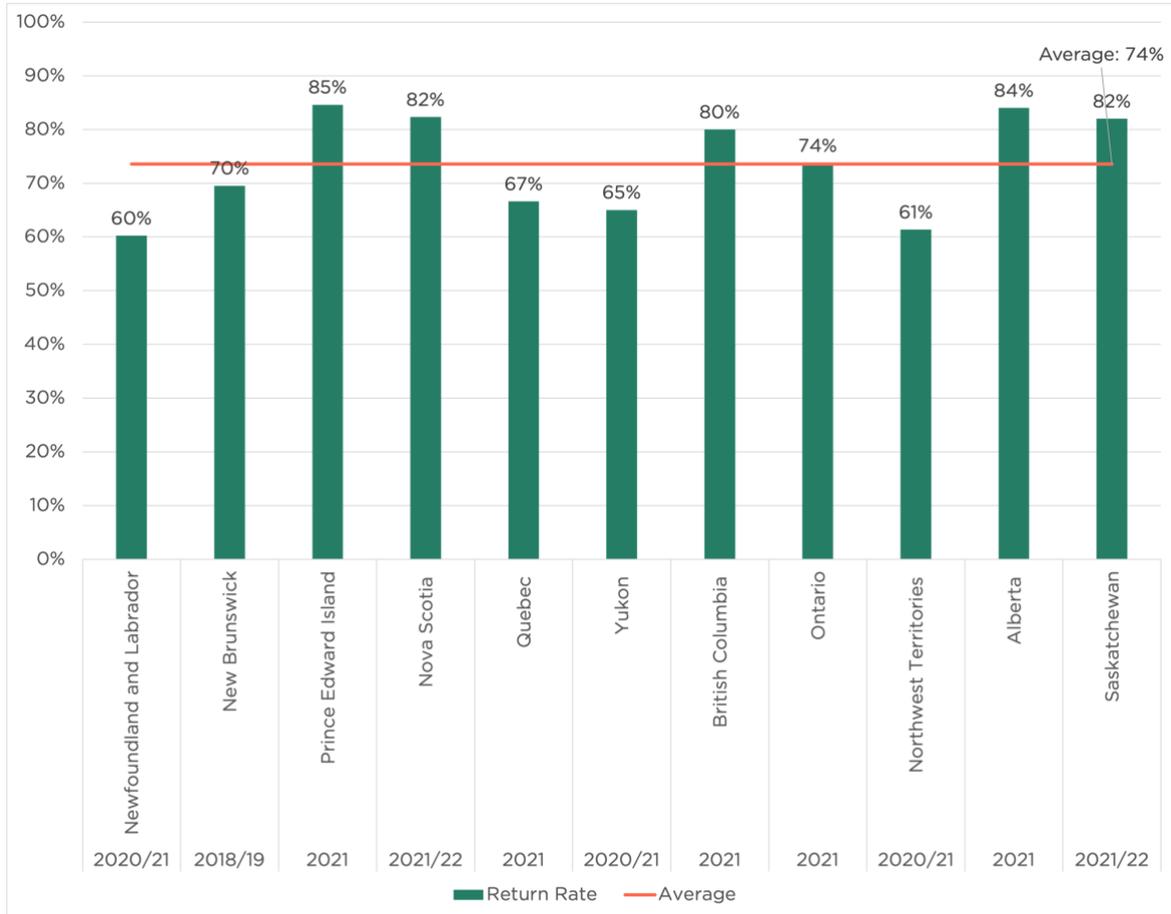
Figure 2 Overall Return Rates for Single-Use Drinks Containers in Deposit Return Systems in the USA, by State



In Canada, provinces and territories with DRS collect 74% (on average) of eligible single-use drinks containers sold, compared to less than 50% in Ontario where non-alcohol containers are recovered through municipal kerbside recycling programmes (see Figure 3). Some

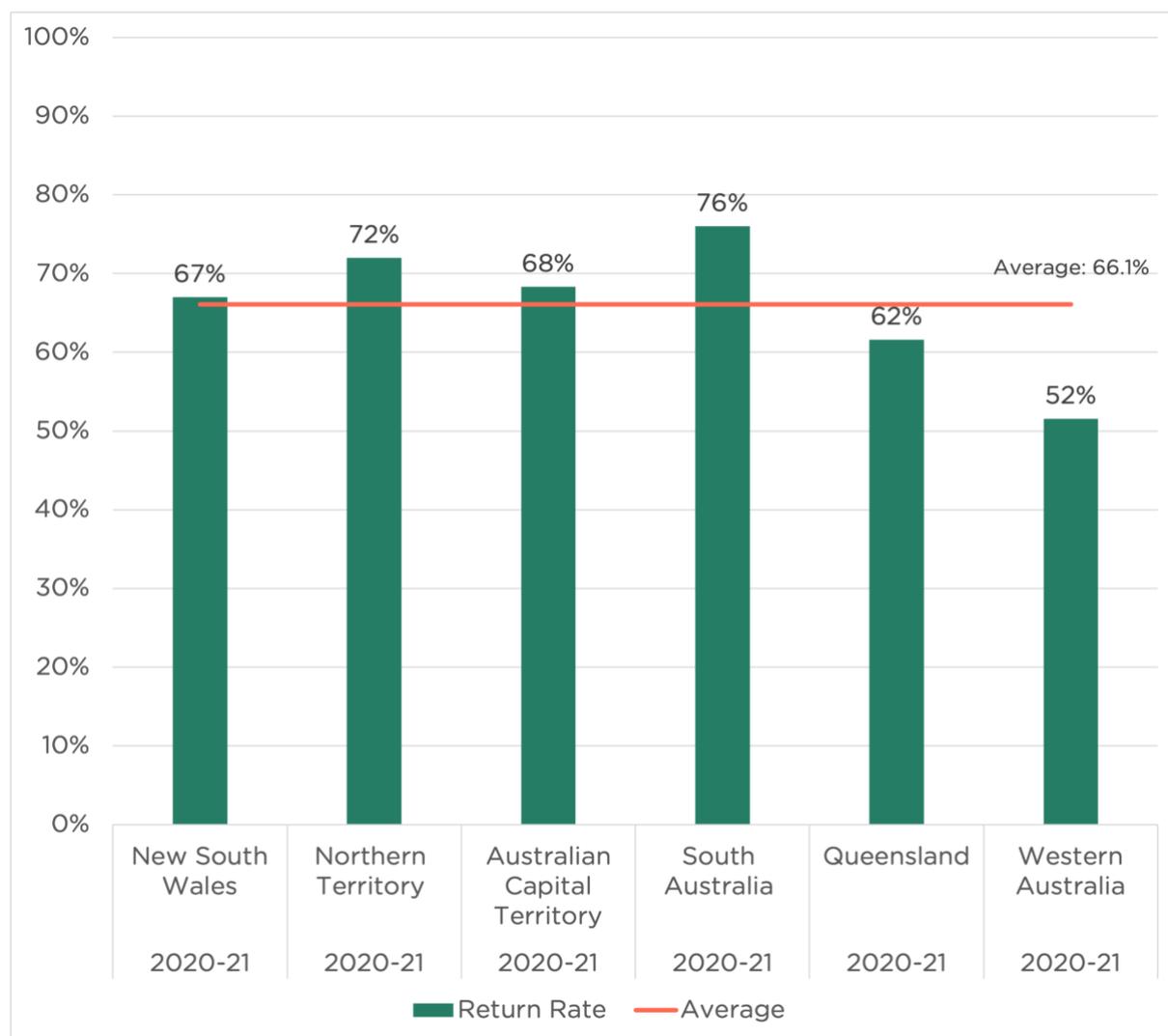
provinces, like Alberta (84%), Prince Edward Island (85%), and Saskatchewan (82%), have reached even higher collection rates.

Figure 3 Overall Return Rates for Single-Use Drinks Containers in Deposit Return Systems in Canada, by Province/Territory



In Australia, the average return rate for states with DRS is 66% (see Figure 4). This low performance can be partly explained by the fact that three of the programmes—Queensland, Australian Capital Territory, and Western Australia—are relatively new, having been implemented in 2018, 2018, and 2020, respectively. The highest return rate of 76% can be seen in South Australia, which has the country’s oldest DRS (implemented in 1977).

Figure 4 Overall Return Rates for Single-Use Drinks Containers in Deposit Return Systems in Australia, by State



How is performance measured?

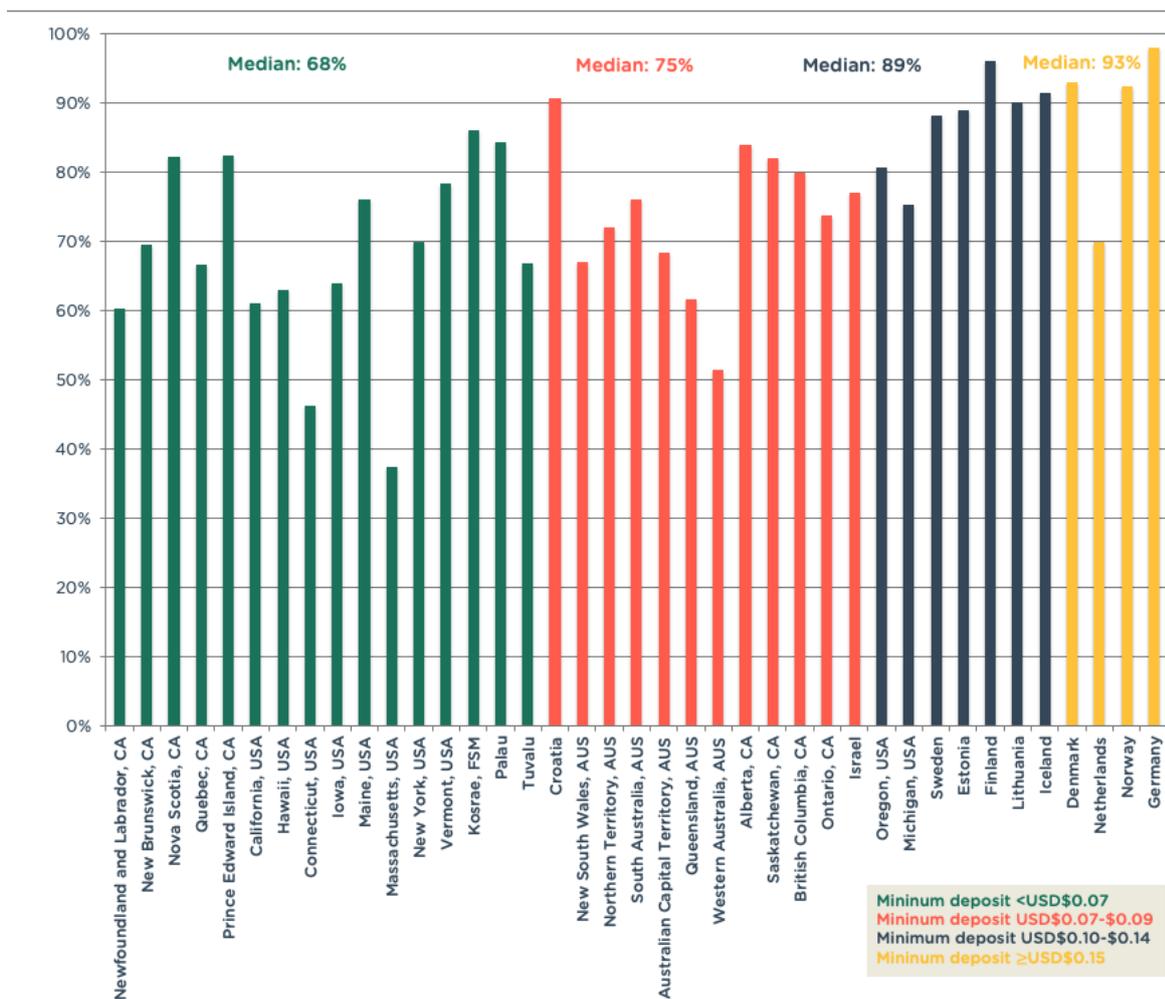
In a DRS, performance is typically measured using the collection rate, which represents the number of containers collected for recycling in a given jurisdiction versus the number of containers sold. Calculating the collection rate in a DRS is straightforward since the deposit/refund allows sales and collections to be tracked to the last unit. Measuring the performance of kerbside collection programmes, on the other hand, is more complex because drinks packaging is collected together with other material, such as paper and non-drinks containers. This is why collection rates for non-DRS containers tend to be over-estimated because they report on collection rather than what is actually recycled. What's more is that these rates do not account for free-riders and can sometimes include tonnage of imported recyclables. In contrast, in a DRS, collection *is* recycling because contamination is low and quality is high, and because these rates are reported on unit counts, not on weight.

What factors influence performance?

Deposit value

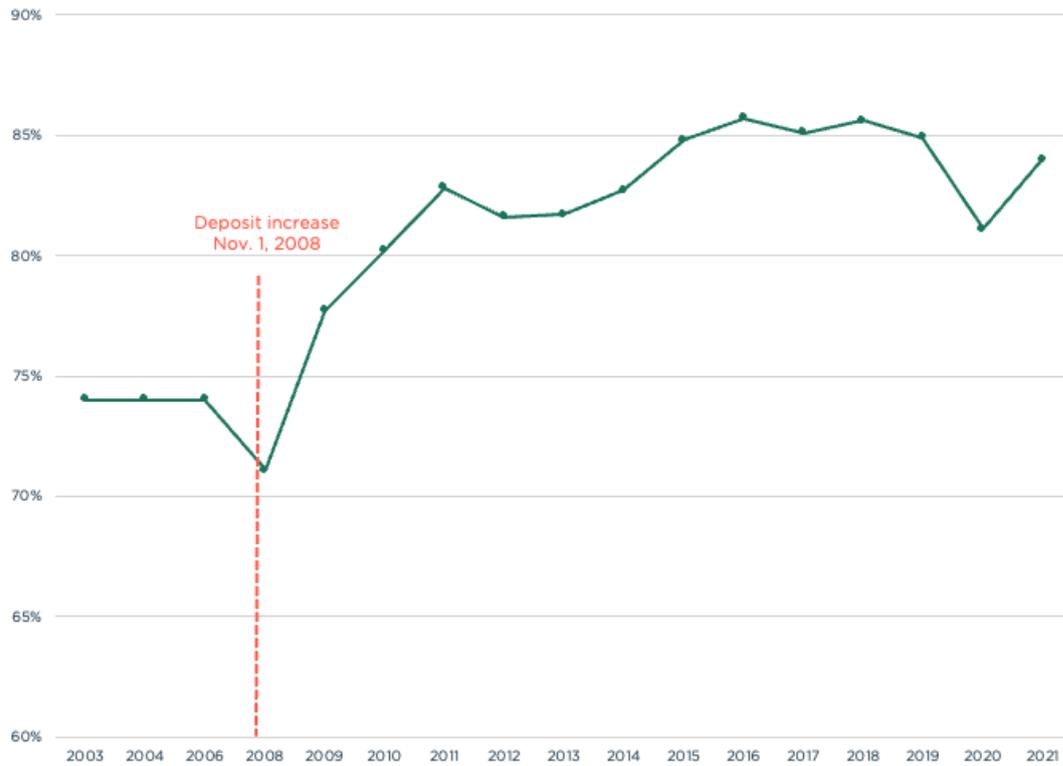
Although system performance can be influenced by several factors, there is strong evidence to suggest that the size of the deposit/refund matters, and that higher deposit/refund values tend to generate higher collection rates. Based on the latest available data, our research reveals that the median collection rate in jurisdictions with a minimum deposit of less than USD\$0.07 (€0.07) was just 68% (see Figure 5). This increases to 75% for programmes where the minimum deposit is between USD\$0.07 and USD\$0.09 (€0.07-€0.08), and to 89% in places where the minimum deposit is between USD\$0.10 and USD\$0.14 (€0.09-€0.12). Jurisdictions that apply a minimum deposit of USD\$0.15 (€0.13) or more achieve the highest median return rates (93%), and it's worth noting that all of these programmes are in Europe.

Figure 5 Latest Return Rates in Deposit Return Systems by Minimum Deposit Value



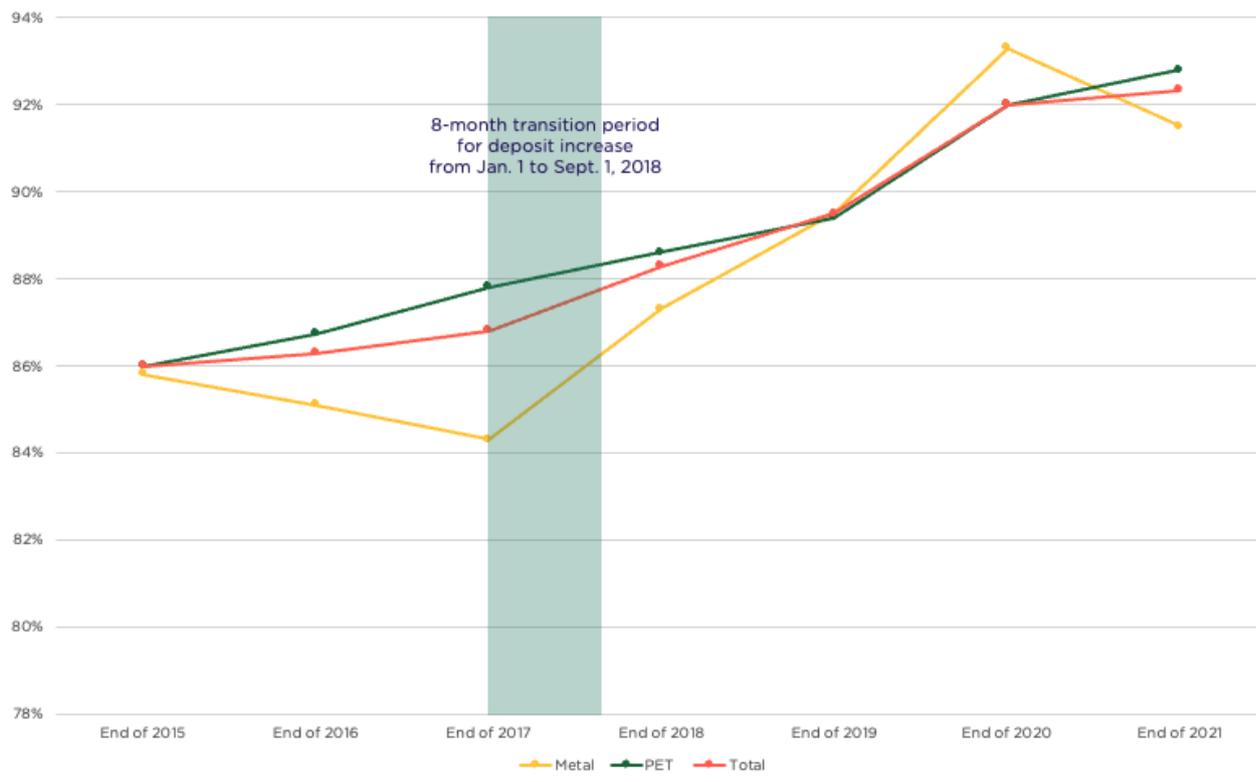
Some of the most robust evidence that deposit levels have an impact on beverage container return rates comes from programmes that have increased deposits over time. Alberta, Canada offers one example. Within just three years of the provincial government increasing the deposit on all drinks containers to 10-cents (up from 5-cents) for containers 1L and under, and 25-cents (up from 20-cents) for containers larger than 1L, the overall return rate increased by approximately 12 percentage points (see Figure 6).

Figure 6 Overall Return Rate, Alberta (Canada) (2003-2021)



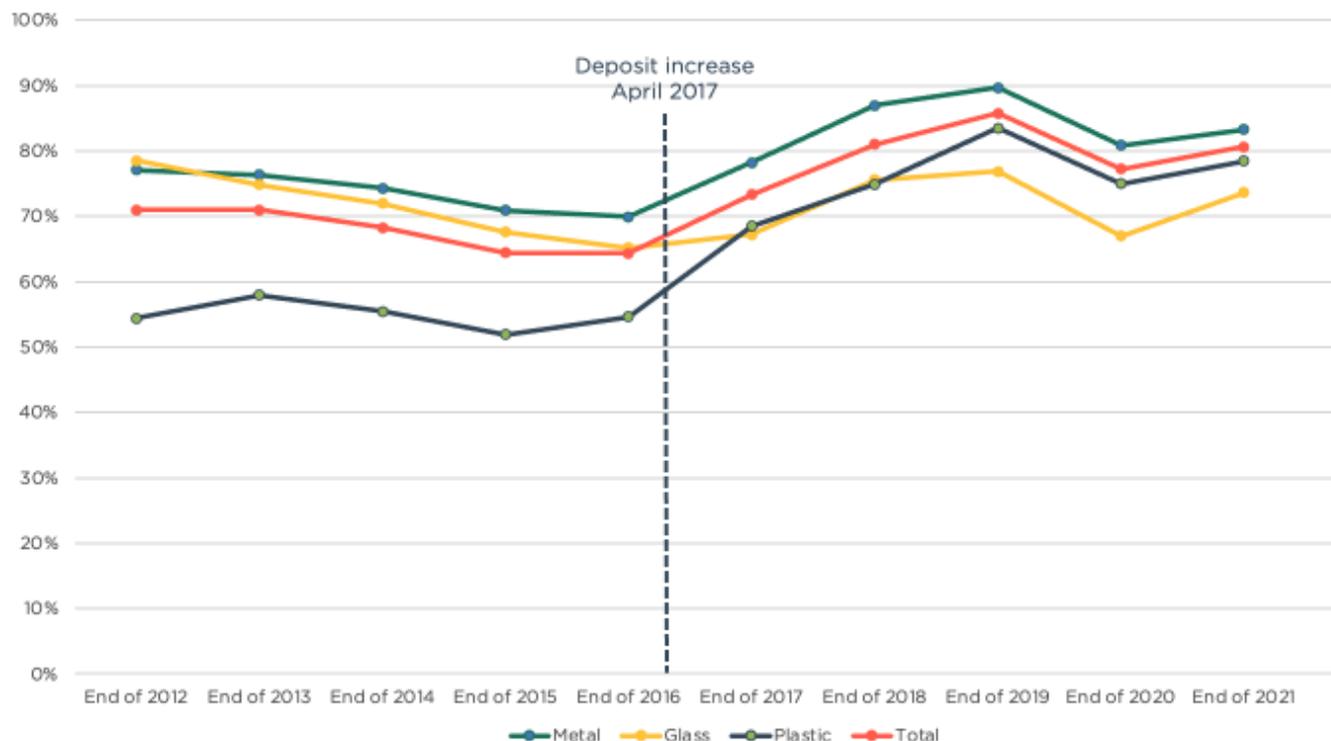
The Norwegian DRS offers yet another example. In 2017, cans and plastic bottles achieved a return rate of 84.3% and 87.8%, respectively. Still, around 180 million cans and bottles were not being returned for recycling.³ To boost return rates even further, the deposit on bottles and cans smaller than 500ml doubled from NOK 1 to NOK 2 in September 2018, the first increase since the programme’s launch in 1990. The deposit on bottles and cans larger than 500ml also increased from NOK 2 to NOK 3. As shown in Figure 7, return rates were up to 93% and 92% for cans and plastic bottles, respectively, by the end of 2020—just two years after the deposit increase.

Figure 7 Return Rates, Norway (2015-2021)



In the U.S., Oregon’s return rate was stagnant at 64% in 2016 until the state doubled its deposit value for all drinks containers from 5- to 10-cents. This deposit increase, along with enhanced return options such as drop-and-go bags, resulted in an overall return rate of 86% in 2019 (see Figure 8). Oregon is only one of two states (Michigan being the other) with a 10-cent minimum deposit value. As of the end of 2019, these two states showed the highest return rates in the country.

Figure 8 Return Rates, Oregon (U.S.) (2012-2021)

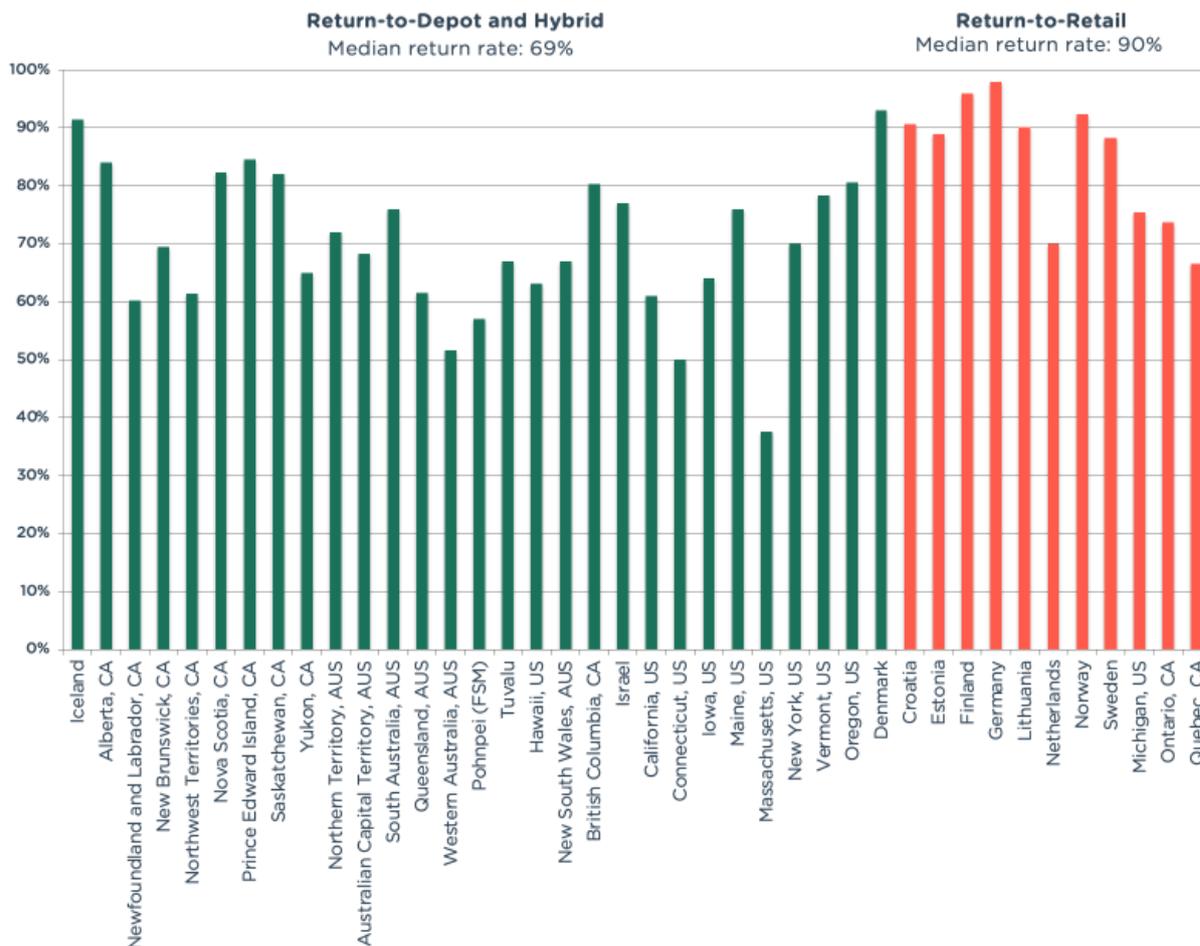


Level of convenience

Besides the deposit value, the level of convenience – that is, how easy it is for consumers to participate – is another key factor affecting system performance. The world’s best performing DRSs ensure that container redemption is accessible for the consumer by making it as easy to return the container as it was to purchase the product in the first place.

The highest return rates can be seen in systems that use a return-to-retail approach (R2R), where retailers selling beverages are legally responsible for redeeming empty containers from consumers and refunding their deposit. Our research reveals that the median return rate achieved in DRS jurisdictions that utilise an R2R redemption model is 90%, compared to just 69% in jurisdictions that use a redemption centre model or hybrid system (see Figure 9). R2R models are most common in Europe, whereas return-to-depot (or redemption centre) models, which allow consumers to return empty containers to facilities established solely for this purpose, are more prevalent in the rest of the world. R2R is considered best practice as it offers the highest level of convenience for consumers (allows consumers to take back their containers when they do their shopping or, if they are consuming their beverage outside of the home, to the nearest convenient location, which may be a shop or other local hub) and avoids expensive system-specific infrastructure.

Figure 9 Latest Return Rates for Single-Use Drinks Containers in Deposit Return Systems by Type of Collection Model



Programme scope

The overall performance of a DRS is also dependent on the types of drinks and containers included in the programme. In general, the wider the scope of the DRS, the more effective it will be. Most programmes in operation today include plastic, metal and glass containers, although some cover only certain material types. In Norway, Sweden, and the Netherlands, for example, glass is excluded. The Netherlands’ DRS also excludes metal, however, the system will expand to drinks cans as of 31 December 2022.

Case studies

Norway, which reached a 92.3% return rate in 2021, offers a great case study of a high-performing DRS. In Norway, all retailers selling deposit-bearing beverages are required by law to take-back empty containers. Containers can be returned to over 15,000 redemption points, which translates into a ratio of one redemption point for every 360 people, meaning consumers do not have to travel far, undertake a special journey to redeem their deposit, or sort their containers and return to a number of shops with different brands. To make redemption even more convenient, Norway has also made provision for consumers to return their empty drinks containers via a home delivery service provided by retailers.

Germany is another great example of a high-performing system. In Germany, all retailers and other final distributors of deposit-bearing drinks are required to take back brands they sell. There are approximately 130,000 redemption locations, which equates to a ratio of one redemption point for every 640 people. Germany’s return rate in 2021 was estimated at 98%, the highest in Europe.

At the other end of the spectrum, the state of **California** offers the perfect example of how an inconvenient returns network can negatively impact recycling performance. California uses a hybrid redemption model, where redemption centres operate alongside retail stores to accept returns, and where there are no take-back obligations for retailers. Retailers are only required to accept container returns if they are not located within a “convenience zone”—that is, within a specified distance of a redemption center—or if redemption centres close. Retailers can also opt out by paying a \$100 daily fee to the recycling program, but this is largely unenforced. This has created a situation where there are less than 1,270 redemption points across the state, which translates to about 1 for every 31,000 people. As more and more redemption centres have closed their doors in recent years, California’s return rate has exhibited a steady decline, from 74% in 2013 to just 61% in 2021.

Latest DRS performance data

The following tables and figure summarise the latest performance data for over 40 DRSs for single-use drinks containers around the world, where data was available. Return rates are presented alongside information on deposit values and type of redemption system.

When analysing this data, it is important to note that the way in which performance is measured or reported on can vary between jurisdictions. For example, while some system operators report a ‘collection rate’, others report a ‘recycling rate’ or ‘redemption rate.’ For the purpose of consistency, and because it is not possible to know for certain how performance is measured in each jurisdiction, this fact sheet uses ‘return rate’ as a catch-all term.

Table 1 Return Rates for Single-Use Drinks Containers in Deposit Return Systems in Europe

Country	Data Year	Refund		Redemption System	Total Return Rate
		Local Currency	Euro and USD Equivalent		
Croatia	2020	0.5 HRK	€0.07, USD\$0.07	R2R	91% ⁴
Denmark	2021	1-3 DKK	€0.13- €0.40 USD\$0.15-\$0.45	Depot	93% ⁵
Estonia	2020	€0.10	USD\$0.11)	R2R	86% ⁶
Finland	2021	€0.10-€0.40	USD\$0.11-\$0.45	R2R	96% ⁷
Germany	2021	€0.25	USD\$0.28	R2R	98% ⁸
Iceland	2021	18 ISK	€0.12, USD\$0.14	R2R	91% ^{9,10}
Lithuania	2021	€0.10	USD\$0.11	R2R	90% ¹¹

Country	Data Year	Refund		Redemption System	Total Return Rate
		Local Currency	Euro and USD Equivalent		
Netherlands	2021	€0.15-€0.25	USD\$0.28	R2R	70% ^{12,13}
Norway	2021	2-3 NOK	€0.13-€0.32 USD\$0.12- \$0.30	R2R	92% ¹⁴
Sweden	2021	1-2 SEK	€0.11-€0.22 USD\$0.12- \$0.24	R2R	88% ¹⁵

Table 2 Return Rates for Single-Use Drinks Containers in Deposit Return Systems in the United States

State	Data Year	Refund		Redemption System	Total Return Rate
		Local Currency (USD\$)	Euro Equivalent		
California	2021	\$0.05-\$0.10	€0.05-€0.09	Hybrid	61% ¹⁶
Connecticut	2021	\$0.05	€0.05	Hybrid	46% ¹⁷
Hawaii	2020-21	\$0.05	€0.05	Redemption Centre	63% ¹⁸
Iowa ¹⁹	2016	\$0.05	€0.05	Hybrid	65% ²⁰
Maine	2020	\$0.05-\$0.15	€0.05-€0.14	Hybrid	76% ²¹ (plastics only)
Massachusetts	2021	\$0.05	€0.05	Hybrid	38% ²²
Michigan	2021	\$0.10	€0.09	R2R	75% ^{23,24}
New York	2021	\$0.05	€0.05	Hybrid	70% ²⁵
Oregon	2021	\$0.10	€0.09	Hybrid	84% ^{26,27}
Vermont	2021	\$0.05-\$0.15	€0.05-€0.14	Hybrid	78% ²⁸

Table 3 Return Rates for Single-Use Drinks Containers in Deposit Return Systems in Canada

Province / Territory	Data Year	Refund		Redemption System	Total Return Rate
		Local Currency (CAD\$)	Euro and USD Equivalent		
Alberta	2021	\$0.10-\$0.25	€0.07-€0.17 USD\$0.07-\$0.18	Depot	84% ²⁹
British Columbia	2021	\$0.10	€0.07 USD\$0.07	Hybrid	80% ^{30,31}
Newfoundland and Labrador	2020-21	\$0.05-\$0.10	€0.03-€0.07 USD\$0.04-\$0.07	Depot	60% ³²
New Brunswick	2018-19	\$0.05-\$0.10	€0.03-€0.07 USD\$0.04-\$0.07	Depot	70% ³³
Northwest Territories	2020-21	\$0.10-\$0.25	€0.07-€0.17 USD\$0.07-\$0.18	Depot	61% ³⁴

Province / Territory	Data Year	Refund		Redemption System	Total Return Rate
		Local Currency (CAD\$)	Euro and USD Equivalent		
Nova Scotia	2021-22	\$0.05-\$0.10	€0.03-€0.07 USD\$0.04-\$0.07	Depot	82% ³⁵
Ontario	2021	\$0.10-\$0.20	€0.07-€0.13 USD\$0.10-\$0.15	R2R	74% ³⁶
Prince Edward Island	2021	\$0.05-\$0.10	€0.03-€0.07 USD\$0.04-\$0.07	Depot	85% ³⁷
Quebec	2021	\$0.05-\$0.20	€0.03-€0.13 USD\$0.04-\$0.15	R2R	67% ³⁸
Saskatchewan	2021-22	\$0.05-\$0.40	€0.03-€0.27 USD\$0.04-\$0.29	Depot	82% ³⁹
Yukon	2020-21	\$0.05-\$0.25	€0.03-€0.17 USD\$0.04-\$0.18	Depot	65% ⁴⁰

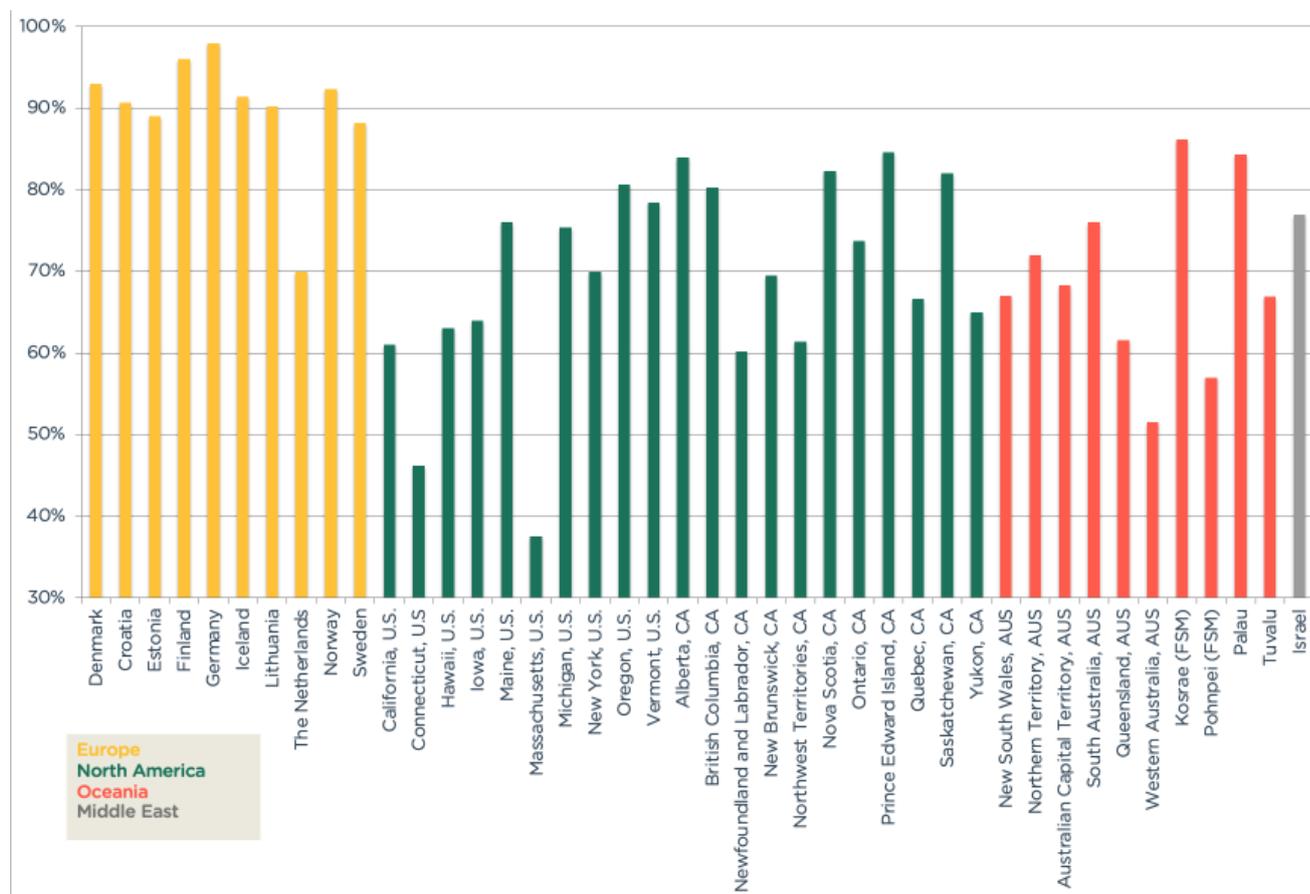
Table 4 Return Rates for Single-Use Drinks Containers in Deposit Return Systems in Oceania

State or Country	Data Year	Refund		Redemption System	Total Return Rate
		Local Currency	Euro and USD Equivalent		
Australia					
New South Wales	2020-21	AUD \$0.10	€0.06 USD \$0.07	Hybrid	67% ^{41,42}
Queensland	2020-21	AUD \$0.10	€0.06 USD \$0.07	Depot	62% ⁴³
Northern Territory	2020-21	AUD\$0.10	€0.06 USD \$0.07	Depot	72% ⁴⁴
Australian Capital Territory	2020-21	AUD\$0.10	€0.06 USD \$0.07	Depot	68% ⁴⁵
South Australia	2020-21	AUD\$0.10	€0.06 USD \$0.07	Depot	76% ⁴⁶
Western Australia	2020-21	AUD\$0.10	€0.06 USD \$0.07	Depot	52% ⁴⁷
Federated States of Micronesia (FSM) & Other					
Kosrae (FSM)	2017	USD\$0.05	€0.05	Depot	86% ⁴⁸
Pohnpei (FSM)	2017	USD\$0.05	€0.05	Depot	57% ⁴⁹
Republic of Palau	2020	USD\$0.05	€0.05	Depot	84% ⁵⁰
Tuvalu	2021	USD\$0.05	€0.05	Depot	67% ⁵¹

Table 5 Return Rates for Single-Use Drinks Containers in Deposit Return Systems in the Middle East

Jurisdiction	Data Year	Refund		Redemption System	Total Return Rate
		Local Currency	Euro and USD Equivalent		
Israel	2021	0.3 ILS	€0.07 USD\$0.08	Hybrid	77% ⁵²

Figure 11 Latest Return Rates for Single-Use Drinks Containers in Deposit Return Systems Worldwide



Endnotes

- ¹ Changing Markets Foundation, Break Free From Plastic, and Deutsche Umwelthilfe. “New data shows how European countries can cut 75% of drinks container waste and meet EU plastic targets.” <http://changingmarkets.org/wp-content/uploads/2021/04/What-We-Waste-European-Press-Release.pdf>
- ² Container Recycling Institute (CRI). 17 January 2022. “CRI Supports HB 1652 – New Hampshire January 17th, 2022.” https://www.container-recycling.org/images/stories/PDF/CRI%20supports%20HB1652_NH_Jan2022.pdf
- ³ Infinitum. Annual Report 2017. https://issuu.com/infinitum-norway/docs/infinitum_annual_report_2017_pages
- ⁴ Environmental Protection and Energy Efficiency Fund (FZOEU)
- ⁵ Dansk Retursystem. Årsrapport 2021. <<https://danskretursystem.dk/app/uploads/2022/03/Aarsrapport-2021.pdf>>
- ⁶ Eesti Pandipakend. “Ulevaade Eesti Pandipakend OU tegevusest 2020.” aastal <https://eestipandipakend.ee/wp-content/uploads/2021/09/Tegevusaruanne-2020.pdf>
- ⁷ Personal communication with Tommi Vihavainen (Suomen Palautuspakkaus Oy), March 21, 2022
- ⁸ Personal communication with Michael Löwe, Vice President, Public Affairs, Head of System Design, TOMRA, 31 March 2022
- ⁹ Personal communication with Helgi Lárusson, Managing Director at Framkvaemdastjóri, March 21, 2022.
- ¹⁰ This rate includes containers recovered through the DRS as well as those recovered through other collection systems. A total of 89.3% of containers are recovered via the DRS alone, plus an additional 2.1% through other systems.
- ¹¹ Užstatò už vienkartinės pakuotes sistemos finansavimo schemos 2021–2023 m. vykdymo metinė ataskaita už 2021. metus <https://grazintivertai.lt/dokumentai/ataskaitos/144/2021-12>
- ¹² Personal communication with Suze Govers and Rob Burmann, Recycling Network Benelux, 21 April 2022
- ¹³ The overall return rate of 70% is for the second half of 2021 only.
- ¹⁴ Infinitum. Årsrapport 2021. https://infinitum.no/media/0pxb1kay/infinitum_a-rsrapport_2021_web.pdf
- ¹⁵ Returpack Svenska AB. “Atervinningsgrad 2021.” <https://statistik.pantamera.nu/atervinningsgrad>
- ¹⁶ Container Recycling Institute. 6 July 2022. “New Data Shows That 2021 Beverage Container Redemption Rates in Most U.S. Bottle Bill States Did Not Return to Pre-COVID Levels.” <https://www.container-recycling.org/images/2022/Press%20release%20on%20redemption%20rates%20for%202021%20with%20chart%20final.pdf>
- ¹⁷ Personal communication with Chris Nelson, Supervising Environmental Analyst, CT Department of Energy & Environmental Protection (DEEP), 17 May 2022
- ¹⁸ Personal communication with Jaylen Ehara, Hawaii State Department of Health, 10 February 2022.
- ¹⁹ Recycling rate is 71%; estimate of 7% is through kerbside and other programmes.
- ²⁰ Container Recycling Institute. “Redemption Rates and Other Features of 10 U.S. State Deposit Programs.” Last updated 28 January 2022.
- ²¹ Container Recycling Institute. 6 July 2022. “New Data Shows That 2021 Beverage Container Redemption Rates in Most U.S. Bottle Bill States Did Not Return to Pre-COVID Levels.” <https://www.container-recycling.org/images/2022/Press%20release%20on%20redemption%20rates%20for%202021%20with%20chart%20final.pdf>
- ²² Personal communication with Sean Sylver, MassDEP, 13 May 2022.
- ²³ Personal communication with Howard Heideman, Michigan Department of Treasury, 13 May 2022.
- ²⁴ Redemption rates in Michigan were unnaturally low during 2020 and 2021. Prior to COVID-19, Michigan’s redemption rate was at 89% (in 2019), the highest of all U.S. deposit programmes. However, during the onset of the pandemic, the Governor mandated all redemption locations to cease redemption for multiple months and redemption was authorised again—though only at locations with RVMs—for a transitional period. Whereas Michigan made it illegal to redeem containers during this time, all other US states simply allowed retailers to stop redeeming containers.
- ²⁵ Personal communication with Jennifer Kruman, Bureau of Waste Reduction & Recycling, NY Department of Environmental Conservation, 27 April 2022.
- ²⁶ Oregon Beverage Recycling Cooperative. “2021 Annual Report.” <https://www.obrc.com/Content/Reports/OBRC%20Annual%20Report%202021.PDF>
- ²⁷ This is the redemption rate reported by Oregon Beverage Recycling Cooperative, which covers the vast majority (~96%) of deposit containers sold in the state.
- ²⁸ Personal communication with Rebecca Webber, Environmental Analyst, Vermont Agency of Natural Resources, 25 April 2022.
- ²⁹ Alberta Beverage Container Recycling Corporation. “Sustainability Report 2021.” <https://www.abrc.com/assets/Uploads/ABCRC-2021-Sustainability-Report.pdf>
- ³⁰ Encorp Pacific (Canada). 2021 Annual Report. https://ar.return-it.ca/ar2021/pdf/Return-It_2021_Annual_Report.pdf
- ³¹ BC Brewers Recycled Container Collection Council. 2021 Annual Report to the Director. <https://envirobeerbc.ca/wp-content/uploads/2022/06/BRCCs-2022-Annual-Report-to-Ministry-Covering-2021-Calendar-Year.pdf>
- ³² Personal communication with Gordon Wall, Field Operations Officer, Multi Material Stewardship Board, 28 March 2022
- ³³ Personal communication with Colette Boucher, Encorp Atlantic Inc., June 2020.
- ³⁴ Government of Northwest Territories. “Waste Reduction and Recovery Program: 2020–2021 Annual Report.” https://www.ntassembly.ca/sites/assembly/files/td_631-192.pdf
- ³⁵ Personal communication with Gilles Doucette, Director of Operations, Divert NS, 28 June 2022.
- ³⁶ The Beer Store. 2022. “The Beer Store Responsible Stewardship 2021: Evolving Together as Environmental Leaders.” https://www.thebeerstore.ca/wp-content/uploads/2022/04/StewardshipReport2021_ENG_Final-1.pdf
- ³⁷ Personal communication with Mike Cheverie, Program Coordinator, Beverage Containers Program, 21 April 2022
- ³⁸ Recyc-Quebec. “Tableau des ventes et de la recuperation des contenants consignes (Biere et Boissons gazeuses).” <https://www.recyc-quebec.gouv.qc.ca/sites/default/files/documents/statistiques-ventes-recuperation-cru.pdf>
- ³⁹ SARC. “Annual Report 2021–2022.” https://issuu.com/sarcsarc/docs/sarc_annual_report_2021
- ⁴⁰ Personal communication with Natalia Baranova, Environmental Protection Analyst, Yukon Government, 6 April 2022.
- ⁴¹ Personal communication with Evonne McCabe at Exchange For Change, 9 May 2022.
- ⁴² Includes returns through the DRS network and kerbside recycling programmes (MRF operators).

⁴³ Container Exchange (CoEX). “Annual Report 2020-2021.” <https://containerexchange.com.au/wp-content/uploads/2021/09/COEX_Annual_Report_FY21.pdf>

⁴⁴ Northern Territory Environment Protection Authority. Environment Protection (Beverage Containers and Plastic Bags) Act – Annual Report 2020-21. <https://ntepa.nt.gov.au/__data/assets/pdf_file/0010/1075096/cds-2020-21-annual-report.pdf>

⁴⁵ ACT Government. “ACT Container Deposit Scheme Annual Statutory Report 2020-21.” <https://www.exchangeforchange.com.au/who-we-are/publications-and-reports.html>

⁴⁶ South Australia Environmental Protection Authority. “Container Deposits.” www.epa.sa.gov.au/environmental_info/container_deposit

⁴⁷ WA Return Recycle Renew Limited. “Annual Report 2020-2021.” <https://warrri.com.au/wp-content/uploads/2022/02/WARRRL-2021-WARRRL-Annual-Report.pdf>

⁴⁸ Kosrae State Solid Waste Management Strategy 2018-2027 (Action Plan: 2018-2022).

<<https://www.sprep.org/attachments/VirLib/Palau/kosrae-solid-waste-management-strategy.pdf>>

⁴⁹ Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management in Pacific Island Countries, Phase II (J-PRISM II), Japan International Cooperation Agency (JICA). March 2022. “Container Deposit Schemes in the Pacific Islands: A Guide for Policy Makers.”

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⁵⁰ Ibid.

⁵¹ Ibid.

⁵² Personal communication with Carmit Bardugo, ASOFTA Recycling Corporation, 10 March 2022