Genie in a bottle

Unlocking the full potential of California's bottle bill

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www.changingmarkets.org
https://www.nsaction.us/

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Printed on recycled paper

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Return and Earn public outdoor RVM for recycling of empty cans, bottles or carton drink containers in New South Wales, Australia

This briefing highlights the opportunity to update California's bottle bill by increasing safety and convenience for Californians wanting to redeem their bottle deposits during the COVID-19 pandemic and beyond. Unlocking $400 million in economic stimulus could be the first step to bring the program to the best-in-class (BiC) level, leading to the creation of new jobs and environmental and economic benefits while supporting Californians' desire to do more to tackle plastic pollution.

1. Why California's bottle bill needs an update

California's bottle bill is in crisis. Since its enactment in 1987, it has been hailed as one of the most successful and cost-effective recycling programs in North America,1 with recycling rates at 85%. However, over the last several years, redemption rates have fallen to 66%[2] and will continue to decline due to the closure of recycling centers, making it difficult for citizens to return their used containers.[a] For this reason, consumers receive on average only 2.65 of the 5 cents they pay upfront as a deposit.[3] In addition, an opinion poll conducted in early March 2020 by YouGov shows that over a third (37%) of Californians are unaware of the existence of the bottle bill, and the majority (53%) do not use redemption centers to return their empty containers.[b]

Since the arrival of coronavirus (COVID-19), onsite redemption has further declined as residents obey stay-at-home orders, and some redemption centers have closed in response to the public health crisis. Recyclable empty containers are accumulating in peoples' homes, awaiting return for redemption when stay-at-home orders are lifted, or otherwise going to landfill. There is now a need to completely reform the operational container-return process in California to one that uses "no-touch" reverse vending machines (RVMs), bag-drop systems, and other methods that reduce physical contact between people and materials. California also needs far more redemption sites scattered throughout the state to enable social distancing, rather than the scarcity of sites that currently leads to crowded recycling centers and long lines.

The Beverage Container Recycling Fund and its sub-accounts currently have approximately $400 million in fund balances from accumulation of unspent funds over the years, some of which should be invested in additional pilot programs and modernization for greater safety of material handling.

The program currently fails to return $400 million in deposits to residents each year.[c] An updated, convenient, and effective collection program with a redemption rate of at least 90% would provide instant refunds to res-

a The additional 9% of containers recycled are through curbside and dropoff collection, bringing the total collection to 75%.

b All figures, unless otherwise stated, are from YouGov Plc. Total sample size was 1003 adults. Fieldwork was undertaken between 4th - 8th March 2020. The survey was carried out online. The figures have been weighted and are representative of all Californian adults (aged 18+).

c According to Consumer Watchdog report, the program takes in $1.35 billion in initial deposits and returns $831 million to consumers, plus $92 million to "bottle collectors." This means $427 million is not returned to consumers. Most of the rest of the unredeemed deposits are spent on program operations, like administration, payments to redemption centers, payments to curbside programs ($126 million), "quality" payments, plastics payments, etc. See: Tucker, L. (2019) Half a nickel: How California consumers get deposits ripped off on every bottle deposit they pay. [ONLINE] Available at: https://consumerwatchdog.org/sites/default/files/2019-02/Half%20a%20Nickel.pdf (p.3).

Workers manually sorting materials at recycling plant in Los Angeles, California

idents of $1.2 billion per year, putting money directly into consumers' pockets so they can spend it on necessities like food. Meanwhile, program revitalization will also ensure job security for the 8,000 people currently employed in the system and create 5,000 jobs, which are urgently needed in this time of economic uncertainty.[4]

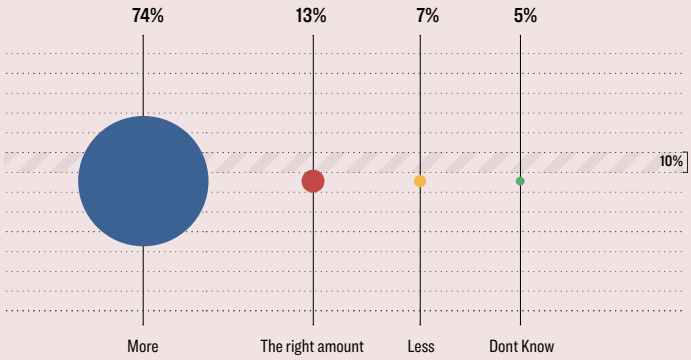
The purpose of this briefing is to show why California's legislators should seize the opportunity to reform the bottle bill now—before the return system loses more recycling centers during the COVID-19 health crisis, and when the public needs their deposits back more than ever. The briefing presents the main findings of a study by independent consultancy Eunomia Research & Consulting, which calculated the environmental and social benefits of modernizing the existing system to best-in-class (BiC) level. It is important to state that, although the current system has existing environmental and social benefits, these do not deliver as much as they might if the system was performing on par with other BiC systems, such as those in Oregon, Michigan, Norway, or Germany, where redemption rates are much higher (see Table 1).

Californians want real action on plastic pollution

A YouGov survey conducted for the Changing Markets Foundation in early March 2020 shows that 74% of Californians are in favor of more being done to tackle plastic pollution and 80% agree that plastic producers should contribute to managing plastic waste. In addition, of those Californians who are unaware of the bottle bill or only sometimes, rarely, or never use redemption centers, 70% say that they would be more likely to return their bottles and cans to redeem their deposits, if the system were more convenient.

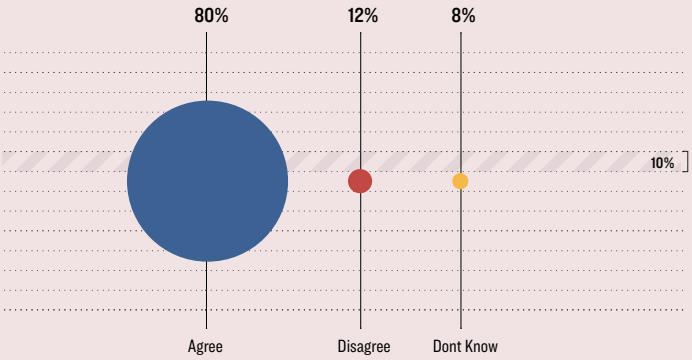
SHOULD MORE BE DONE TO REDUCE PLASTIC POLLUTION ?

For the following question, by 'plastic pollution', we mean the accumulation of synthetic plastic products (e.g. plastic bottles, bags and microplastics, etc.) in the environment, such as in cities, on beaches, or in national parks, that affects the health of humans and wildlife. Generally, do you think more or less should be done to reduce plastic pollution, or is the right amount currently being done?



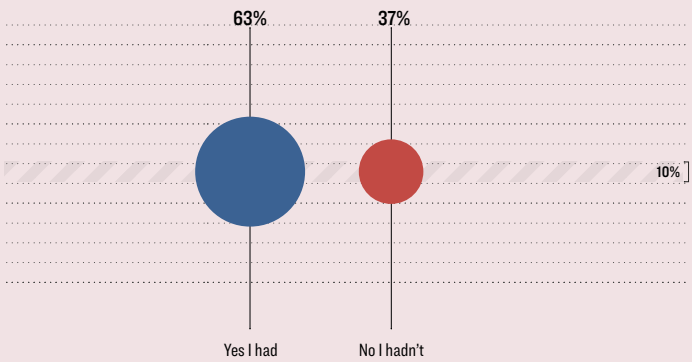
SHOULD PLASTIC PRODUCERS CONTRIBUTE TO MANAGING PLASTIC LITTER?

For the following question, by 'plastic litter', we mean plastic in the form of packaging and containers (e.g. food packaging, shampoo bottles, beverage bottles etc.) after it has been used. To what extent do you agree or disagree that the producers of plastic (e.g. manufacturers, businesses who sell products packaged in plastic etc.) should contribute to managing plastic litter?



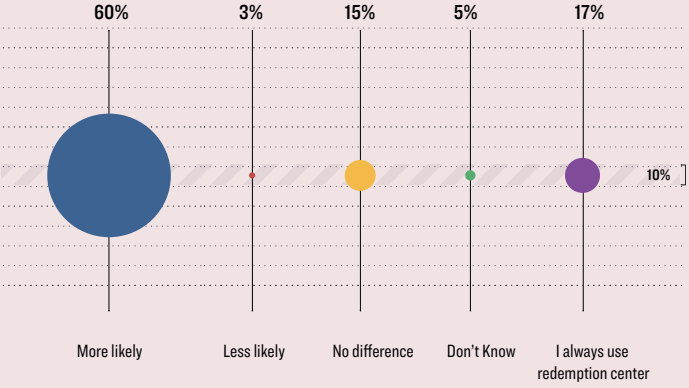
HAVE YOU HEARD OF CALIFORNIA'S BOTTLE RETURN SYSTEM?

For the following question, by 'California's bottle return scheme,' we mean a system that adds a deposit (a small additional cost) to the price of certain products (e.g. plastic bottles, tin cans, etc.) upon purchase. Citizens can then get their deposit back when they return their empty containers after use to a designated redemption center. Before taking this survey, had you EVER heard of 'California's bottle return scheme'?



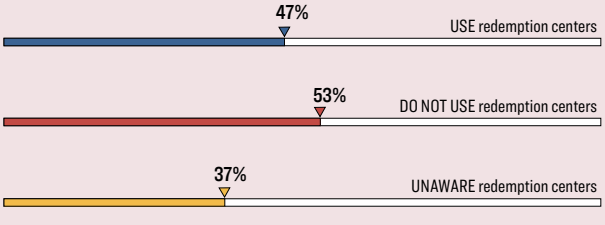
WOULD YOU BE MORE LIKELY TO RETURN CONTAINERS IF IT WERE MORE CONVENIENT?

As a reminder, by 'California's bottle return scheme,' we mean a system that adds a deposit (a small additional cost) to the price of certain products (e.g. plastic bottles, tin cans, etc.) upon purchase. Citizens can then get their deposit back when they return their empty containers after use to a designated redemption center. Would you be more or less likely to use California's bottle return scheme if you could return your empty containers in a convenient way (e.g. local grocery store, local collection points, etc.), or would make this no difference?



HOW OFTEN DO YOU USE REDEMPTION CENTERS?

For the following question, by 'redemption centers', we mean designated collection points for empty containers. They are used for California's bottle return scheme that adds a deposit (a small additional cost) to the price of certain products (e.g. plastic bottles, tin cans, etc.) upon purchase. Citizens can then get their deposit back when they return their empty containers after use to a designated redemption center. In general, how often, if at all, do you use redemption centers?



YouGov research of 1,003 Californian adults, fieldwork conducted 4th - 8th March 2020

OF THOSE WHO ONLY SOMETIMES, RARELY, OR NEVER USE REDEMPTION CENTERS, OR WHO ARE UNAWARE OF THE SYSTEM, WHAT PERCENTAGE WOULD USE THE SYSTEM IF IT WERE MORE CONVENIENT?

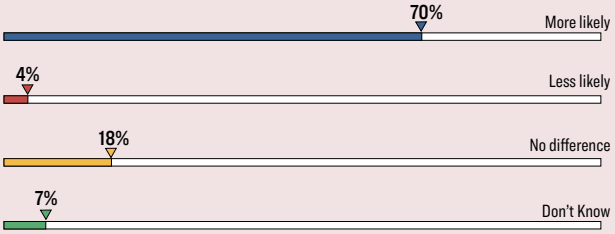
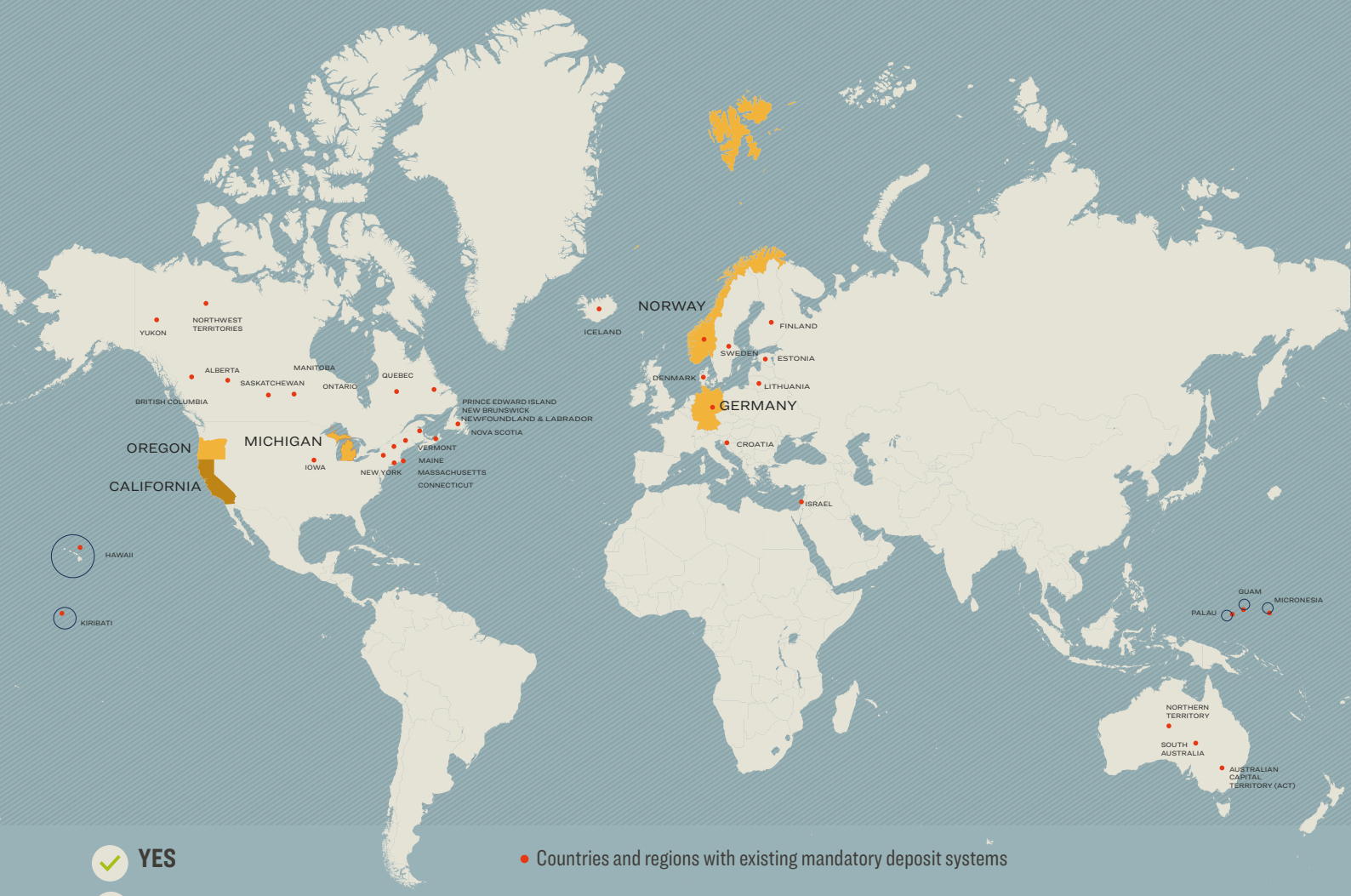


TABLE 1: CHARACTERISTICS OF DEPOSIT-RETURN PROGRAMS

**Map not to scale and for illustrative purposes only*



✓ YES

✗ NO

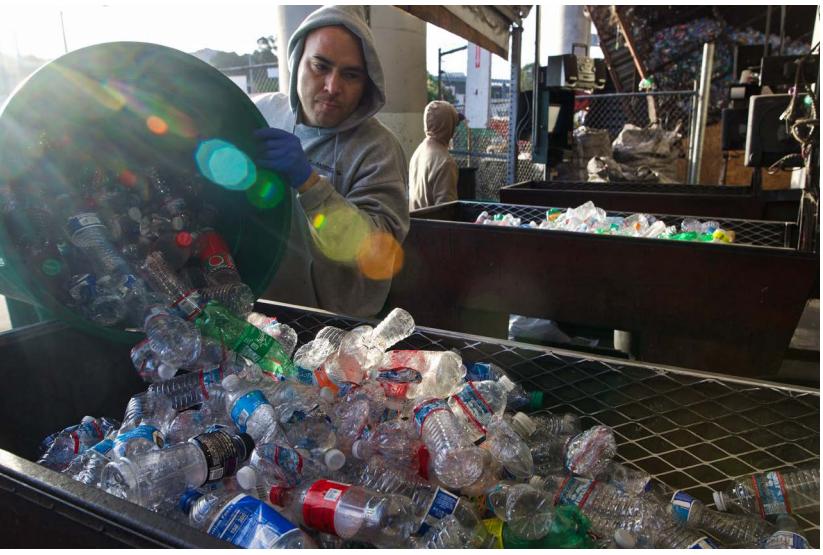
● Countries and regions with existing mandatory deposit systems

	CALIFORNIA (2018)	OREGON (2018)	MICHIGAN (2018)	NORWAY (2016)	GERMANY (2015)
Redemption rate	66%*	81%	89%	92%	98%
Beverage industry responsible for programs	✗	✓	✓	✓	✓
All retail stores required to provide redemption	✗	✓	✓	✓	✓
Deposit amount	$0.05–0.10	$0.10	$0.10	Up to $0.30	$0.08–0.28
Curbside haulers collect California Redemption Value (CRV) from consumer deposits	✓	✗	✗	✗	✗

* The recycling rate in California 2018 is based on the Container Recycling Institute calculation, which extracts 12% of containers collected through curbside and drop-off programs.

2. Recycling centers in crisis

From 2013 to 2019, more than 1,200 recycling centers closed. Closure rates range from 68–89% in some California counties, with some recycling centers now serving well over 256,000 people—an average increase of 315%.[5] These closures are a result of an ineffectual mechanism for compensating the centers for their role in providing convenient locations for residents to redeem their containers, and have lowered the state-wide recycling rate.[6] As 53% of recycling centers closed between 2013–19, the state-wide recycling rate has subsequently dropped by 10 percentage points.[7]



Returning bottles and queuing at a San Francisco redemption centre

Using this historical data, Eunomia estimated how many tons of containers would be landfilled each year under scenarios where 25% more redemption centers close, as well as a more severe scenario where 50% of the currently operating redemption centers close. Figure 1 shows how, if 25% and 50% of the remaining recycling centers close, there will be an increase of 47,000 and 94,000 tons of containers landfilled respectively. If half of the remaining recycling centers close, the number of tons of beverage containers landfilled will rise by 30%. Eunomia estimated this would lead to an additional 131,000 metric tons of greenhouse gas (GHG) emissions per year—the equivalent of 325 million more car miles, or of putting more than 27,000 more cars on California's roads each year.

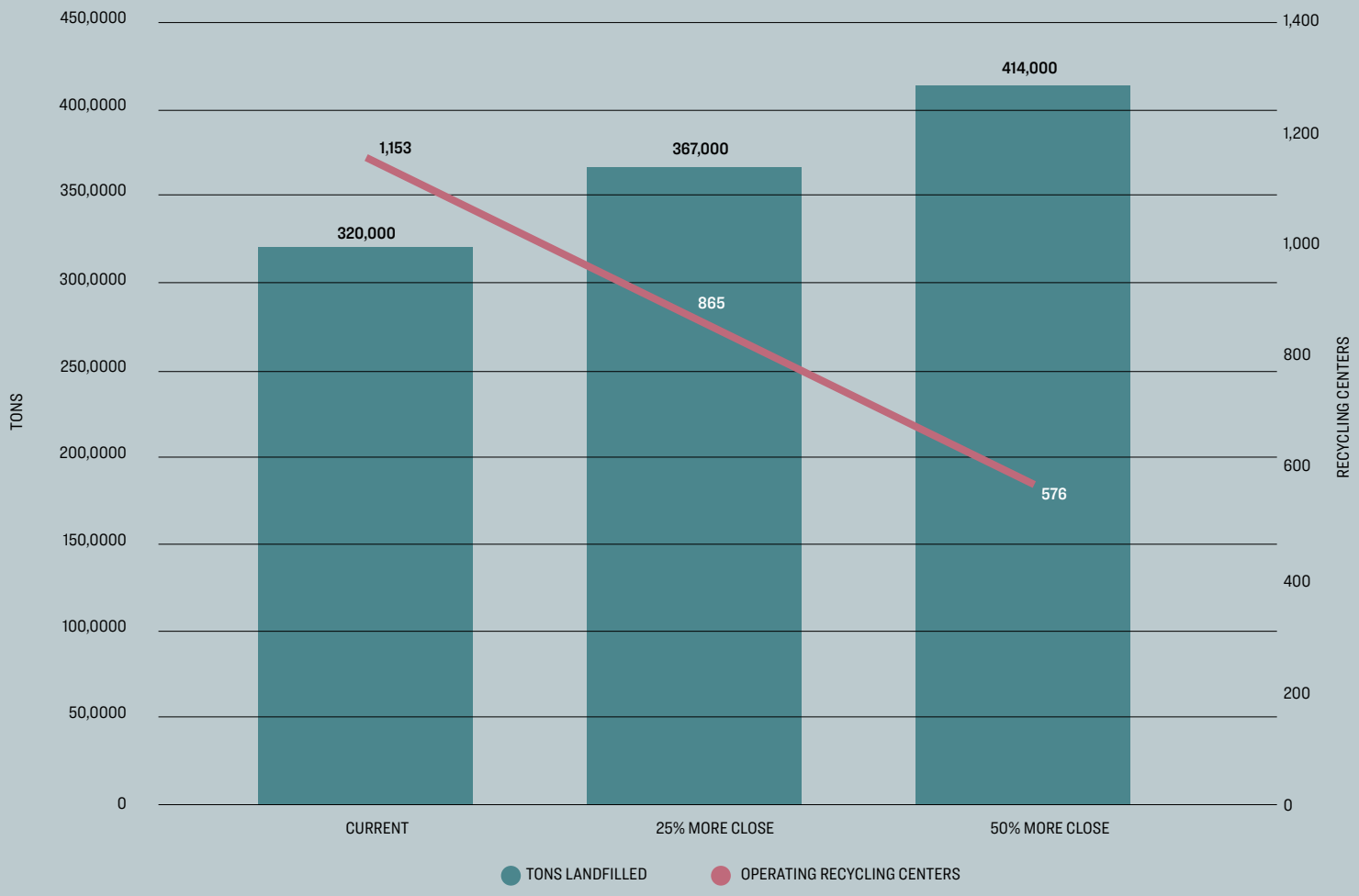


Figure 1: Increase in container tons landfilled if more recycling centers close

Source: Edwards, S. and Carhart, J. (2020) Environmental and social impacts of a failing bottle bill in California: Report for Changing Markets. New York: Eunomia Research & Consulting.

A garbage truck deposits recyclable material at a landfill in Orange County, California

3. The environmental and social benefits of reforming the bottle bill

Against this backdrop, Eunomia has calculated the benefits (see Table 2) of moving California's bottle deposit program toward the BiC level, so that it collects 96% of beverage containers for recycling. The reform includes increasing the convenience of the system for consumers to return empty bottles and cans, and includes wine and liquor containers, among other measures. According to the YouGov public opinion poll, 68% of Californians are in favour of extending deposit sytem to include wine and liquor containers.

3.1. Job creation

The current California redemption program provides over 8,000 full-time-equivalent jobs state-wide. Recycling centers account for 53% of those jobs, while processing accounts for 37%. Most processors in the state manage glass and plastic bottles, while aluminum is often shipped out of state for repurposing.[8] The inclusion of wine and liquor containers in the bottle bill, as well as an increase to a 96% redemption rate in California's system, would lead to nearly doubling the total redeemed tonnage of materials. In turn, **this could almost double the number of jobs to 13,000.**

Bales of recyclables at recycling plant in Los Angeles

3.2. Reduction of litter

By instituting a BiC deposit system, average levels of aluminum and Polyethylene terephthalate (PET) litter would fall by 45%. For aluminum specifically, the tonnage of containers littered each year would decrease by 71%, while PET would decrease by 51%.

Of all material littered on land, approximately 10% is likely to end up as marine litter. Land-based litter escapes into the marine environment via rivers, sewers, and street drains. On World Clean-Up Day in 2017, over 10 million pieces of marine litter were cleared from Californian beaches—the equivalent in weight to 500 cars.[9] In terms of number of containers, the current California deposit system is already preventing over 60 million containers from ending up in the marine environment each year. However, a BiC system could amplify this impact, leading to a further 42% reduction.

Volunteers on a beach clean up day in Pacifica, California

As California communities are spending nearly half a billion dollars annually to prevent trash from polluting the state's beaches, rivers, and ocean, such measures could ease the economic burden for local governments and taxpayers—especially as public budgets tighten following the COVID-19 health crisis.[10]

Additionally, an estimated 5 billion plastic bottle caps end up in California's natural environment every year.[11] If all plastic bottles under the deposit system had their caps attached when taken for redemption, 130–400 million fewer bottle caps could end up in the marine environment.[d]

d Based on the range of current bottle caps already recycled with their bottles. See: Edwards, S. and Carhart, J. (2020) *Environmental and social impacts of a failing bottle bill in California: Report for Changing Markets*. New York: Eunomia Research & Consulting.

Table 2: Summary of benefits of reforming the bottle bill

Benefits		Current system Benefits over "curbside only" scenario	Best-in-class system	Missing benefits
AVOIDED WASTE TO LANDFILL (CONTAINERS)				
	PET	7.9 billion	11.4 billion	3.4 billion
	Aluminum	2.2 billion	4.2 billion	2 billion
	Glass	1.7 billion	2.4 billion	0.8 billion
AVOIDED TOTAL LITTER (CONTAINERS)				
	PET	398 million	464 million	66 million
	Aluminum	196 million	345 million	149 million
AVOIDED MARINE LITTER (CONTAINERS)				
	PET	40 million	47 million	7 million
	Aluminum	19.6 million	34.7 million	15 million
GHG SAVINGS				
	Total (MTCO2e)	1.5 million	1.9 million	0.4 million
MATERIAL VALUE LOSS ($)				
	PET	22 million	17 million	5 million
	Aluminum	62 million	47 million	15 million
NUMBER OF JOBS				
	Full-time equivalent	8,000	13,000	5,000

Source: Edwards, S. and Carhart, J. (2020) Environmental and social impacts of a failing bottle bill in California: Report for Changing Markets. New York: Eunomia Research & Consulting.

3.3. Reducing GHG emissions

An often-overlooked advantage of a deposit-return system is its role in providing recycled and reusable feedstock to product manufacturers. Recycled feedstock replaces virgin plastic in the production of new products. Using recycled material saves GHG emissions, which are produced in the manufacturing process of new beverage containers. Creating a new beverage can from recycled aluminum instead of virgin aluminum emits 82% fewer GHG emissions throughout the manufacturing process, and 60% fewer for PET bottle manufacturing.[12]

Having a BiC system would save an additional 400,000 metric tons of GHG per year in comparison to the current system—a 27% reduction, or the equivalent of taking 86,000 passenger cars off the road for a year. The current California bottle bill already saves over 1 million metric tons of GHG per year, bringing the total savings to 1.5 million metric tons per year—the equivalent of taking 324,000 passenger cars off the road per year.

This drop in overall emissions alone, when moving to a deposit system with a BiC redemption rate, would get California 0.2% of the way toward meeting state-wide emissions reductions targets (40% below 1990 levels). Additionally, if the system achieved BiC redemption rates and added wine and liquor to its scope, a further decrease of 133,000 metric tons of GHG could be obtained. A glass beverage container can also be refilled up to 25 times before having to be recycled, leading to even higher GHG savings.[13]

A landfill compactor at a garbage dump in Orange County, California

3.4. Material value and amenity loss

After recycled materials are collected and sorted, they are sold on the materials market as feedstock in the creation of new products. In this market, the quality of materials, including the rate of contamination, is key in obtaining the best price. Separately collected materials, such as those returned through a deposit system, have higher market value compared to materials collected through single-stream curbside recycling, which tend to be more contaminated. California's current system allows more than $108 million worth of materials to be lost to landfill or litter.

Instituting a BiC system would also reduce per-capita amenity loss costs by $29 per person per year—a reduction over 54% greater than California's current deposit-return system. The loss of this amenity amount, or "welfare" loss, signifies the extent to which citizens are adversely affected by litter being present in their neighborhood. Amenity impact value, in this case, is quantified by each citizen's willingness to pay to have less litter in their surroundings.

Volunteers clearing a beach of litter in Pacifica, California

4. Conclusion

The California legislature is at a crossroads when it comes to its landmark bottle bill. This briefing has shown that, with the closure of recycling centers, the environmental and social benefits have reduced significantly—and they are likely to shrink even further as redemption of deposits becomes more difficult. More than ever, during the COVID-19 crisis and associated economic turmoil, people need their deposits back quickly just to buy food and other basic necessities. Reform could bring significant economic and environmental benefits, including:

- 5,000 additional jobs;
- GHG emission savings equivalent to taking 86,000 passenger cars off the road per year;
- reduction of litter, equivalent to 215 million fewer containers ending up in the environment and 22 million fewer aluminum and PET containers ending up as marine litter;
- reduction of clean-up costs to California communities, standing at $500 million a year; and
- significant material savings and reduction in amenity loss.

For these reasons, some of the funds contained in the Beverage Container Recycling Fund and its sub-accounts should be released and urgently invested in rolling out pilot programs and modernization for greater safety of material handling at convenient locations around the state.[e]

One way to do this is by locating redemption centers where customers already go. Grocery retailers should install RVMs[14] outside where people can insert empty beverage containers and get cash back immediately—a process that is already successful in dozens of countries, and less expensive for retailers than paying fines for refusing to accept bottles and cans.

Additionally, California should explicitly allow "bag drop" programs,[15] where bagged beverage containers can be dropped off at special kiosks and recycling centers, as is already done in Oregon, Maine, and New York. RVMs and bag-drops are "touch-free" and give consumers new, convenient options to existing recycling centers.

Public opinion supports more action to address plastic pollution, and Californians say they would use the system more if redemption points became more convenient. Modernization of the bottle bill is in the hands of California legislators, who can leave their mark by updating the system as part of the solution to the COVID-19 health crisis. Unlocking these funds would bring additional economic benefits, and Californians could once again pride themselves for their environmental leadership with a BiC system.

e For additional list of recommendations on how to bring the legislation to the BiC, see: Edwards, S. and Carhart, J. (2020) *Environmental and social impacts of a failing bottle bill in California: Report for Changing Markets*. New York: Eunomia Research & Consulting.

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