

# Deposit-Refund Systems (DRS) for Packaging

October 2018

## GIVING PACKAGING WASTE AN ECONOMIC VALUE

**Deposit-refund systems have proven to be an effective way to collect large quantities of empty beverage containers and other packaging for high quality recycling.** In such systems, packaging or other items are given an economic value by requiring consumers to pay a deposit on the packaging at the point of sale. When the empty packaging or items are returned, the deposit is refunded. Giving a monetary value to empty packaging significantly increases separate waste collection and returning rates by consumers, making recycling both more feasible and cost efficient. Deposit-refund systems can therefore play a key role in progressing towards a circular economy and reducing the amount of littered packaging waste, including plastics that become marine litter.<sup>1</sup>

### 1) Principles and framework conditions of deposit-refund systems

**Deposit-refund systems incentivise consumer participation, enabling large-scale collection of well-sorted materials.** Consumers actively participate in returning packaging to retailers or other take-back stations to recover deposits they paid on their packaging. This reduces littering and promotes recovery of recyclable and reusable materials from household waste. As deposit-refund systems focus on specific goods such as bottles or cans, they enable collection of large quantities of well-sorted materials. This reduces contamination with other waste types, reducing sorting costs and enabling high quality recycling. Deposit-refund systems also increase the competitiveness of reusable packaging and products such as glass bottles in restaurants or large plastic water containers in households, widespread in low- and middle-income countries.

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**Introducing a deposit-refund system depends on several framework conditions.** In particular, the following needs to be taken into account:

- » which items of which material composition and size should be collected
- » where and by whom should the items be collected
- » which collection infrastructure needs to be set up
- » how to label the collected items
- » which organisational and administrative efforts are necessary
- » how to finance the deposit-refund system

## 2) Deposit-refund systems based on direct relations between consumers and retailers

**In their most simple form, deposit-refund systems are based on 1:1 relations between a consumer and a retailer.** The consumer pays a fixed deposit when buying an item, which is added to the normal product price (e.g. 1 \$ product price + 0.25 \$ deposit = 1.25 \$). In this case, the take-back station can simply be the point of sale. When returning empty packaging or items, the consumer presents the sales receipt of packaged products or items. The retailer then pays back the deposit or gives the consumer a voucher with the respective deposit amount for use in-store. The retailer sells the collected packaging waste or items to a recycler who pays the retailer the material scrap value. In the case of reusable beverage containers, the retailer returns them to consumer goods companies for cleaning and refilling.

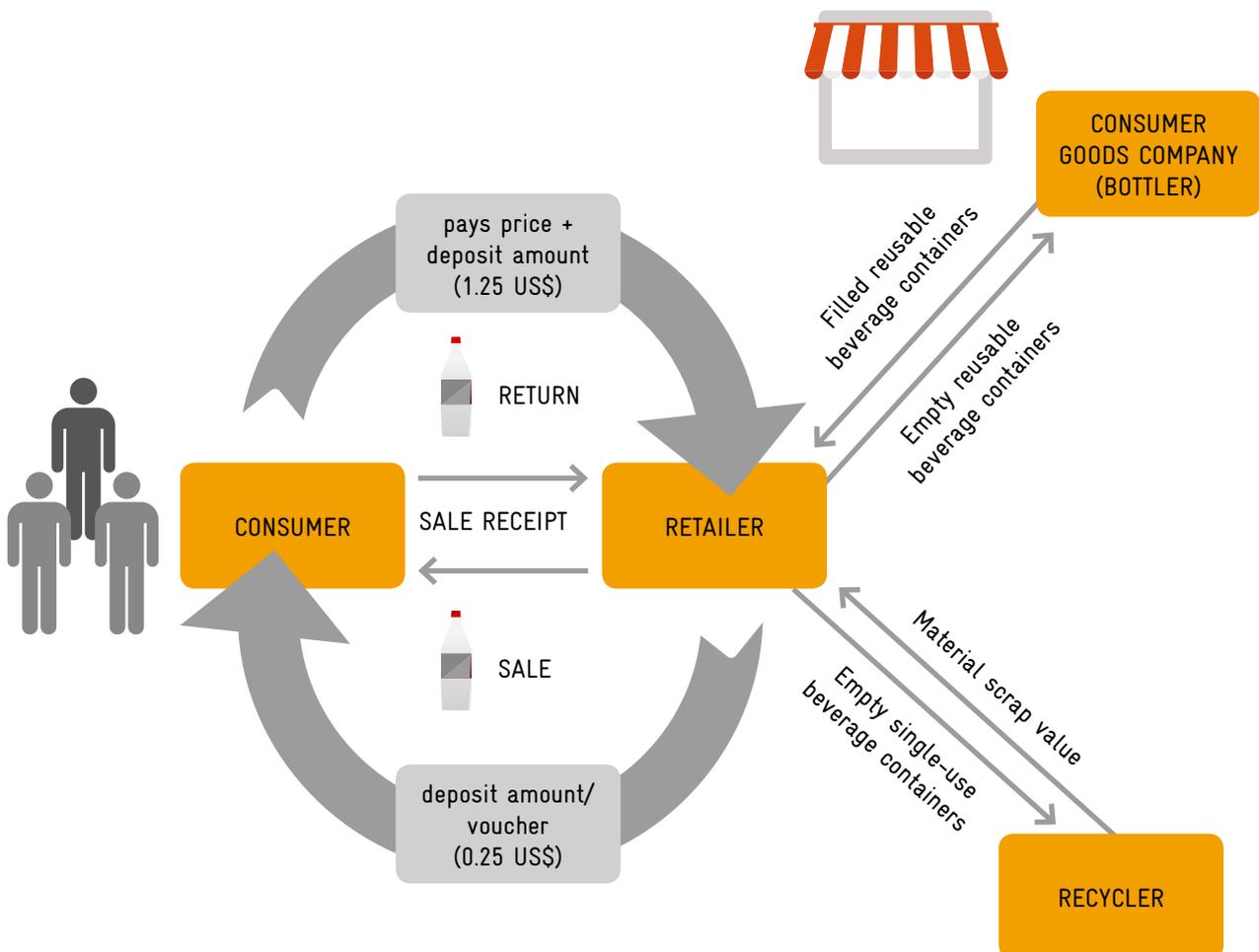


FIGURE 1: Basic principle of a deposit-refund system based on a 1:1 relation between a consumer and a retailer with the example of a bottle as packaging item

<b>Consequences</b>	<ul style="list-style-type: none"> <li>Responsibility of recycling or reuse lies with the retailer</li> <li>The retailer can make profit on containers that are not returned</li> <li>The consumer loses money when not returning the packaging or losing the receipt</li> </ul>
<b>Risks</b>	<ul style="list-style-type: none"> <li>Counterfeiting of the receipt</li> <li>Discontentment of consumers with the obligation to show receipts</li> <li>The containers' materials might not be recycled if there is no obligation or no proof of "easy" recycling paths</li> </ul>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>Minimal administrative and organisational efforts</li> <li>Voluntary commitment by retailers</li> <li>Retailers enhance customer loyalty through returnable packaging</li> </ul>

## EXAMPLE

In Spain, the Mundet campus of the University of Barcelona has implemented a deposit-refund system since 2016. For every beverage bottle bought from a vending machine on the campus, an additional amount of 0.10 € is charged. This deposit amount can only be reimbursed if the buyer returns the bottle to the take-back station on the campus.<sup>2</sup>

### 3) Deposit-refund systems with clearing mechanisms

**When several retailers are involved, the deposit-refund system requires an additional clearing mechanism.** As in the previous model with a 1:1 relation, the consumer pays a deposit when buying the packaged product. However, the consumer is not limited to the point of sale as the take-back station and can instead return the packaging at different participating retailers to receive the deposit amount. As several retailers are involved, they pay the deposits to consumer goods companies (fillers, importers) who pay these deposits to a clearing organisation. Based on the deposit-refund records of retailers, the

clearing organisation refunds the retailers based on their accounting records of the collected empty containers.

**The clearing organisation plays a central role in the system.** It is responsible for handling the deposit financial flows as well as for administrative and organisational aspects. Its administrative costs need to be covered separately from the deposit flows through financial contributions by retailers, which benefit in turn from the services the clearing organisation provides. The empty packaging goes into ownership of the retailers once consumers return them. The retailers can sell the packaging to recyclers.

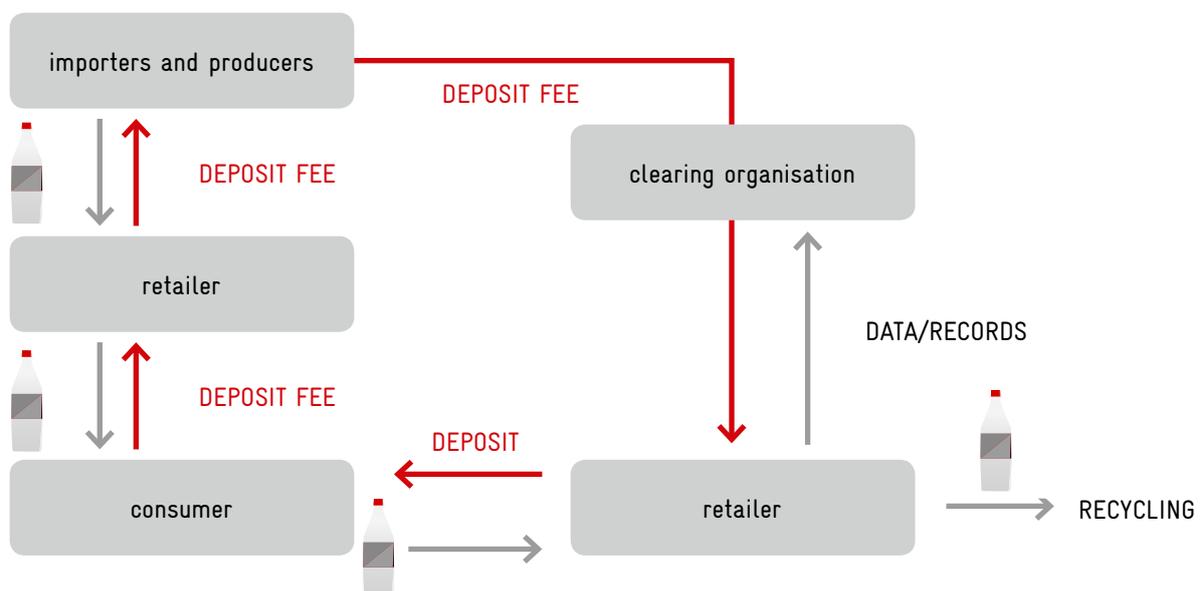


FIGURE 2: General structure of a deposit-refund system with clearing

<b>Consequences</b>	<ul style="list-style-type: none"> <li>• The financial responsibility lies with the clearing organisation</li> <li>• The organisation makes profit with packaging containers that are not returned</li> <li>• The consumer loses money when not returning the packaging container</li> </ul>
<b>Risks</b>	<ul style="list-style-type: none"> <li>• Possibilities of frauds depending on deposit amounts and system management</li> <li>• Requires labelling / barcodes on packaging containers</li> <li>• Administrative costs to establish clearing organisation and return infrastructure</li> </ul>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Administrative and organisational efforts lie with the clearing organisation</li> <li>• Greater flexibility for consumers: more points of return, payments independent of a receipt from a single retailer</li> <li>• A financial excess of the clearing organisation could be used e.g. to finance anti-littering campaigns/ awareness raising or administrative costs</li> </ul>

## EXAMPLE

In 2005, the Netherlands introduced a deposit-refund system with clearing for PET bottles. Although the system is established nationwide, only two supermarket chains are participating in it. To coordinate the clearing process between the retailers of these supermarket chains, Stichting Retourverpakkingen Nederlands (SRN) was established as a central clearing organisation. This organisation is responsible for both reimbursing the individual retailers for taking-back the empty bottles as well as for organising the transport of the returned PET bottles to sorting centres and from there to recyclers. In turn, SRN reports the data of the collected PET bottles to the producers and importers and receives from them reimbursements as well as an administration fee. In 2016, this system achieved a **95% return rate of PET bottles**.<sup>3</sup>

## EXAMPLE

In 2003, Germany established by law a compulsory deposit-refund system for single-use beverage packaging made from glass, plastics, metals or composite materials. From 2003 to 2006, the deposit-refund system built on a direct relationship between consumers and retailers. Empty single-use beverage bottles could only be returned at the original point of sale. After 2006, the deposit-refund system was transformed. Since then, the law obliges every retailer to take back deposited single-use beverage packaging made of materials they supply through their own product range. Thereby, Germany implemented a uniform, nationwide deposit-refund system with clearing. The Deutsche Pfandgesellschaft (DPG) was established as a clearing organisation, owned by the German Retail Association and the German Food Association. Through employing clearing service providers, the producers and importers of beverages receive the record data of returned deposited beverage packaging and reimburse the respective amount to the retailers. The **return rate of deposited beverage packaging was 98.4% in 2015**.<sup>4</sup>



Reverse vending machine, Germany

## 4) Other forms of deposit-refund systems

### Adapting deposit-refund systems to local conditions

**leads to various implementation models.** They differ predominantly in regards to (i) the take-back stations where consumers return items and receive deposits back, (ii) the degree of administrative and organisational efforts, (iii) the financing of deposit-refund systems, and (iv) the involvement of producers and importers. Moreover, it is possible to integrate already established structures for waste collection, e.g. Waste Banks, as take-back stations. Former informal waste workers can be integrated in take-back systems. When packaging is not returned, informal collectors may also gain additional income options through returning packaging with a deposit value.

## EXAMPLE

The Pacific small island developing state Kiribati (102,000 inhabitants in 2013) has introduced a container deposit legislation in 2004 with its 'Special Fund (Waste Recovery Act)'.<sup>5</sup> Importers pay a deposit of 0.05 US\$ per PET bottle and aluminium can, which they pass on to retailers. Consumers also pay 0.05 US\$ as deposit to shops but receive only 0.04 US\$ as refunds upon returning empty PET bottles or cans to collection points. The remaining 0.01 US\$ serves to finance handling and export for recycling.<sup>6</sup>

## EXAMPLE

The municipality Ciutadella on the Spanish island Menorca introduced a temporary deposit-refund system. During the local Sant Joan festivities in 2018, visitors had the opportunity to return their empty beverage containers (plastic bottles, cans and beverage cartons) and receive 0.10 € per returned container at a designated automat. In total, 13,627 empty beverage containers could be collected this way while reducing the littering in public spaces during the two days of the festivities.<sup>7</sup>

### 5) Alternative incentive mechanisms between retailers and consumers

**Returning empty packaging items can be incentivised not only through charging a deposit but also through other rewards.** In this case, retailers or consumer goods companies offer rewards to consumers for returning packaging. Such rewards can be e.g. bonus points for buying services or products, school items for children, a lottery participation to win products, vouchers to accumulate phone credits or electronic money payments.

**The difference to deposit-refund systems is the fact that consumers do not pay any deposits when buying packaged products.** Thus, retailers or consumer goods companies need to finance such rewards themselves or through partnerships for marketing, publicity or enhancing customer loyalty. This may form a part of their corporate social responsibility strategy. Besides plastic bottles, such rewards could also be used for lower-value single-use packaging such as plastic sachets. These reward-based systems have similar advantages to deposit-refund systems, however, impacts depend on whether rewards are offered on a large scale and continual basis or only as individual small-scale campaigns.

## EXAMPLE

In the USA, two cosmetic brands take back their packaging containers and give a reward in return. In its "Back-to-MAC" programme, MAC Cosmetics offers consumers the option of returning empty containers either at MAC stores or by post. Consumers get a lipstick of their choice as a reward for returning six empty containers. The cosmetics brand Kiehl's has a "Recycle Your Empty Bottle & Be rewarded" programme. For returning an empty packaging in a Kiehl's store, consumers receive a stamp. Upon collecting ten stamps, customers receive a travel-size product as reward.<sup>9</sup>

### Outlook

**Deposit-refund systems offer significant potential to developing and emerging economies for increasing separate collection and recycling of beverage bottles and other packaging.** Consumer goods companies, retailers, shops or other stakeholders such as universities or festival organisers can introduce small-scale deposit-refund systems individually or in partnerships. In this way, they can promote reusable and recyclable beverage containers or other items. Large-scale deposit-refund systems are feasible at national level, as shown by examples

in European countries, or at sub-national level as in Canada and the USA. Appropriate models need to be adapted to the local context in order to ensure cost-efficiency and effectiveness.<sup>10</sup> Furthermore, there is scope for developing innovative reward schemes for incentivising consumers to return empty packaging without deposits. Public policy should provide the framework conditions for establishing deposit-refund systems or other kinds of economic incentives in order to stop plastic pollution, increase resource efficiency and mitigate climate change.

## References

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The GIZ Advisory project "Concepts for sustainable waste management and circular economy" provides guidance papers, conferences, trainings and policy advice on resource efficient and climate friendly waste management in cities of low- and middle-income countries. On behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ), it advises on marine litter prevention, the sustainable management of waste of electrical and electronic equipment and climate change mitigation in the waste sector through circular economy approaches.

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