Deposit systems for single-use and refillable beverage packaging

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About Environmental Action Germany (DUH)

- Environmental and consumer protection NGO, nonprofit
- Entitled to take direct legal action
- Founded in 1975 at Lake Constance
- Around 300,000 active supporters
- Offices: Radolfzell, Berlin, Hannover, Köthen, Erfurt
- Around 110 employees

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We work on...

Circular economy, traffic and air pollution, renewable energys, grid expansion, nature conservation, environmental education, consumer protection
Why focus on beverage packaging?

Around 10 percent* of German packaging waste** is beverage packaging.

* Packaging for wine, sparkling wine and spirits as well as milk drinks is not included in this quantity. The percentage share of beverage packaging is therefore even higher. Source: Gesellschaft für Verpackungsmarktforschung (2015)

** 18 million tonnes of packaging waste in 2016 make Germany the EU champion, including 3 million tonnes of plastic packaging.
Why focus on beverage packaging?

Plastic bottles and cans without deposit are among the most littered items in marine ecosystems and landscapes.

Source: Joint Research Centre, European Commission (2017)
Why focus on beverage packaging?

- Beverage packaging (PET, metal, glass) has a high material value
- High value creation potential due to bottle-to-bottle recycling
- Boosts recycling industry and creates jobs
Different systems for beverage packaging distribution and collection

- Deposit system for refillables
- Deposit system for single-use
- „Green dot“/Curbside collection
Beverage packaging in Germany: Two systems

**Voluntary** deposit for refillable beverage packaging:
- Historically evolved system
- 50 % less CO2 emissions (sector mineral water / soft drinks) compared to single-use packaging over the entire life cycle
- One refillable glass bottle (0.7 l) can be reused up to 50 times and replaces 23 single-use plastic bottles (1.5 l)

**Obligatory** deposit for single-use beverage packaging:
- Since 2003, German Packaging Law
- Separate collection of clean high value materials, collection rate of 98.5 %
- 16.4 billion single-use plastic bottles in Germany each year = 474,000 tonnes of plastic
1. Deposit system for refillable bottles

- Description
- Experiences and results
The German deposit system for refillables

- Fillers have high interest in getting bottles back
- No fixed deposit fee (deposit amount corresponds with the production value of the bottle)
- Glass, PET

**Beer**
8 Euro cent per bottle
0.33; 0.5 Liter

**Water, juices, soft drinks**
15 Euro cent per bottle
0.2; 0.5; 0.7; 0.75; 1.0 Liter
Refillables reduce packaging waste

- Single-use containers are only used once, before – assuming best case with separate collection – going into recycling
- a glass refillable bottle can be refilled and circulated over 50 times before it goes into recycling
- a PET refillable bottle is refilled and circulated around 15 times before going into recycling
- a crate, on average, is circulated between 100-150 times before going into recycling
Standardized bottles improve efficiency

- Most refillable bottles are standardized pool bottles
- Pool bottles can be used and returned by all system participants - minimizing transport distances
Standardized bottles improve efficiency

- Standardized pool bottles *differ only by label* and improve system efficiency
There are glass and PET refillable bottles

Refilling process of reusable PET pool bottles
Average bottle circulation rates for refillables

Plastic bottles get scratches faster than glass bottles

<table>
<thead>
<tr>
<th></th>
<th>Refillable glass bottles</th>
<th>Refillable PET bottles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mineral water</td>
<td>53,4</td>
<td>11,4</td>
</tr>
<tr>
<td>Juices</td>
<td>27,5</td>
<td>12,8</td>
</tr>
<tr>
<td>Carbonized soft drinks</td>
<td>30,6</td>
<td>13,1</td>
</tr>
<tr>
<td>Beer</td>
<td>50 *)</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: German Environmental protection agency (2012)
* Source: German Private Breweries Association (2010)
Refillables: Perfect implementation of EU waste hierarchy
The closed loop of refillables

99% of the refillable bottles are returned by consumers

Beverage whole sale
Collection from retail sale, sorting, return of empty bottles to each filler

Retail sale
Take back of empty bottles and crates, pre-sorting

Consumer
Purchase, return of empty bottles and crates

Filler/ Producer
Filling, washing

Beverage whole sale
Pickup from filler, storage, delivery to retail sale

Retail sale
Display, marketing, sales
Refillables are resource-efficient

For the same volume of mineral water only 1 refillable 0.75 liter glass bottle replaces the new production of 40 1.0 liter one-way PET bottles are used as packaging.
Refillable bottles reduce CO2 emissions

Contribution to climate change

Kg CO₂ / 1.000 Liter

Source: IFEU (2008)
Refillable bottles reduce CO2 emissions

**CO₂-Emissionen im Vergleich**

Mineralwasser in Mehrweg- und Einwegflaschen

CO₂ in kg pro 1.000 Liter

- Glas-Mehrweg: 80 kg
- PET-Einweg: 140 kg

Quelle: Ökobilanz G08/TFEU 2008

Contribution to climate change from one way PET bottles is nearly twice as from refillables
Refillable bottles reduce CO2 emissions

Beverage cans have significantly higher contribution to climate change
Refillable bottles reduce CO2 emissions

<table>
<thead>
<tr>
<th>Beverage consumption 2007: 20.9 billion liter non-alcoholic beverages</th>
<th>CO2 emissions (t/a)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scenario “One-way”</strong></td>
<td>2.754.072</td>
</tr>
<tr>
<td>80% PET one-way</td>
<td></td>
</tr>
<tr>
<td>10% Beverage cartons</td>
<td></td>
</tr>
<tr>
<td>10% PET one-way with recycling</td>
<td></td>
</tr>
<tr>
<td><strong>Scenario “Refillables”</strong></td>
<td>1.498.349</td>
</tr>
<tr>
<td>80% PET refillables</td>
<td></td>
</tr>
<tr>
<td>20% Glass refillables</td>
<td></td>
</tr>
<tr>
<td><strong>CO2 saving potential for refillables vs. one-way</strong></td>
<td>-1.255.723</td>
</tr>
</tbody>
</table>
CO₂ reductions in comparison

1.26 million tons of CO₂ correspond to

**Transport sector:**
Annually 560,000 less cars on the roads (medium-sized vehicles driving 15,000 km annually)

**Energy sector:**
Annual energy savings due to replacement of 39 million incandescent light bulbs for energy saving lamps (replacement of 60 W light bulbs for 11 W CFL with the German energy mix)
Current situation: More and more single-use plastic bottles and cans on the German market

- Price fight with cheap products in cans and single-use plastic bottles from discounters like Aldi and Lidl, since the end of the 90s
- Aldi and Lidl took over the market leadership in the mineral water sector only with single-use plastic bottles
- The result is a reduction of the refillable quota
Decreasing refillable quota and introduction of the single-use deposit system

- The refillable quota fell from around 75 percent (end of the 90s) significantly below the 70 percent target (regulation mechanism in the German packaging ordinance was triggered)
- Because of the falling refillable quota (under 70 percent) the Federal Government introduced the single-use deposit – the intention was a steering effect towards refillable bottles
- The single-use deposit of 25 cents was supposed to lead to financial disadvantages for single-use bottles and cans, because consumers have to pay more deposit than with reusable containers
Deposit systems – Perfecting collection and recycling

- **In 2003**: introduction of mandatory single-use deposit of 25 eurocent for single-use PET and glass bottles as well as cans

- **Objectives**:
  - Stop littering
  - Boost collection and recycling rates
  - Enable closed loop recycling
  - Steering effect towards refillables
2. Deposit system for single-use containers

- Description
- Experiences and results
The German deposit system for single-use containers

- Fixed deposit amount (German Packaging Law)
- 25 eurocent per container
- Applies to packaging sizes of 0.1-3.0 litres
- Glass, PET

Beverage segments included:
Beer, water, soft drinks, alcoholic mixed drinks

Packaging materials included:
Glass, plastic, metals
Deposit system for single-use

Deposit
- At least 25 eurocent

Labeling
- Logo and EAN code

Take back
- Done automatically (reverse vending machines) or manually
- Retailers are obliged to take back single-use containers of the same material (metal, plastic or glass) they sell
- Exception: Small shops (less than 200 m²) only need to take back the brand they sell in their shop
  - Small shops are relieved of the burden
Deposit system for single-use containers

Consumer purchases beverage product

Consumer pays price + deposit
Retail sale (store) pays price + deposit
Filler/Producer gets total deposit

The deposit is (in all trade steps) paid in physical exchange for the beverage container.

Consumer returns empty container to a return location

Consumer returns empty container and gets deposit back
Retail sale (store) gets the containers and hands deposit to consumer
Transport of containers to processing/recycling facility
Reimbursement of deposit amount paid out by store/depot

After take-back in retail, the deposit and the material from the beverage container go in different directions. This causes a need for clearing of the deposits.
Results of the single-use deposit system: Steering effect towards refillables

😊 Beer
82%

😊 Mineral water – Deposit at least slowed down the decline
30%

😊 Soft drinks
21%

Juices (not subject to obligatory single-use deposit)
8%
Results of the single-use deposit system: Refillable quotas

- The single-use deposit had a positive effect on the refillable quota in the beer segment
- However, the single-use deposit was not sufficient to prevent a decline in the overall quota
- What is required?
  - A mandatory refillable target
    - 70 percent refillable target in the German packaging law
    - If the reusable rate is not met, a **levy of 20 cents** must be introduced on single-use bottles and cans - in addition to the deposit
  - Clear labelling of single-use and reusable containers on the product
    - Mandatory labeling near the product
Plastic bottles and cans main items in littering
Littering of cans and plastic bottles

Littering of annually 3 billion cans and plastic bottles before the introduction of the deposit system
Deposit works since 2003 – a success story

Before …

After …
Results: curbside collection vs. Single-use deposit?
Collection rate of valuable materials

Current Collection rate of one-way beverage containers with deposit amount

98,5 %

The collection rate is almost double than in green dot systems!

Collection rate of plastic sales packaging amount around

50 %
Recycling rate and quality of materials

Clean material collection:
No material damage, no impurity, very high quality.
Total effective recycling rate amount **97-98 %!**

No mono-fraction material: impurity, adhesions, heavy rests, loss material in sorting process.
The recycling rate of collected plastic material amount only **45 %!**
Closed loop recycling

High material quality enable the use for the original function
Glass, Aluminum, PET, Steel

Bottle-to-Bottle Recycling

Low material quality
The use of green dot materials for the production of food packaging is not allowed.

No Bottle-to-Bottle Recycling
Downcycling
Material revenue

High material quality enable **high revenues**
Clear PET 400 – 430 EUR per ton

Low material quality enable **low revenues**
Clear PET 250 – 290 EUR per ton
Contribution to environmental protection

High contribution to environmental protection through the high collection- and recycling rate:
- Less incineration
- Less air pollution
- Less climate damage
- Less resource consumption

Comparatively low contribution to environmental protection through the low collection- and recycling rate

Deposit system

Green dot system
Cost efficiency

- Reduction of costs through high material revenues
  - High collection rate
  - No sorting costs
  - Cost Reduction of the public waste removal
  - Deposit slip

- Comparatively low material revenues
  - Low collection rate
  - Sorting costs
  - Costs for incineration of the sorting rest
  - Loss of materials
Overall results of the one-way deposit system

😊 Extremely high return rates
   - 98.5%
   - Nearly everything goes into recycling

😊 Clean high value materials
   - Pure PET
   - High revenues
   - Bottle-to-bottle recycling possible

😊 Littering problem solved
   - No more littering of beverage packaging
The German deposit system is well-established

- 16 years after the start of the single-use deposit system, it is broadly accepted
- There are only winners:
  - **Politicians**: achievement of high collection and recycling rates within the system
  - **Retailers**: high material revenues, better customer relationship and experienced customer service
  - **Packaging producers**: high quality material for a higher percentage of ‘bottle to bottle recycling’ (PET)/ material revenues
  - **Citizens**: clean environment without 3 billion littered cans and plastic bottles (situation up to 2002)
Retailers are in favour of the deposit!

- Even the hardliners from the single-use packaging industry and the biggest single-use bottlers and discounters now accept the single-use deposit system:
  
  "We will support the deposit system, because the customers and the producers appreciate it. The deposit system generates high recycling rates for PET and metals. Littering is almost eliminated" (BGVZ Bund Getränkeverpackungen der Zukunft)

- High material revenues and unredeemed deposit ("Pfandschlusspfund"): The German retailer REWE made 12 Mio EUR profit (net) with the deposit system in 2009

- Unredeemed deposit in 2015 amounts to a total of 180 million euros
- Consumer-friendly take-back via reverse vending machines
- No real problems from the take-back (smell, littering etc.)
- Better customer relationship and experienced customer service
- 60-80% of the customers bring back their deposit containers to the same retailer where they purchased them
Wrap-up and Recommendations

What did we learn about the introduction of the German deposit system for single-use beverage containers?

Keep it simple!

▪ Avoid exceptions (most of all for certain beverages)
▪ Take-back everywhere – no “island solutions”
▪ Clear and obvious labeling of containers with deposit
▪ Consumer-friendly automatic take-back system with reverse vending machines in big supermarkets
▪ The single-use deposit system builds up the same infrastructure that is necessary for the return of refillable bottles
Often heard arguments against deposit and why they are not true
“Deposit systems are expensive for consumers and retailers”

- It is a deposit (refund)!
- Consumers that are acting the way the legislator intended don’t pay
- In Germany, retailers keep the materials, selling them on the global market for good money or using them for a bottle-to-bottle recycling
- Refinancing system costs with unredeemed deposit “Pfandschlupf”
- In some countries retailers are given a certain “handling fee” (reducing costs)
„Deposit systems reduce sales of beverages in containers with deposit“

- Beverage producers claim that they would lose sales and market shares if deposit systems on single-use beverage packaging were introduced.
- Markets and sales vary over time – but not depending on the introduction of a deposit system!
Water sales in Germany before and after the introduction of deposit 2003

Water sales were going up before the deposit

Largest increase in sales after the deposit introduction

2003 Introduction of single-use deposit
“Deposit systems hurt existing green dot systems (curbside collection)”

• Green dot systems do not target out-of-home consumption (significant part of beverage containers) – these containers cannot get lost from the curbside collection

• It is not a question of one OR the other system: Green dot and deposit systems can co-exist perfectly

• There is a lot of other valuable plastic and metal packaging available that is sufficient to make profit with the curbside system

• Current license fee for German green dot system is lower than before the introduction of the one-way deposit (fear of break-down of green dot system not true)

• Before the introduction of the single-use deposit, only one dual system was active in Germany. Today after the introduction of the one-way deposit nine dual systems exist
“Deposit systems are inconvenient for consumers”

- If deposit systems were inconvenient, how could you explain the extremely high return rates (Germany: 98.5%)
- If deposit systems were inconvenient, how could you explain that 80-90% of the population are in favour of deposit systems in countries with a deposit system

false
“Deposit systems turns retail stores into waste bins”

- Retailers often keep reverse-vending machines in the back of the shop in order to lead the customer through the store.
- Retailers earn good money with the material from bottles – supermarkets are valuable depots!
- Better customer relationship - 60-80% of the consumers return their bottles and cans where they bought them.
“Deposit systems are vulnerable to fraud”

- This is simply not true.
- In NONE of the countries where deposit systems exist there is a significant problem with fraud
Conclusion: Comparison of collection systems for beverage packaging

1. Deposit system for refillables
2. Deposit system for single-use
3. „Green dot“/Curbside collection
Thank you for your attention!

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