



# **Masters of Recycling**

## **Use and Recycling of PET Beverage Bottles in Germany**

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# Mission and Goals

Forum PET stands for the **ecological improvement** of PET bottles and the cycle management of the raw material PET by **high-quality recycling** in Germany and Europe.

Members of Forum PET come from **all sections of the value chain** and include PET manufacturers, bottle manufacturers, bottling companies, recycling companies and machine manufacturers.

# 25 Years of History

- 1990: Market launch of the **first (refillable) PET beverage bottle in Germany** by Coca-Cola with Schmalbach-Lubeka met with harsh criticism
- 1991: **Foundation of Forum PET** with the aim to create market acceptance of PET bottles
- LCAs prove environmental benefits of refillable PET bottles; gain of market acceptance
- 2002: New criticism because of beginning market penetration of **non-refillable PET bottles**; Forum PET becomes part of IK Industrievereinigung Kunststoffverpackungen



## 25 Years of History

- 2003: **Mandatory deposit system** introduced for non-refillable bottles for mineral water, soft drinks and beer; **80% target** established for refillable and ecologically favorable containers
- Important **ecological improvements** of non-refillable bottles through light weighting, energy efficiency, better logistics and upcoming recycling
- 2010: LCA commissioned by Forum PET shows that the **non-refillable 1.5 liter PET bottle** for sparkling water and soft drinks had **no significant ecological advantages nor disadvantages compared to the glass refillable bottle**

# 25 Years of History



- 2010: Foundation of **Forum PET Europe** which later becomes a founding member of **Petcore Europe**
- 2013: Foundation of **RAL quality association** “Wertstoffkette PET-Getränkeverpackungen e.V.” with an aim to further boost high quality bottle-to-bottle recycling of PET
- 2016: Forum PET has nowadays about 30 member companies; current challenges e.g. new packaging law, circular economy, recycling, marine litter, image ...



# Member Companies



VARIOFORM PET



# Member Companies

## Forum PET market representation

**>60% of preform/bottle manufacturers  
(non-refillables)**

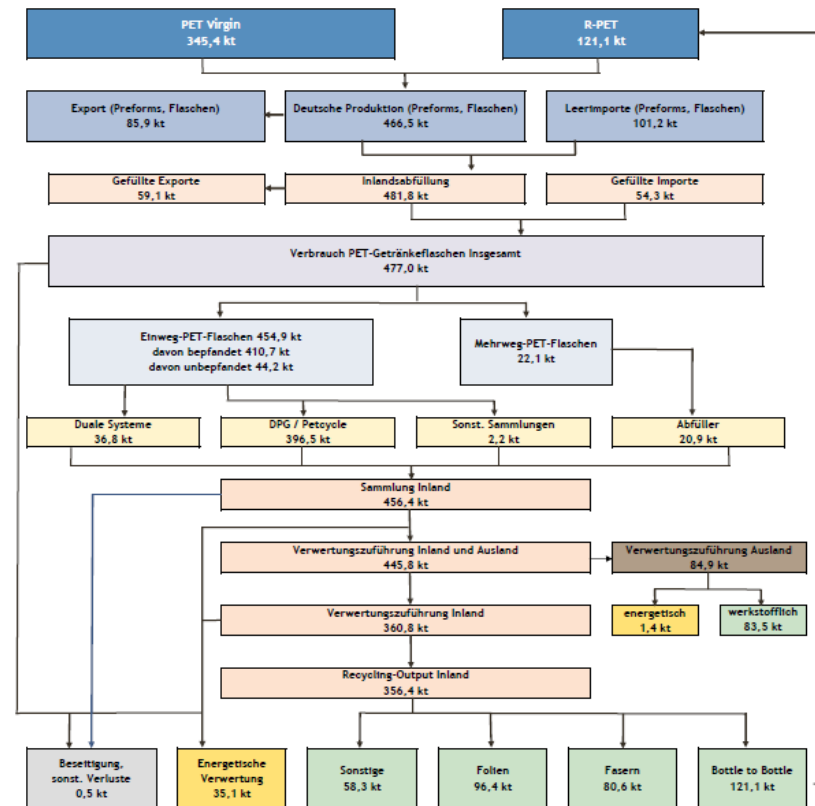
**>70% of preform/bottle manufacturer (refillables)**

**>60% of PET recyclers**



# 2 – Use and Recycling of PET Bottles in Germany

- **Material flow analysis** on PET beverage bottles in Germany
  - Preform/bottle production
  - Filling
  - Consumption
  - Collection
  - Recycling
  - Applications of recyclates
  - Including imports/exports
- Reference years 2013 and **2015**
- Performed by packaging market research institute GVM for Forum PET
  - Comprehensive packaging database
  - 43 expert interviews
  - Desk research
- All data refer to **net weight of PET** in kilotons (without caps, labels etc.)



# Study Scope

### Beverages **with** mandatory deposit system

Mineral water

Soft drinks

Beer

Alcoholic mixed drinks

### Beverages **without** mandatory deposit system

Juice

Sparkling wine

Wine

Spirits

*Out of scope:*  
Milk and drinks containing milk

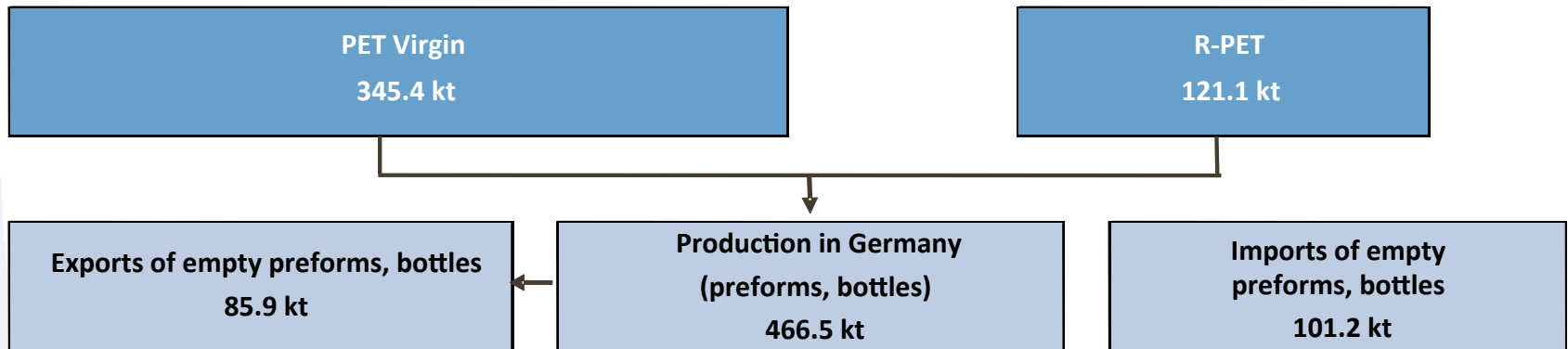


Reverse vending machine (0.25 € deposit per bottle)

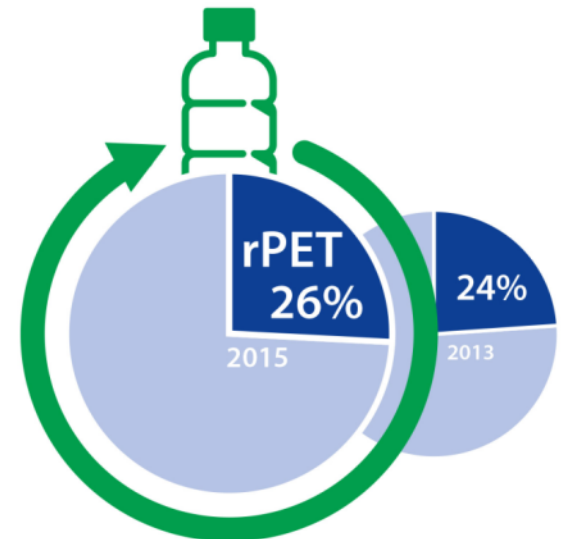


Household collection (recycling bin)

# PET Bottle Production

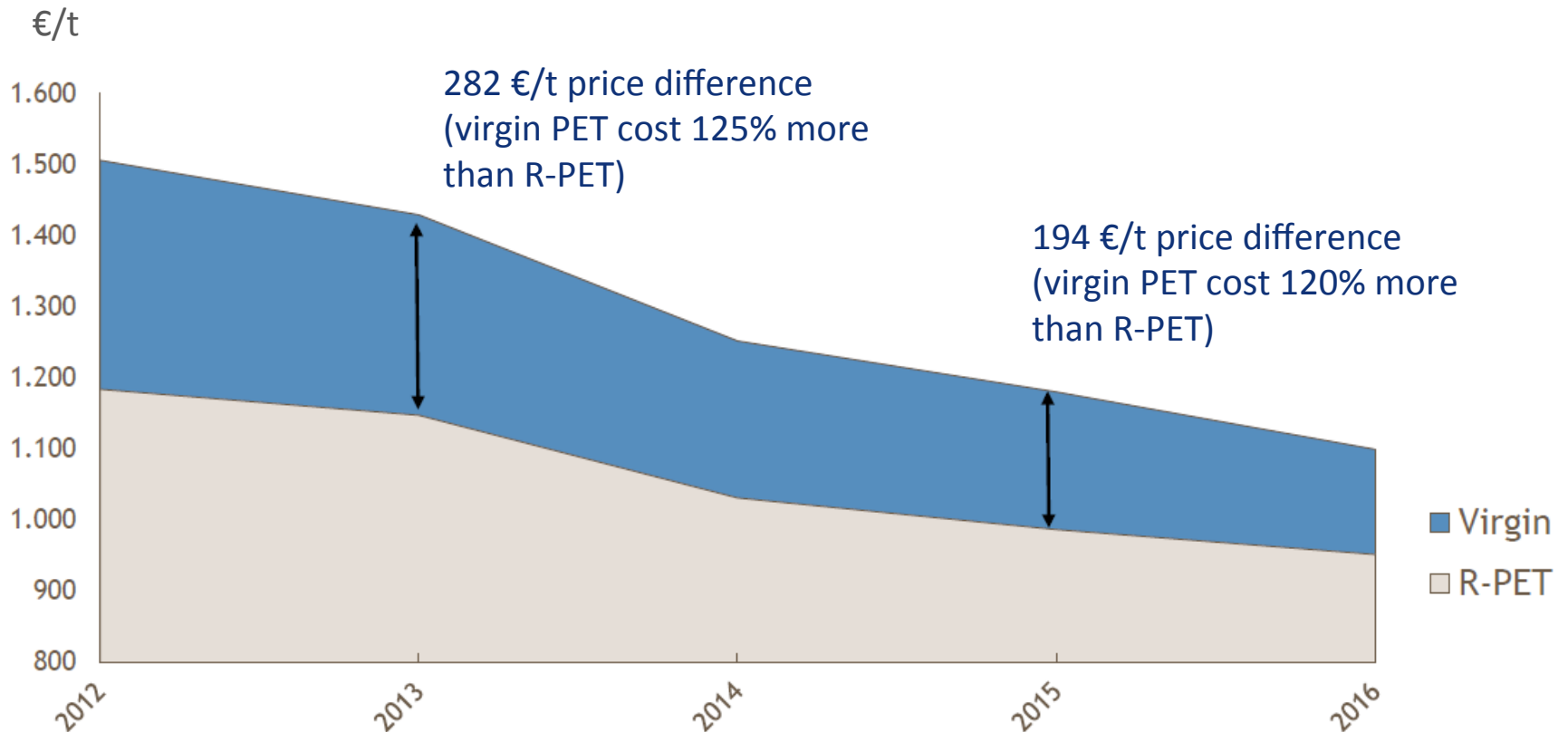


- 466.5 kt of PET beverage preforms/bottles produced in 2015 (about 17 billion bottles)
- **26% of recycled content** in average; increase by 2% since 2013 **despite of drop in virgin PET prices!**

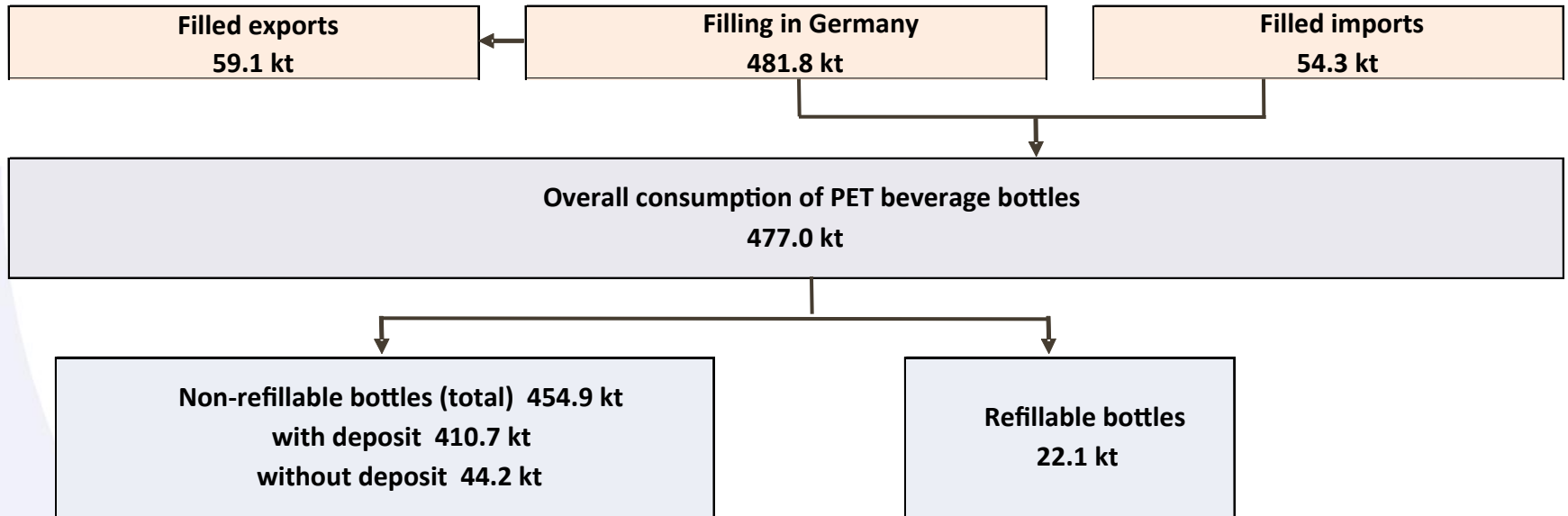


## 2 – Use and Recycling of PET Bottles in Germany

# Virgin and R-PET Price Developments

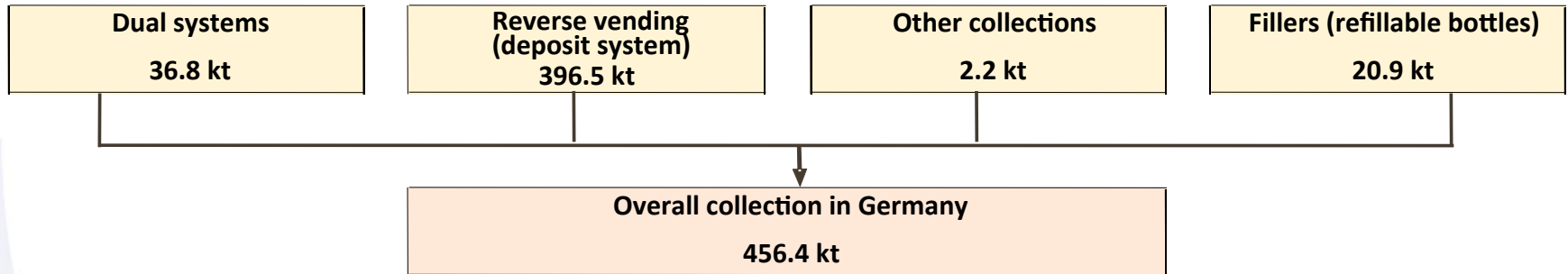


# Filling and Consumption



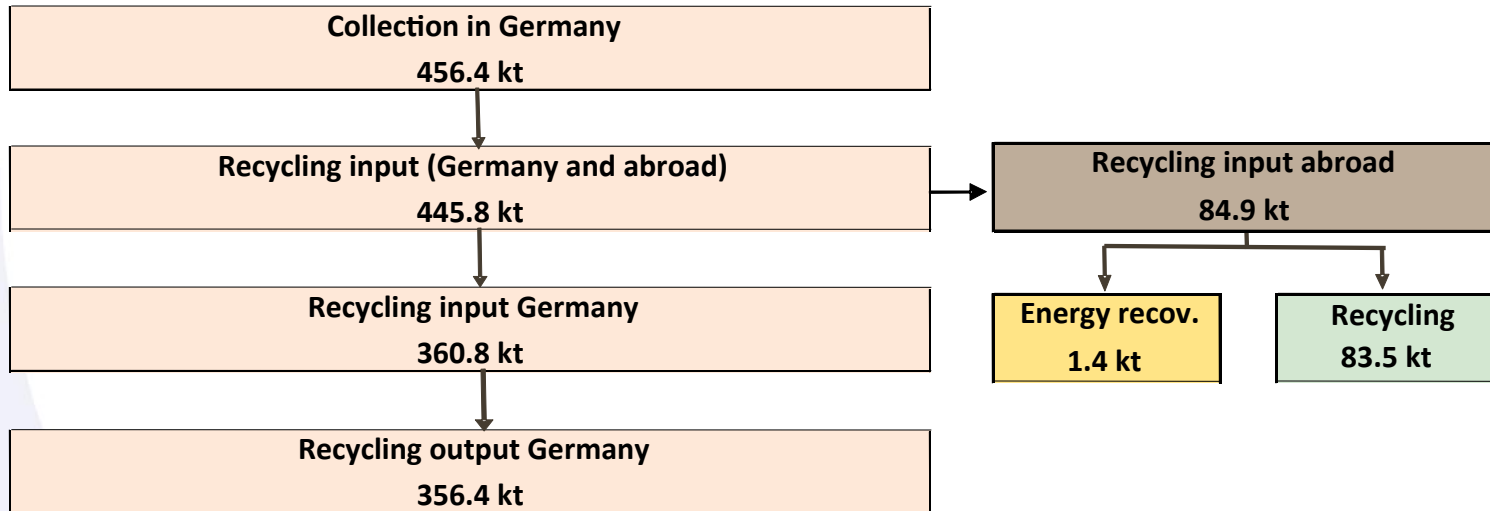
- **477 kt of PET** beverage bottles consumed in 2015 (about **17.4 billion bottles**); increase by 1.5% since 2013
- Most of which are non-refillable bottles with deposit (410.7 kt)
- Refillable bottles: less than 5% of PET use; market share close to 22% (with regard to litres of packed beverages)

## Separate Collection



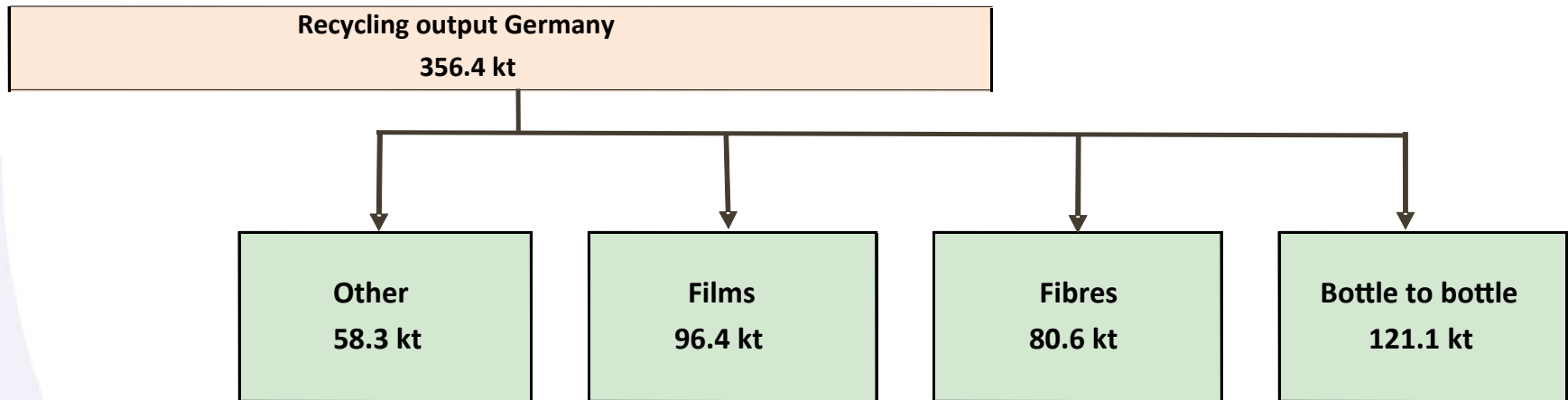
- Total of 456.4 kt of PET beverage bottles collected in Germany in 2015; i.e. **95.7% of consumed bottles**
- **98.8% of bottles with mandatory deposit** are collected separately; 96.5% by reverse vending systems
- Remaining 4.3% of bottles (20 kt) are mainly disposed of as residual waste; some are disposed of abroad or littered (and partly recollected by road cleaning)

# Recycling



- Recycling input: 446 kt (**93.5% of consumed bottles**)
- Losses (energy recovery):
  - 25-30% of PET waste through sorting only applies to collections of dual systems and other collections
  - Another 2-4% of PET waste during recycling
- Exports mostly recycled in neighboring countries; very little exports to the Far East

# Use of Recyclates



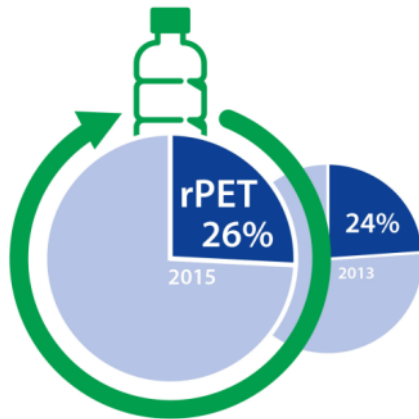
- Most important applications: **34% of bottle-to-bottle recycling** (beverage bottles counted only); followed by films and fibres
- “Other” include e.g. tapes, injection molding, non-food bottles
- Fibre applications becoming less important



# 3 – Summary

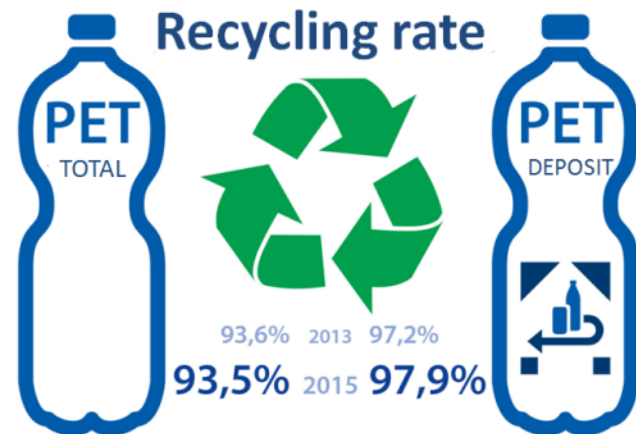
## Recycled content

- In 2015, PET beverage bottles produced in Germany had an average of **26%** recycled content.
- Since 2013, the content was increased by 2% **despite of the drop of PET virgin prizes.**



## Recycling rates

- **93.5%** of PET beverage bottles consumed in Germany were **recycled** in 2015.
- The rate is even higher (97.9%) for bottles with a mandatory deposit .



# 3 – Summary

## Use of recyclates

- More than a **third** of the recycled material is used for the **production of new beverage bottles**. That is the main application.



GVM study, commissioned by the Forum PET in the IK Industrievereinigung Kunststoffverpackungen e.V (2015)



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