

German Environment Agency

Umwelt  
Bundesamt 

BCAW Super Pollutant Workshop, Baku, 3.10.2024

# German Experience in Methane Mitigation in the Waste Sector

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1974–2024

## Introducing the German Environment Agency (UBA)



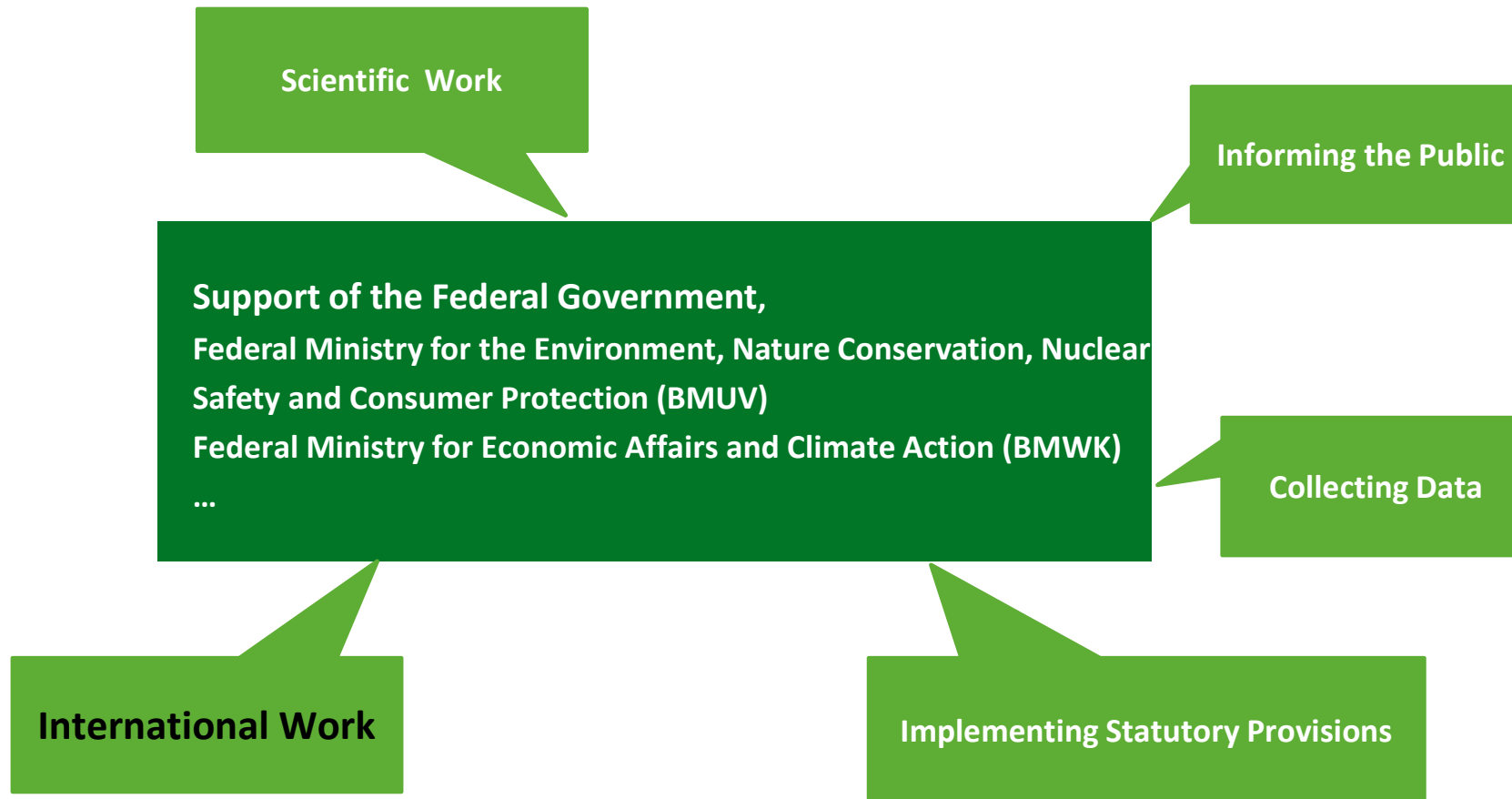
Headquarter of the German Environment Agency in Dessau-Roßlau  
Source: Martin Stallmann / Umweltbundesamt

### Key Data

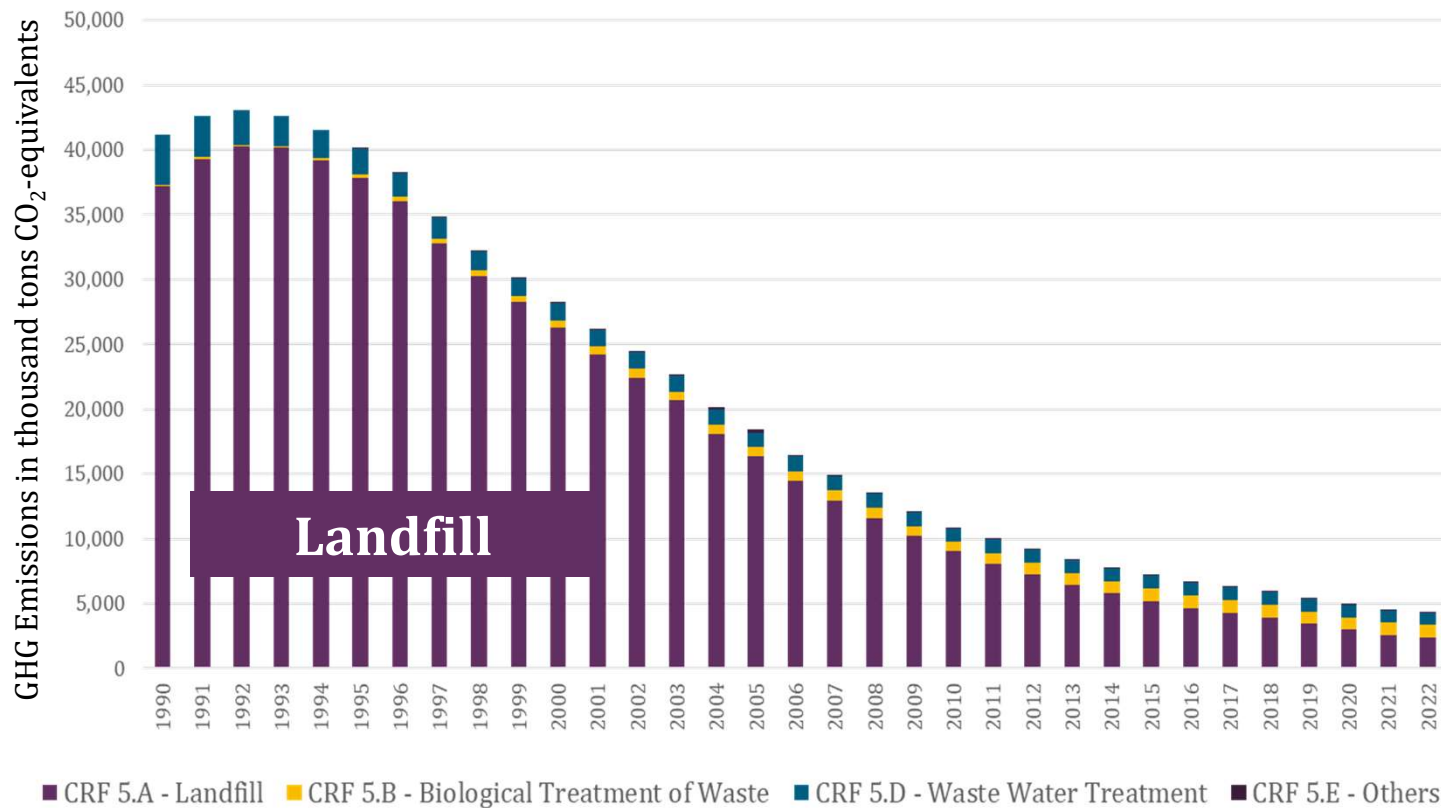
- Founding in 1974
- Around 1.800 employees
- Budget in 2022: 175.9 Mio. Euro
- Five divisions for environmental topics and one Central Office Division
  - *Div I: Environmental Planning and Sustainability Strategies*
  - Div II Environmental Health and Protection of Ecosystems
  - **Div III Sustainable Production and Products, Waste Management**
  - Div IV Chemical Safety
  - Div V Climate Protection and Energy / Emission trading

## Introducing the German Environment Agency (UBA)

*For our Environment*



# Germany: National Inventory Reporting on the Waste Sector



Landfill = 100% methane

**More than 90% reduction of methane emissions from solid waste between 1990 and 2022**

**Biological treatment generates only a fraction of the methane emissions compared to landfill**

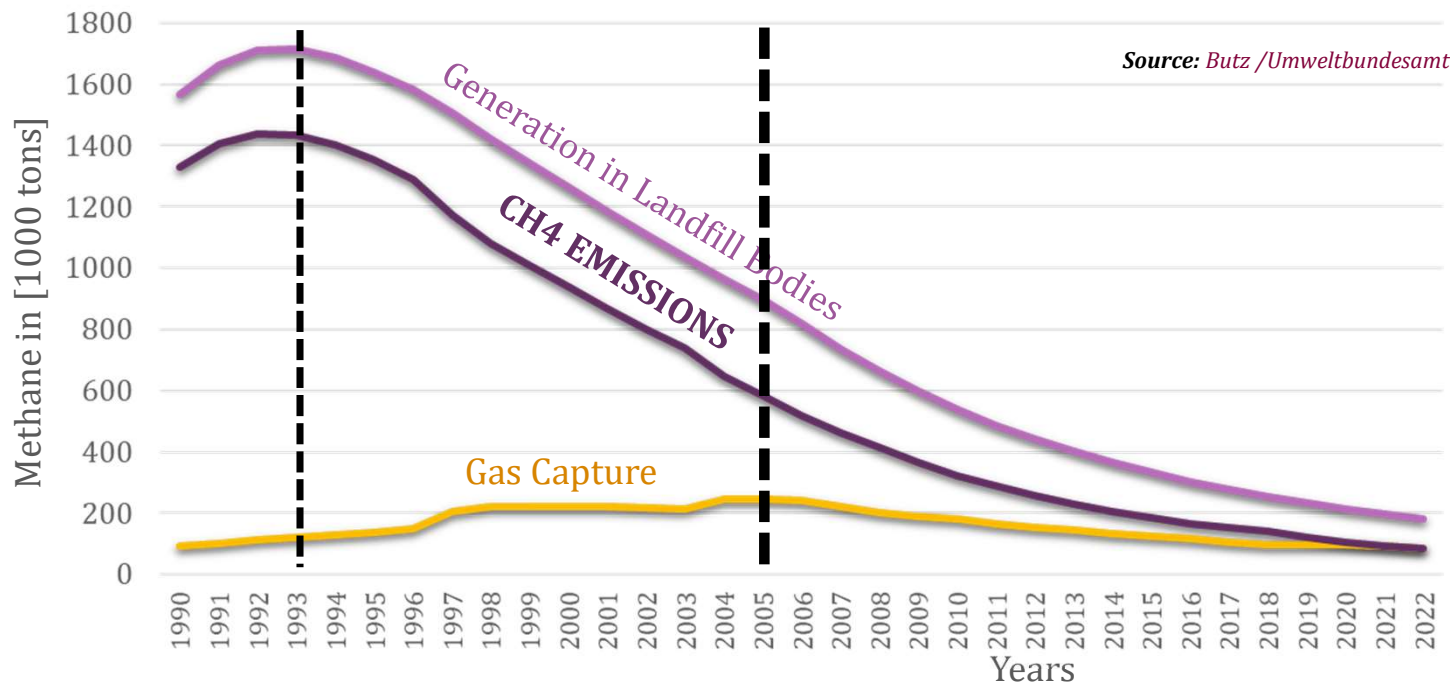
**Biological Waste Treatment** resulting from accidents, operation failures, process or storage

Source: Umweltbundesamt,

[https://www.umweltbundesamt.de/sites/default/files/medien/361/dokumente/2023\\_03\\_15\\_em\\_entwicklung\\_in\\_d\\_ksg-sektoren\\_pm.xlsx](https://www.umweltbundesamt.de/sites/default/files/medien/361/dokumente/2023_03_15_em_entwicklung_in_d_ksg-sektoren_pm.xlsx)

# Germany: Waste Policy Impact on Methane Emissions from Landfill

## 2005 Landfill ,ban' for untreated waste



## Key lessons:

- ✓ Landfill gas capture is limited
- ✓ Stopping landfill of waste that can generate methane is most effective
- ✓ Biodegradable waste landfilled today generates CH<sub>4</sub> for decades, so act quickly!

### Technical Ordinance on MSW 1993:

Total Organic Carbon TOC < 3%  
for non-hazardous waste landfills;  
12 years for transition;  
Landfill gas capture compulsory

### Waste Disposal Ordinance 2001:

Waste from bio-mechanical treatment:  
Total Organic Carbon TOC < 18 %,  
Respiration Activity AT<sub>4</sub> < 5 mg/m<sup>3</sup>,  
Gas Formation Rate GB<sub>21</sub> < 20 ml/g

### German Climate

**Law 2020:**  
Sector-specific  
targets for 2030

## Germany's Experience:

### How to address the methane formation + emission from the waste sector / landfills

#### The Problem

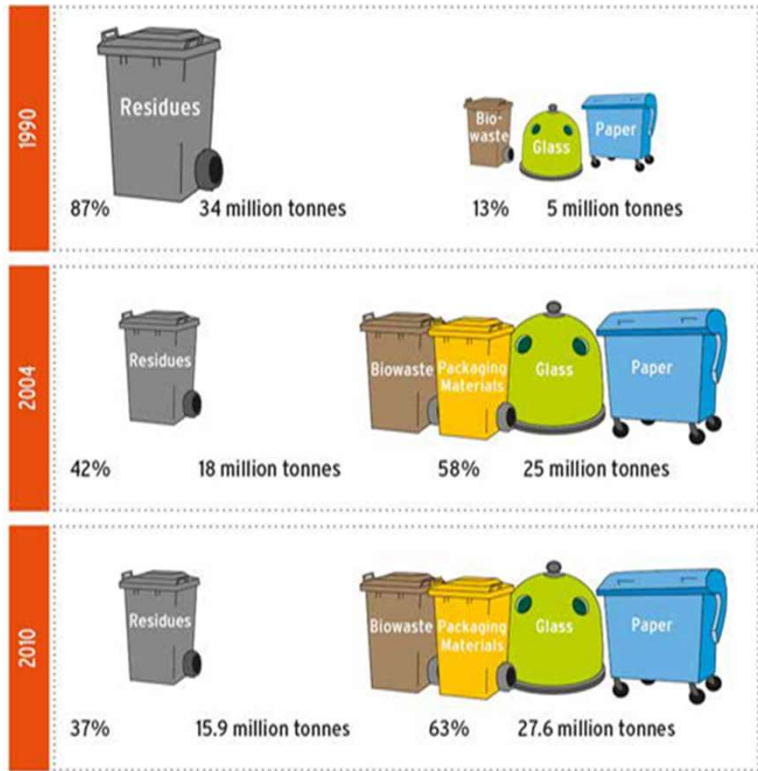
- ✓ Methane is formed in landfills and dump sites, if biodegradable waste is disposed and decomposed
- ✓ Much less than half of the generated gas can be captured / utilized
  - On landfills in operation, methane escapes into the atmosphere via areas kept open to deliver and compact waste, and there is technically hardly any possibility to put a 'lid' on these areas.
  - On closed landfills, surface covers and after care measures must be maintained 50 years or more to avoid further methane emissions or other negative impacts

#### The Solution

- Take control of the properties of the waste disposed and the landfill body
- Ban the landfill of biodegradable or untreated waste
- Divert organic waste to better uses, e.g. for soils improvement
- Implement separate collection + treatment of biodegradable waste, and pretreat residual waste before landfill

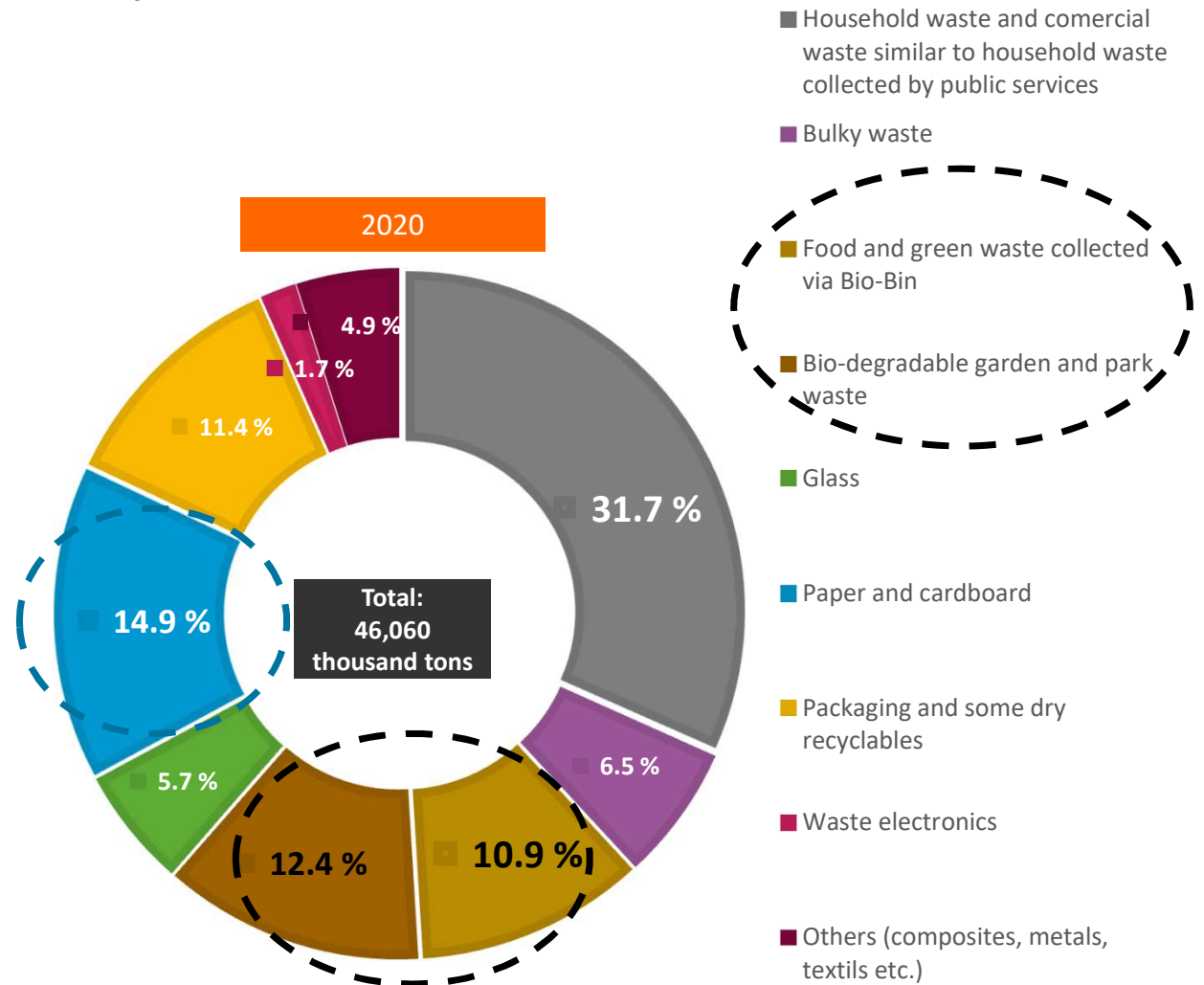
**STOP FEEDING THE BEAST**

# Germany: Trend for household-typical MSW, 1990 to 2020



Source: Federal Statistical Office (Statistisches Bundesamt) 2012, own calculations

**Remark:**  
Data not directly comparable due to different system boundaries.

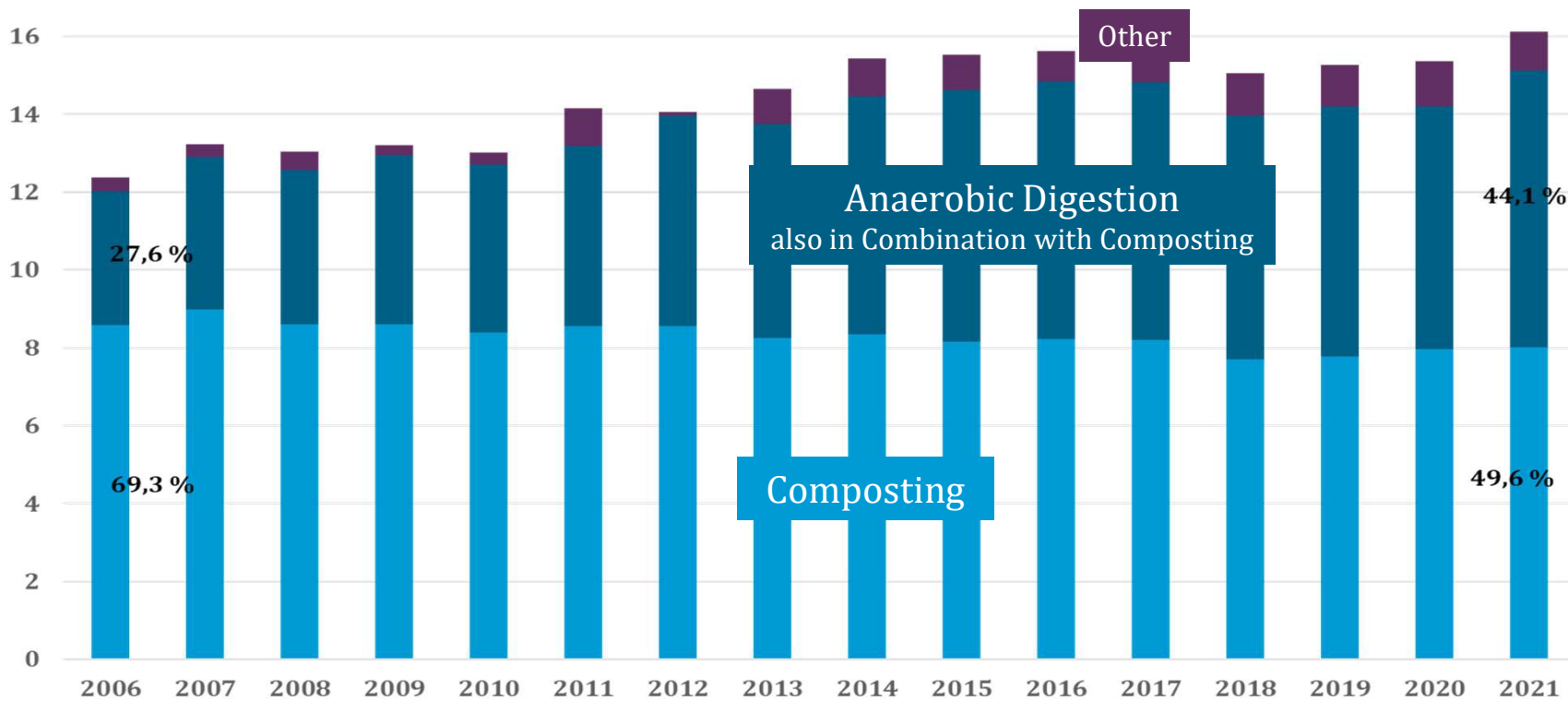


# Germany: Treatment of separately-collected Bio-Waste from Households

## COMPOSTING AND ANAEROBIC DIGESTION

Cascading use consisting of anaerobic digestion with biogas production/use and subsequent production of compost is state of the art for biowaste from households. The aim is to further increase the proportion of anaerobic digestion.

18 Mio. Tonnen

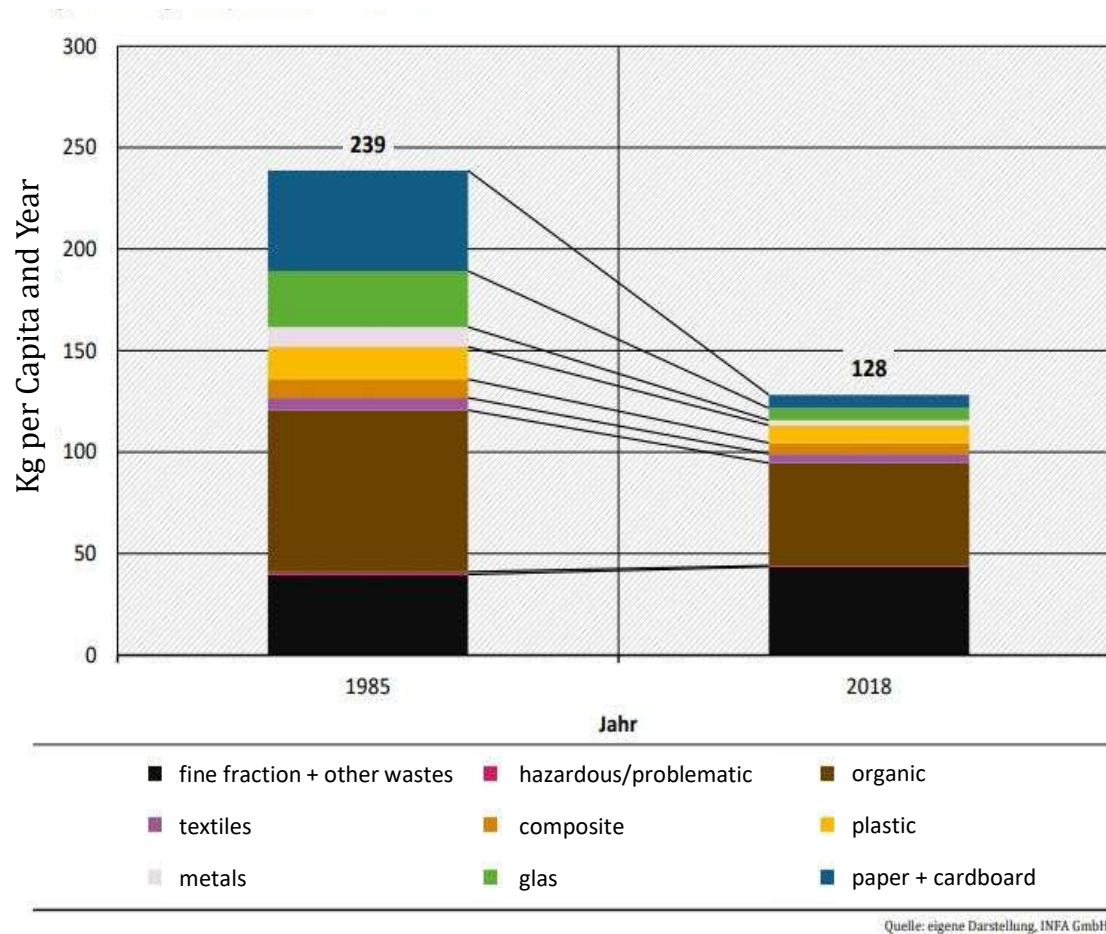


Source: Umweltbundesamt mit Daten des Statistischen Bundesamtes, Abfallstatistik 2021



## Germany: Residual waste, a glance into the bin:

Per capita household waste amounts and composition for 1985 and 2018



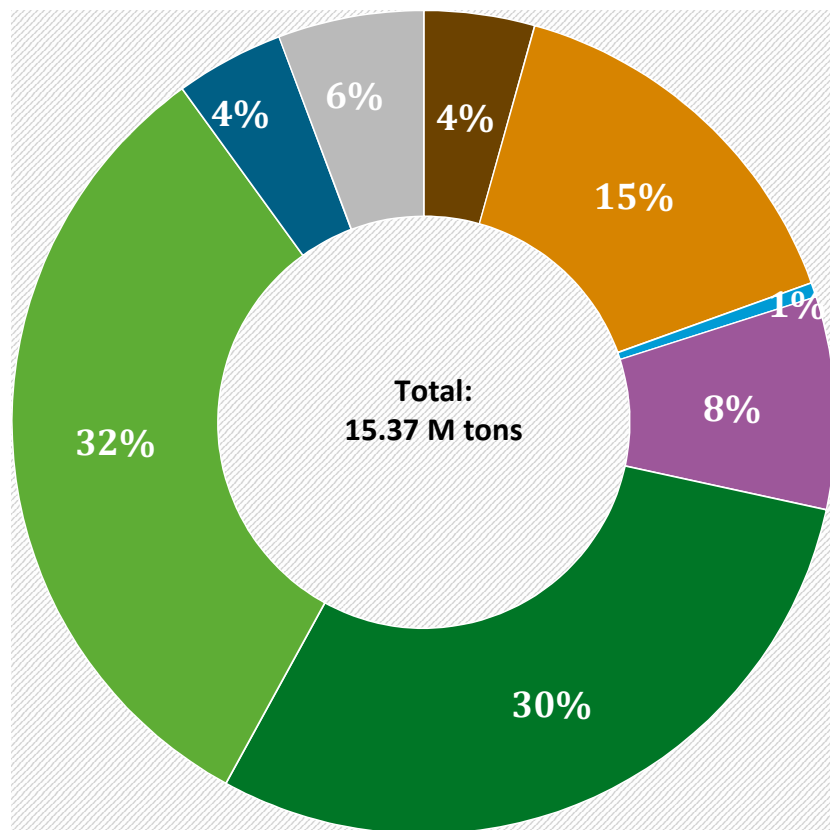
Amounts of residual waste has decreased significantly by separate collection

Despite separate collection of biowaste, the residual waste still contains 39.3 % (weight) of organic waste, corresponding to 50.4 kg per inhabitant and year.

**Pretreatment of the residual waste before landfill remains an imperative to entirely curb the methane emissions at landfills**

## Germany: Separate Collection and Management of total Organic Waste

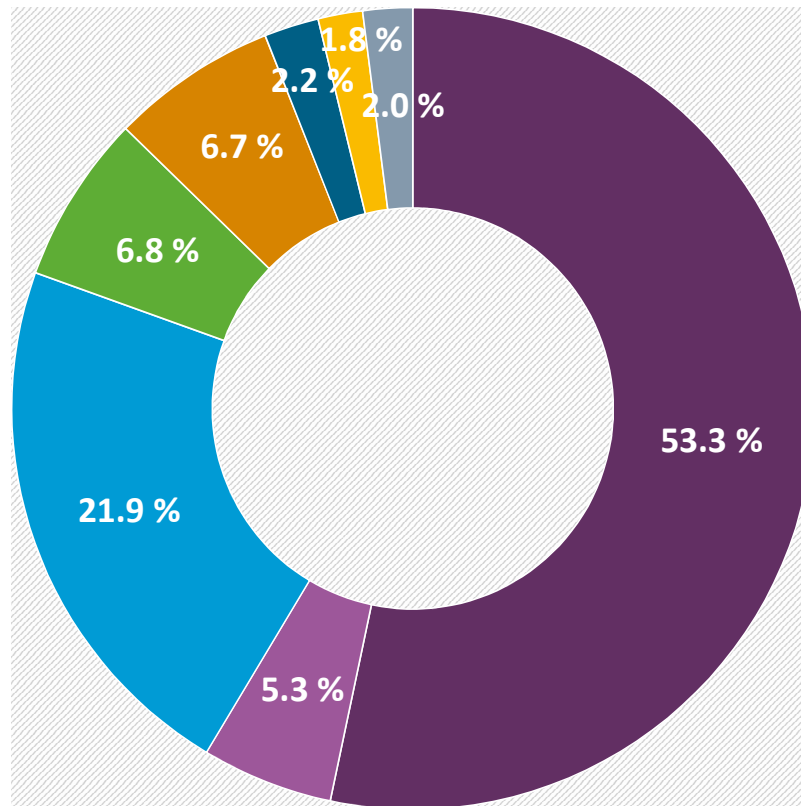
### Organic Wastes (including sewage sludge) delivered at Treatment Plants in 2020



- Manure
- Waste and sludge from agriculture and food processing
- Waste from wood processing
- Sewage sludge
- Garden and park waste
- Waste from Bio-Bin
- Food waste from canteens and restaurants
- others

Data source: <https://www.destatis.de>

## Germany: Management of total Organic Waste Usage of quality-controlled Compost and Digestate in 2021

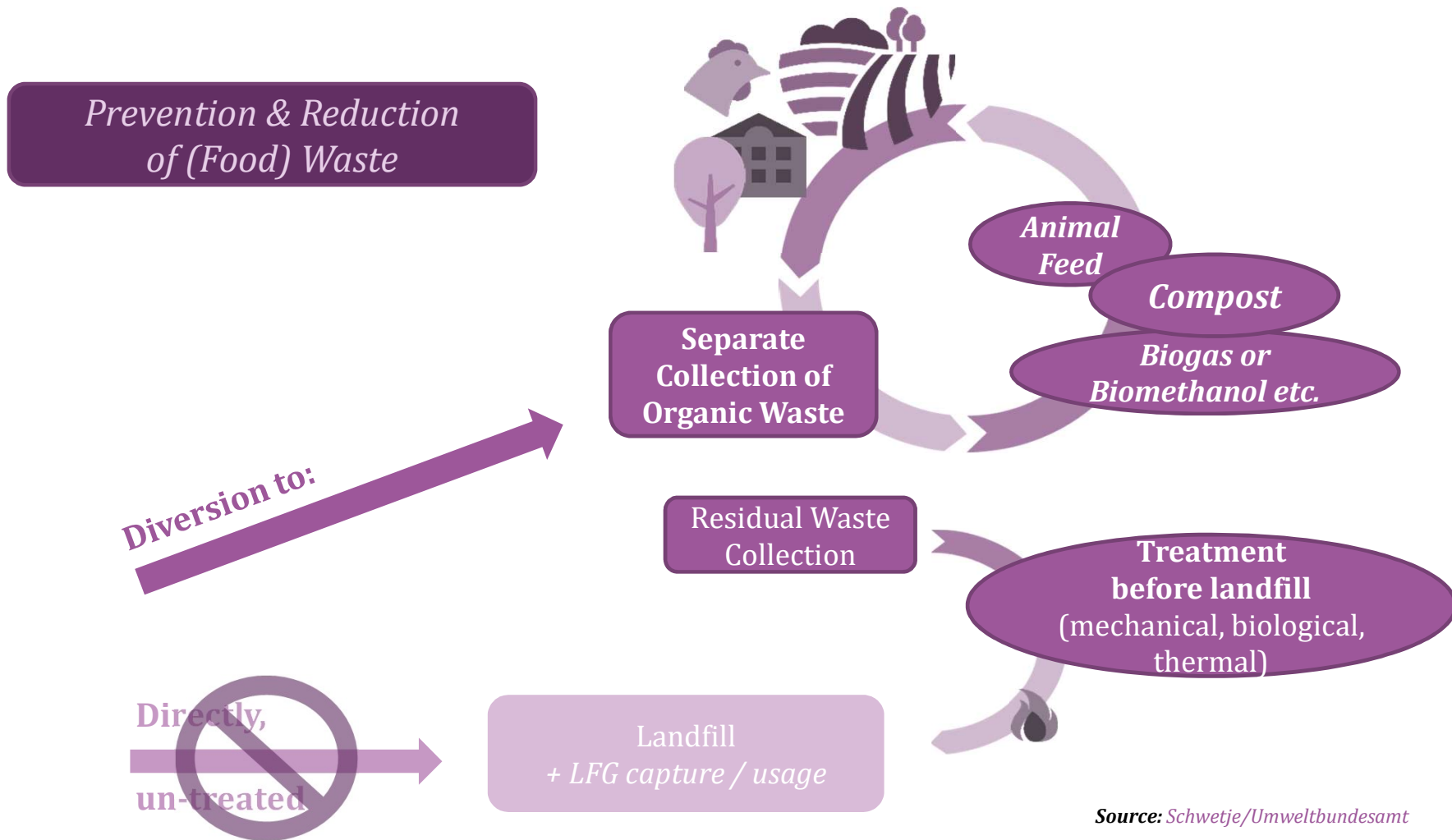


- Agriculture, konventionell
- Agriculture, ecological
- Soil Production
- Landscaping and Recultivation
- Gardening, hobby
- Special crops
- Gardening, professional
- others

Digestate is destined to agriculture by almost 100%!

Data source: Bundesgütegemeinschaft Kompost e.V., German Compost Quality Assurance Organisation

# STOP FEEDING THE BEAST – TURN TO BETTER OPTIONS



**Thank you for your attention!**

**Anja Schwetje**

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