

How the countries of North and Central Europe are achieving the objectives of minimisation of MSW-landfilling and increasing the recycling rates, using the example of Germany



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Why do we have to manage the waste?

❖ In past time the main reasons were :

- Hygiene and health
- Cleanliness of the towns and villages

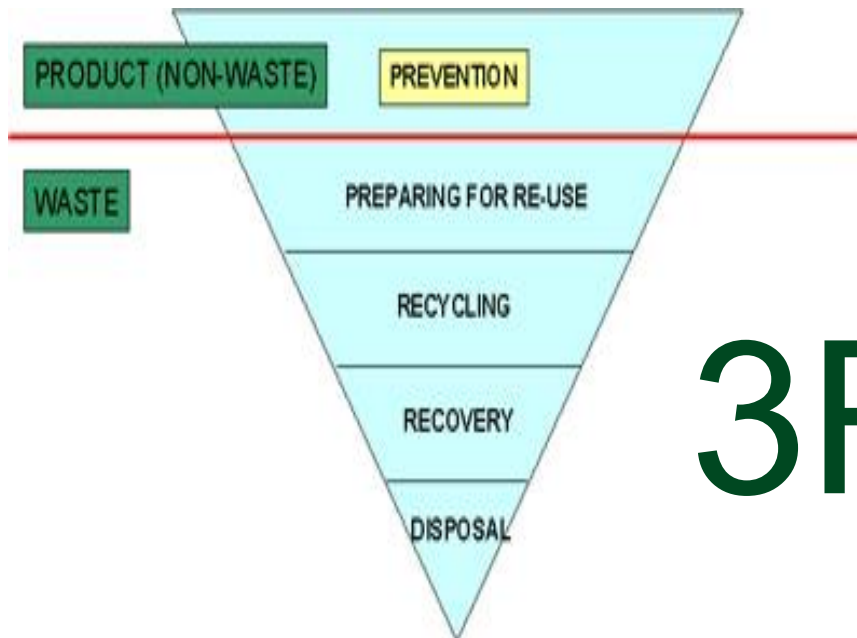
❖ In recent time there are more reasons,
namely protection of our climate and resources:

- Circular economy: Saving of raw materials and energy for manufacturing new things
- Production of energy from incineration or fermentation of waste as well as from landfill gas utilisation (partly renewable)
- Lower production and emissions of landfill gas (methan)



Quelle: AVG, Haeming

Waste hierarchy in Waste Frame Directive



**3R = Reduce
Reuse
Recycle**

Landfill reduction target in Landfill Directive

35 %

Biodegradable

10 %

MSW

Duties, current valid :

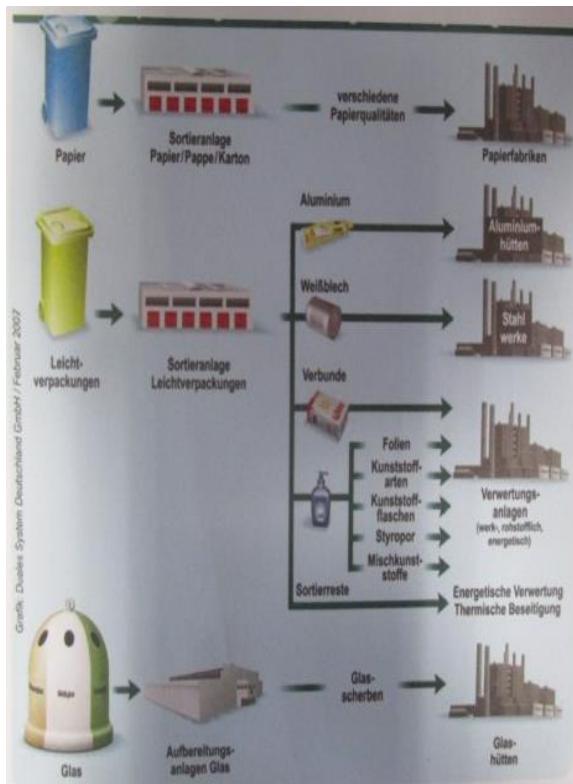
- Reduction of biodegradable waste going to landfills
- 2016 (2020): **35 %** of waste produced in 1995

Results of the Trialogue (Dec 2017):

- Landfilled **MSW** will be limited until **2035** to **10 %** of produced amount MSW
- **Five** years more for member states which 60 % of MSW landfilled in 2015



In which manner is it possible to achieve the 10 % for landfilling?

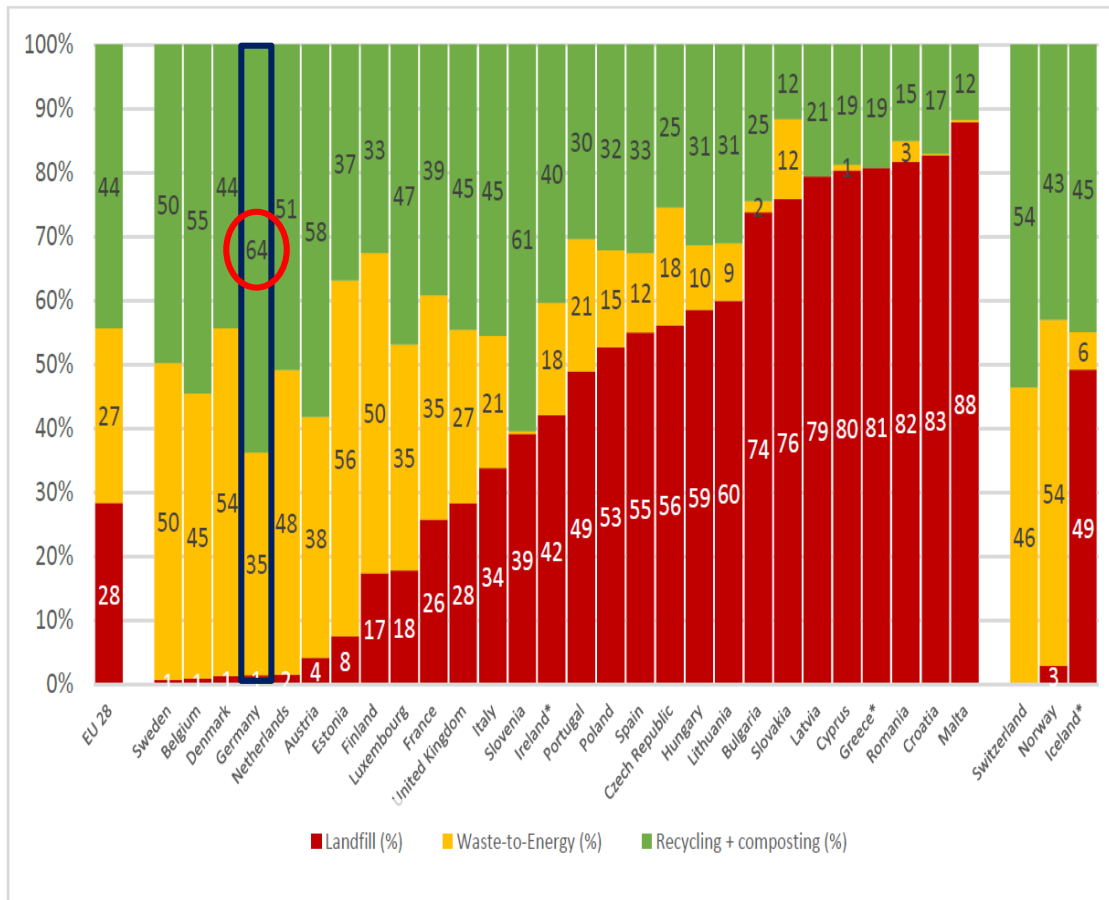


Quelle: AZV SLK

- Increasing the recycling rate through separate collection of single waste fractions (paper, glass, metal, plastics,)
- Sorting and treatment of these fractions before delivering to recycling industry
→ industry needs and take only appropriate materials, that means clean single waste fractions with comparable properties for recycling
- Waste of the residue waste bin and sorting residues has to be treated before landfilling by incineration or mechanical biological treatment
→ loss of mass, recovery of energy, no formation of biogas on landfills

The Reality in the EU in 2014

Municipal Waste treatment in Europe (data from Eurostat 2014)



**Landfill rates
from 1 % to 88 %
in the EU !!!**



Waste collection with 4 fraction directly at houses

Detached house (bins)



Apartment buildings (containers)



blue	paper, cardboards	brown	biowaste, garden
yellow	packages (all kinds)	grey/black	residue waste

Many places in the town for textiles and glas (white, green, brown)



One site in town for more and other waste fractions (recycling depot)



freezer

Electronics, TVs

washing mashines

metals

wood

biowaste

hazardous waste

.....



Disposal of the residue waste

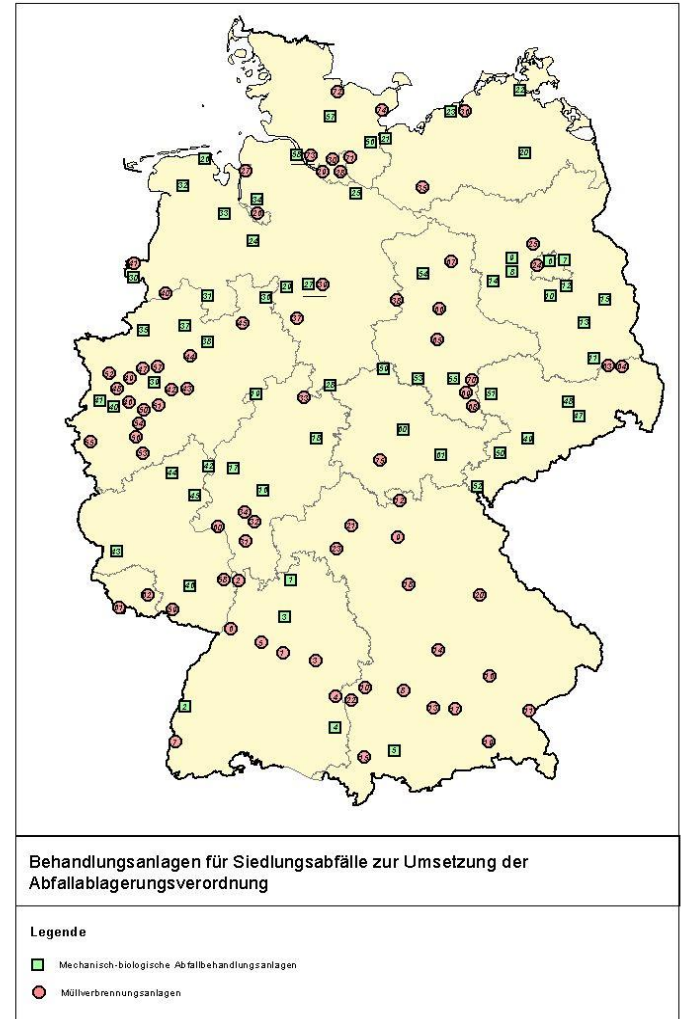
→ pretreatment before landfilling,
recovery of energy and materials

→ exceptionless since June 2005

About 110 treatment facilities for MSW:

MBT – Mechanical-biological treatment
44 facilities 5.400.000 tons/y

WI – Waste incineration
66 facilities 20.600.000 tons/y
25,6 M MWh/y energy output



Treatment of residues

= mass losses + material recycling + energy recovery

Incineration

(75 % of residues)

- 60 – 65 % mass loss
- Fe- and non-Fe-metals
- 10 – 20 % building material from slag
- Energy recovery (steam, electrical energy)
- 3 % hazwaste (filter dust)
- 10 - 20 % landfill (ash, stone)



Treatment of residues

= mass losses + material recycling + energy recovery

Mechanical-biological treatment (25 % of residues)

- 30 % mass loss
(water, biodegradation)
- 50 % extraction of Refuse Derived Fuels (RDF)
- Metals, stones, glass
- Possible energy production from fermentation
- 15 – 20 % for landfill (similar to soil)





Another kind of MBT

- Sorting
- Mechanical treatment
- Biological treatment (fermentation)
- Gas production

Do we need landfills furthermore ?

- **Yes, of course !**
But not for household waste or for MSW
- Landfill sites only for contaminated mineral waste
- TOC < 3 mass-% if MSW is incinerated
TOC < 18 mass-% if MSW is MBT-treated
- All landfills have BAT-standards
- → Only 10 % of all waste is landfilled,
and only 1 % of the MSW (soil, stones)



There are more requirements to fulfill for an appropriate waste management:

- Separat collection of different waste fractions as much as possible
- Pretreatment of the mixed residues before landfilling (incineration, biodegradation in MBT)
- Sufficient financing of all necessary measures
- Willing participation of the residents in waste separation



Some words about money

- Not enough money → No appropriate waste management system !!!
- All necessary measures cost or bring money to the system, e.g.:

Waste collection
Administration
Pretreatment, sorting
Residue treatment
Composting
Landfill operation

Selling of:
Metals
Paper
Some plastics
Energy (steam,
heat, electricity)



→ In sum: Waste management always costs money !!!

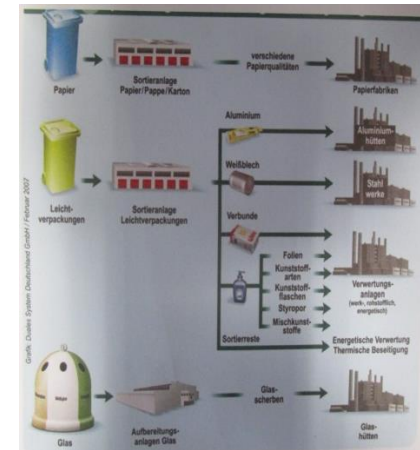
→ This money has to be provided by waste fee or by public budget (the latter often has not enough)

→ I pay monthly < 4,00 € (cigarette pack costs 5,00 €)

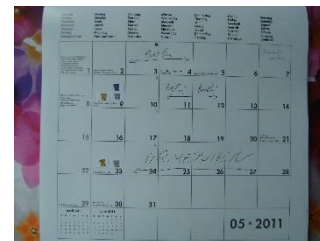


Information of and good contact to residents

- People have to be convinced,
 - the done measures are good for all, for the climate, the resources, the cleanliness ...
 - The prices are reasonable and not too high
- People are forgetful and must be reminded from time to time, how important separate collection is and which waste belongs to which waste bin
- Bin places, streets and parks have to be clean, it is a sign for people that waste management works



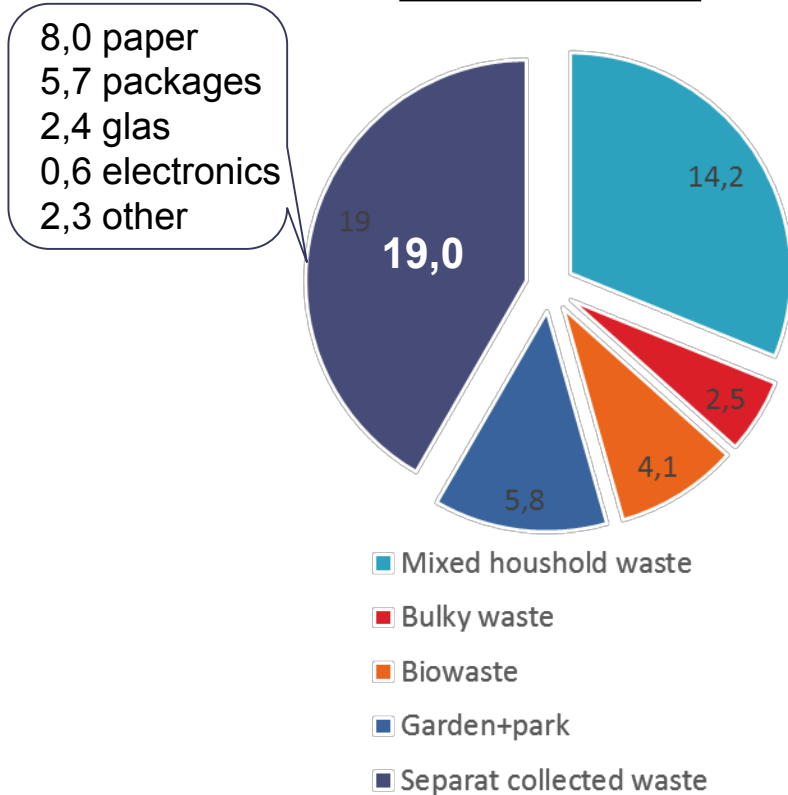
Entsorgungsgebiet	Abfallart	Januar	Februar	März
Aderstedt	Grau	11.25	08.22	08.22
	Braun	11.25	08.22	08.22
	Blau	27.08	24.09	24.09
Alleben	Grau	12.26	09.23	09.23
	Braun	09.23	08.20	08.20
	Blau	09.08	08.05	08.05
Amesdorf	Grau	13.27	10.24	10.24
	Braun	11.25	08.22	08.22
	Blau	13.10	10.10	10.10
Aschersleben 1	Grau	10.24	07.21	07.21
	Braun	12.26	09.23	09.23
	Blau	12.26	09.23	09.23



German results: MSW – gained fractions and their ways

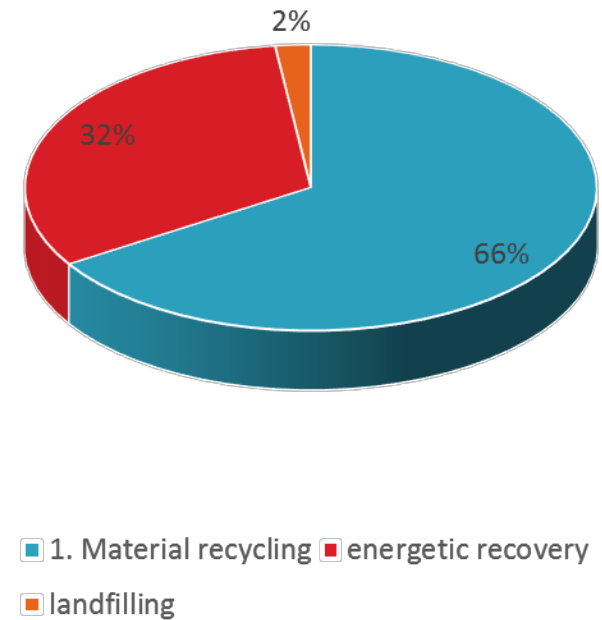
46 M tons/y MSW (= 13 % of all waste)

MSW [M tons]



Ways of MSW in Germany

→ Only 2 % to landfills



Summery

- Goals:
 - Circular economy for materials
 - Minimization of landfilling
- Mean requirements are:
 - Separate collection of different fractions
 - Pretreatment of waste before landfilling
- It sounds so simple to do it well,
but in praxis it is a complicated thing.
- But we are able to learn from each other.



„Waste is raw material“

(If you kiss a frog,
you can get a prince.)

Thank You for Your Attention!



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