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New Calculation Method for Measurement of Recycling Rates and Influence on Recycling Quotas

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German Association of waste management

Content

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- Current methodologies for measurement of recycling waste
- New proposal for calculation method
- Impact on recycling quotas
- Possible practical difficulties
- How to overcome the obstacles

Legislative Basis

- **Europe**
  Directive 2008/98/EC on waste (Waste Framework Directive)

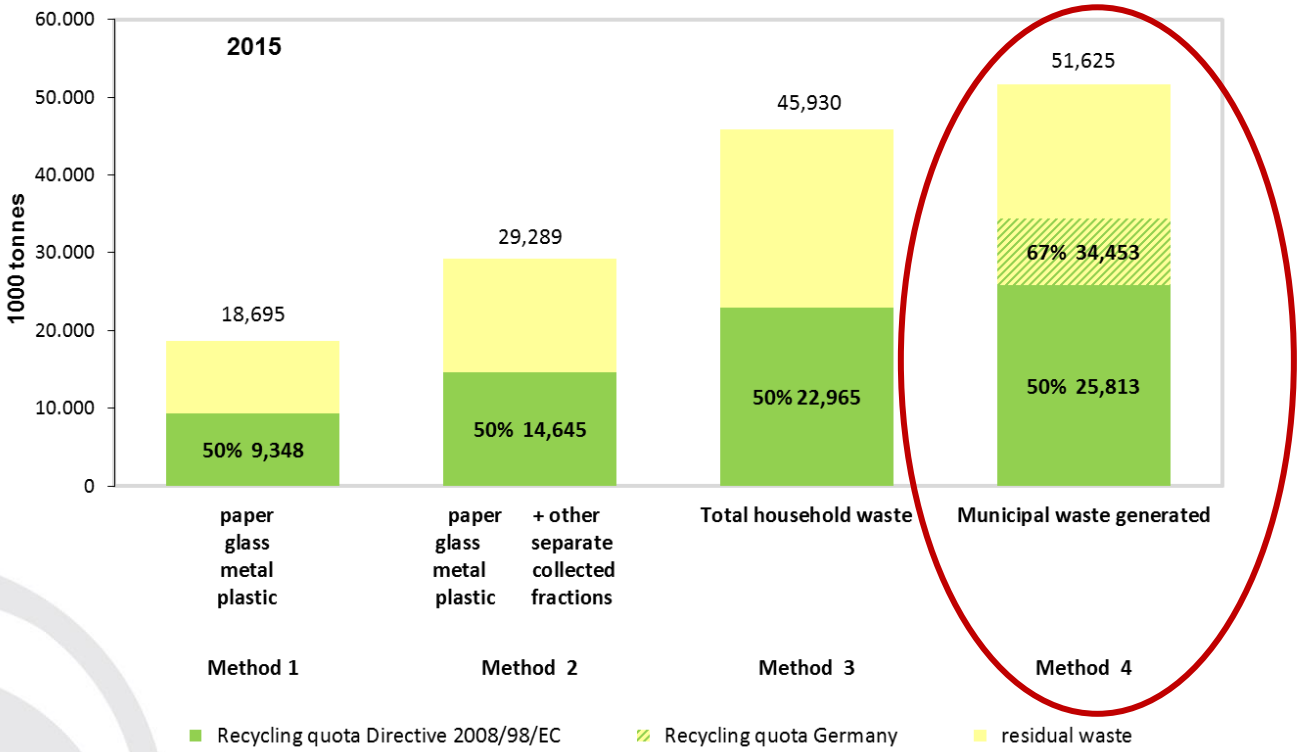
  by 2020 recycling target minimum of **50% by weight for at least paper, metal, plastic and glass**
- **Germany**
  Kreislaufwirtschaftsgesetz KrWG of 24th February 2012 (Law on Life-Cycle Management)[1]

  by 2020 recycling target minimum of **65% by weight of total municipal waste (MSW)**

[1] Last changed on July 20th, 2017

Calculation Methods

- Directive 2008/98/EC on waste allows 4 methods for calulating the recycling rates[1]



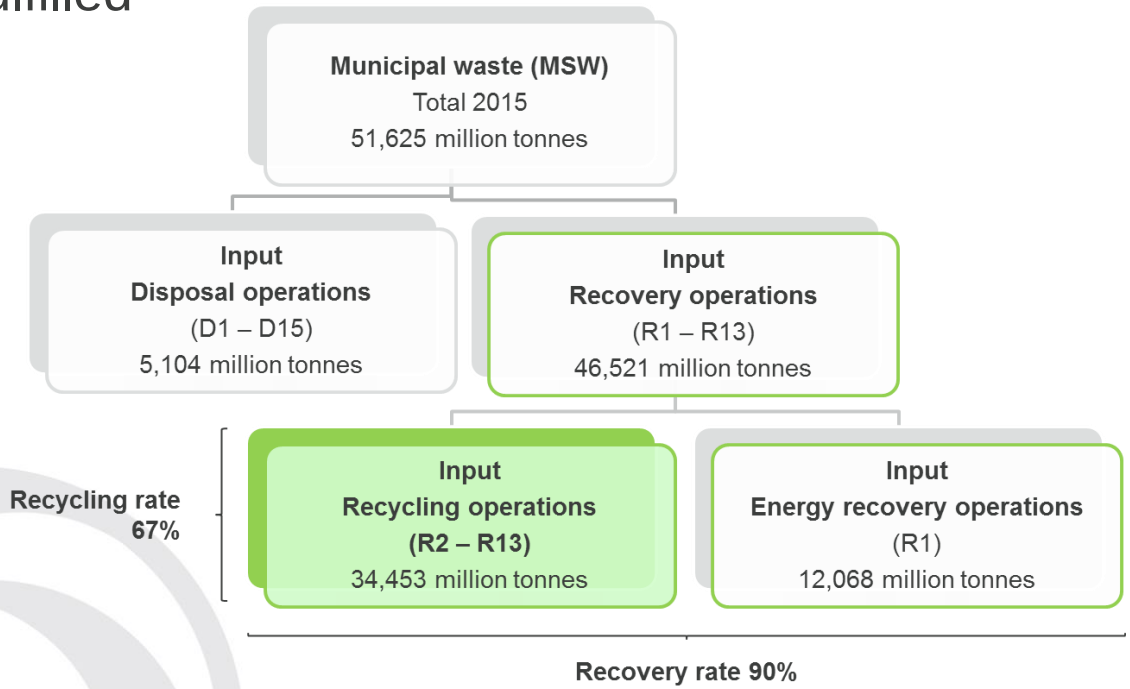
Germany Law on Life cycle management:

Method 4

[1] Commission decision: „Establishing rules and calculation methods for verifying compliance with the targets set in Article 11 (2) of Directive 2008/98/EC“, 18.11.2011, 2011/753/EU

Statistics and Reality

- Calculation of recycling rate with input in recycling plants (R2-R13 operations)
- Recycling Rate 67% (34.5 million tonnes) in 2015, recycling target fulfilled



R2-R13-operations:

- Material Recovery Facilities (MRF),
- Disassembling facilities,
- Shredder plants,
- Composting and anaerobic digestion plants,
- Mechanical Biological Treatment plants (MBT)

Statistics and Reality

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Calculating with input waste streams overestimates recycling

- When regarding the output from separate collection only the recycling of glass, paper & cardboard and metals reaches 85% - 90%.
- Only 50% (other sources say 20-30%) of the output from MRF‘s for plastic and lightweight material is recycled, the rest will be incinerated.

Statistics and Reality

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Calculating with input waste streams overestimates recycling

- About 60% of separate collected biowaste and green waste will be used as compost, the rest is water, CO_2 and a small amount of contraries (7 - 12% of the input waste).
- Composting of biowaste 45%
- Composting of green waste 60%
- Anaerobic digestion 79%

Statistics and Reality

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Calculating with input waste streams overestimates recycling

- Regarding mixed MSW from households treated in MBT plants only 5% mostly metals will be recycled.
- Commercial waste similar to household waste treated in sorting plants (MRF‘s) only 13-20% will be recycelt.

- On the other hand 8% metals are recycled from bottom ashes from incinerators.

Impact on Recycling Quotas

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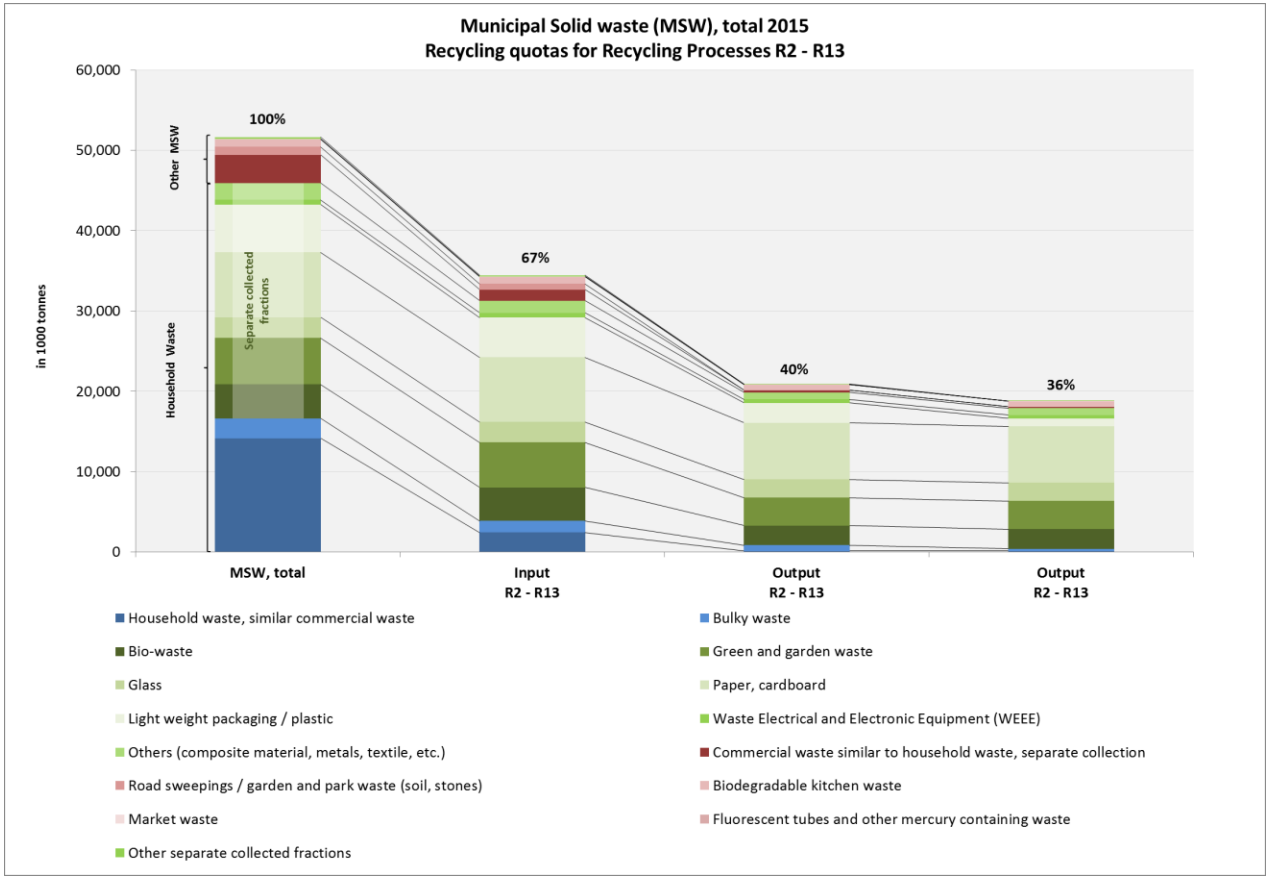
Calculating with input waste streams overestimates recycling (67%)

Calculating output of treatment plants only a recycling rate of 36 - 40% is reached.



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Targets of the Circular Economy Package
Status: August 2017

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Comparison of the positions of EU Commission, EU Parliament (EP), European Council and German Government

- Targets of EP are more ambitious as of Commission and Council

Proposed waste management targets	EU Commission		EU Parliament		European Council		Germany	
	2025	2030	2025	2030	2025	2030	2025	2030
Share of municipal waste prepared for reuse and recycling*	60%	65%	60%	**70%**	50%	60%	60%	65%
Share of bio-waste prepared for recycling					50%	65%		
Share of municipal waste landfilled	-	10%	-	**5%**			-	10%
Share of packaging waste prepared for reuse or[1]/ and[2] recycling	65%[1]	75%[1]	**70%**[2]	**80%**[2]			**70%**	**80%**
Share of packaging waste prepared for reuse	-	-	**5%**	**10%**				
Share of plastic packaging prepared for reuse and recycling	55%	-	**60%**				50%	70%
Share of wood packaging prepared for reuse and recycling	60%	75%	**65%**					
Share of ferrous metal packaging prepared for reuse and recycling	75%	85%	**80%**					
Share of aluminium packaging waste prepared for reuse and recycling	75%	85%	**80%**				50%	70%
Share of glass packaging prepared for reuse and recycling	75%	85%	**80%**					
Share of paper and cardboard packaging waste prepared for reuse and recycling	75%	85%	**90%**					
Calculation method for recycling quotas	Only 1 calculation method for all member states, Input in final recycling process				average loss rate		average loss rate	
Separate collection	paper & cardboard, metal, plastic, glass		**paper & cardboard, metal, plastic, glass, textile, bio-waste**					
***Exceptions**	Member States with <20 % recycling rate in 2013 or expected recycling rate <50% in 2025 receive 5 more years				Extension of time for member states with 65% landfill rate			

EU Circular Economy Package

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New Calculation Method for recycling targets[1]

- Only the input in a „final recycling process“ is counted
- The output of any sorting operation can be counted as recycled when it is send to a final recycling process and when the waste streams for disposal or incineration remain below 10%.
- Metals from bottom ash of incinerators when entering a final recycling process will be counted as recycling when they fulfill certain quality criteria.[2]

[1] Proposal for a Directive of the European Parliament and of the Council amending Directive 2008/98/EG on waste, 02.12.2015

Article 11a. Rules on the calculation of the attainment of the targets laid down in Article 11

Definition in 17a. "final recycling process" means the recycling process which begins when no further mechanical sorting operation is needed and waste materials enter a production process and are effectively reprocessed into products, materials or substances

[2] Article 11a, 6.

Influence on Recycling Quotas

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- Results for recycling quotas with new calculation method

2015 Municipal solid waste (MSW), total	Waste key number (EWC)	Waste type	Waste amount, total in 1000 tonnes	Treatment and Recycling: Recycling plants R2 - R13 percentage of waste amount	Input R2 - R13 in 1000 tonnes	Output R2-R13 percentage of waste amount	Output R2-R13 in 1000 tonnes
Household wast	20030101, ex 20030100	Household waste, similar commercial waste[1]	14,147	MBT / mechanical-physical drying (MPS)	2,443	5%	122
	200307	Bulky waste[8]	2,495	Sorting plant	1,434	20% - 50%	287 - 717
	20030104	Bio-waste[2,3]	4,232	Composting/digestion plants	4,147	**100%**	**4,147**
	200201	Green and garden waste[2,3]	5,771	Composting/digestion plants	5,623	**100%**	**5,623**
	150107, 200102	Glass[4]	2,553	Sorting plant	2,550	**100%**	**2,550**
	150101, 200101	Paper, cardboard[4]	8,103	Sorting plant	8,047	**100%**	**8,047**
	150102, 15010600, 15010601, 15010602, 20019901, 200139	Light weight packaging / plastics[4,9]	5,952	Sorting plant	4,925	20% - 50%	985 - 2,463
	200123*, 200135*, 200136	Waste Electrical and Electronic Equipment (WEEE)	591	Sorting plant	590	70% - 80%	413 - 472
	150103, 150104, 150105, 150109, 200110, 200111, 200113*, 200114*, 200115*, 200140, 20019900, 200399 200117*, 200119*, 200126*, 200127*, 200128, 200129*, 200130, 200131*, 200132, 200133*, 200134, 200138	Others (composite material, metals, textile, etc.)[4,5,6]	2,087	Sorting plant	1,528	**56%**	**856**
Other MSW	20030102, ex 20030100	Commercial waste similar to household waste, separate collection[7]	3,506	Sorting plant	1,365	13% - 20%	177 - 273
	200202, 200203, 200303	Road sweepings / garden and park waste (soil, stones)	986	k.A.	717	0%	0
	200108	biodegradable kitchen waste	928	Digestion plant	875	**100%**	**875**
	200302	Market waste	60	Composting/ digestion plants	50	**100%**	**50**
	200121*	Fluorescent tubes and other mercury containing waste	11	Sorting plant	10	70% - 80%	7 - 8
	150110*, 150111*, 200125, 200137*, 200141, 200304, 200306	Other separate collected fractions[8]	205	Sorting plant	147	10%	15
Municipal solid waste (MSW), total			**51,625**	**67%**	**34,453**	**47% - 51%**	**24,154 - 26,217**
				Metal recycling from Waste to Energy plants[10,11]			80 - 400
				Recycling quotas including metal recycling		**47% - 52%**	**24,234 - 26,617**

100% Amount in tonnes

in biological processes possibly lower, depending how water reduction is considered

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German Government

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New Calculation Method for recycling targets

„Average loss rate“

Principle:

- An „average loss rate“ is subtracted from the separate collected fractions.
- It differs from type of waste and treatment process.
- All 3 to 4 years a „new average loss rate“ will be estimated.

Reason:

- Because of commingling, separating and other operations a generation of statistical data is often not possible, so that a calculation of the recycling quotas will fail.

EuRIC –
European Recycling Industries' Confederation

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- When calculating the recycling targets, the most reliable point of measurement is the **output of a sorting facility**, because it is possible to trace
  - i) the origin of the streams for which targets have been set and
  - ii) the losses occurring with a level of precision matching statistical needs.

EuRIC –
European Recycling Industries' Confederation

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- Recycling targets cannot be measured at the input of final recycling defined by reference to a production process because:
  - Raw materials used in a production process are bought on the basis of their price, quantity and quality, not of their origin. It is impossible, in most instances, to identify the original waste stream (municipal, C&I, etc.), as certain industry specifications issued by the manufacturing industry itself testifies.
  - In Member States where there are no "final recycling processes" for given waste streams, it will be even more difficult to obtain the information enabling to report recycling rates.
- Measuring recycling targets at the input of a production process runs against the objective of accurate statistics across the EU.

ITAD DWMA

- Achieving a general recycling rate of 70% would be a considerable challenge, even if it does only apply from 2030.
- Such an ambitious target could encourage the use of inefficient processing systems rather than acting as an incentive to work on ecodesign and stimulate the recycling market.

ITAD = Interessengemeinschaft der Thermischen Abfallbehandlungsanlagen in Deutschland e.V.
Source: “European Parliament votes on Waste Framework Directive - Are the new European waste targets and measurement methodology realistic?”, Dutch Waste Management Association, March 2017

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Activities in Germany to increase recycling

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- Implementation of separate collection of biowaste area-wide since 2015 (KrWG),

  At the end of 2015 4.2 million tonnes of biowaste is collected separately. This corresponds to 51 kg per inhabitant*.
- An increase up to 60 kg per inhabitant can be reached when separate collection is widened. This corresponds to 4.9 million tonnes biowaste per year.
- In the result 0.7 million tonnes more biowaste can be generated in the following years, that means an increase of 1% of the recycling quota, calculated with the amount of MSW from 2015.

* inhabitants 82.18 million in 2015

For comparison: 2013 separate collection of biowaste 46,5 kg per inhabitant per year (biowaste: 3,757,000 t, inhabitants: 80.77 million)

Activities in Germany to increase recycling

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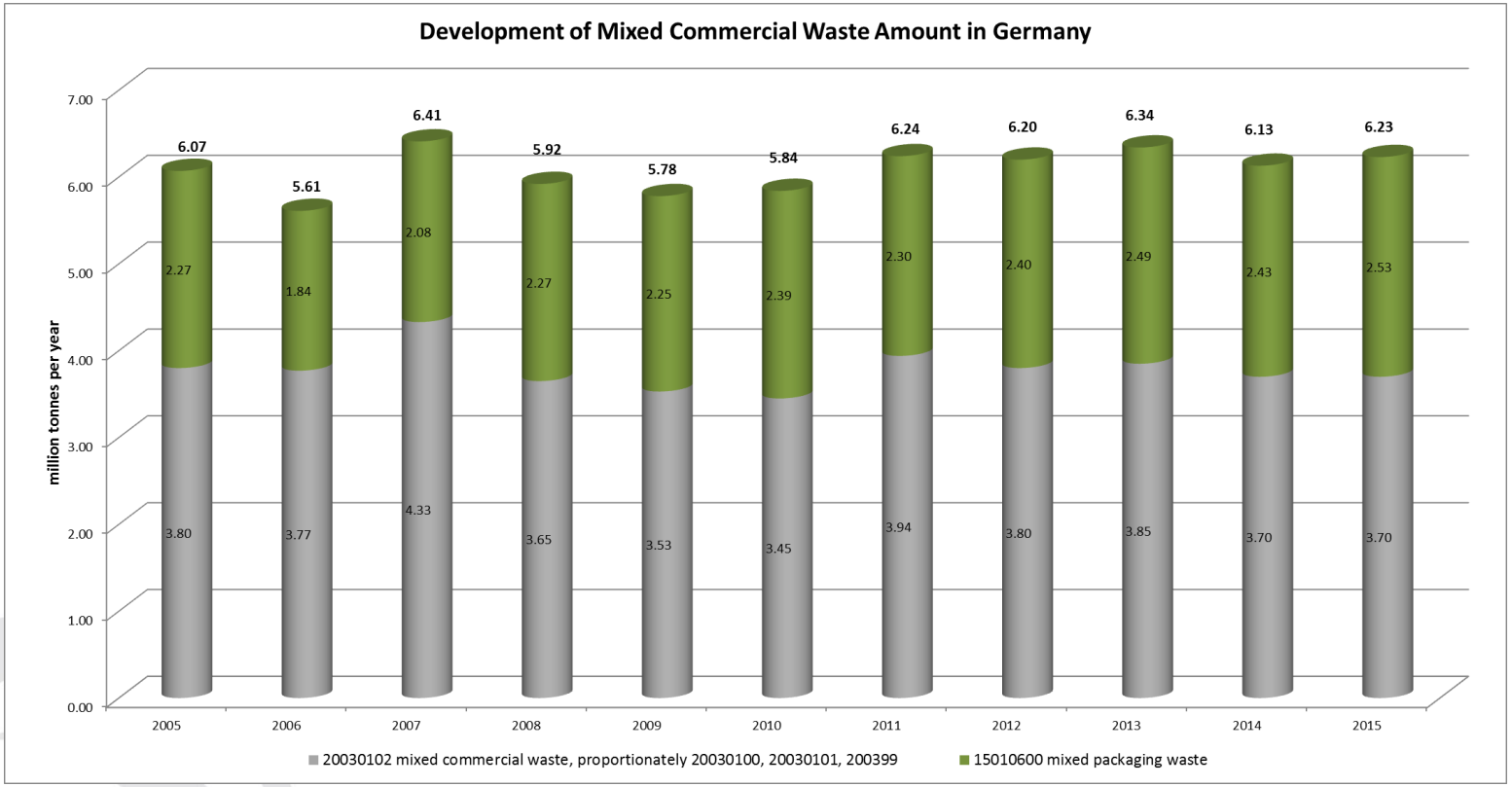
- C&I waste, nearly stable around 6.2 million t/a since 2011



Source: UBA-Texte 18/2016; calculation of 2012 to 2015 TOMM+C from Destatis

Activities in Germany to increase recycling

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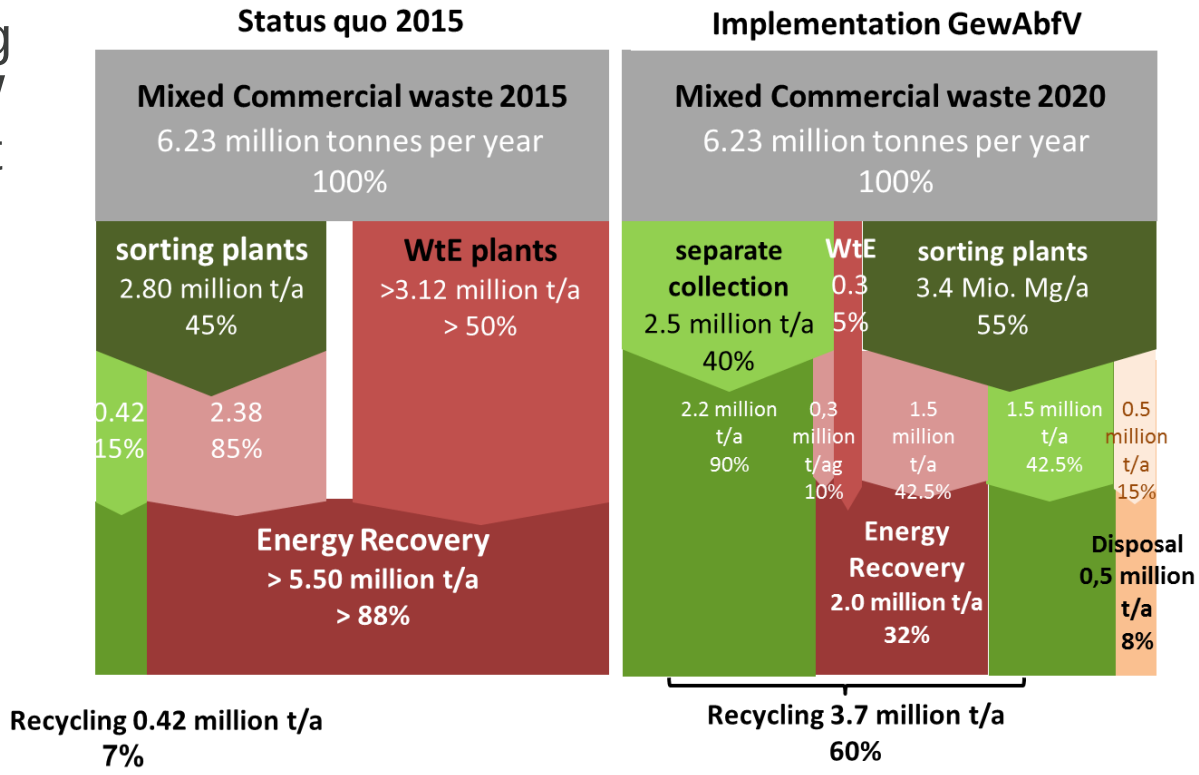
- C&I waste, GewAbfV* (commercial waste regulation)
  - Commitment for separate collection of recycables from August 2017 on,
  - Commitment for pre-treatment of C&I waste which cannot be separated,
  - Pre-treatment plants have to reach a recycling quota of 30% from January 2019 on.

* Gewerbeabfallverordnung of 18th April 2017, Commercial waste regulation

Activities in Germany to increase recycling

- If separate collection of mixed C&I waste reaches 40% and sorting plants reach a recycling quota of 42.5% in 2020, recycling can reach 3.7 million tonnes per year.
- Total recycling quota of MSW can rise about 6%.



Risk that the reduction of the total amount of residual MSW in Germany fails

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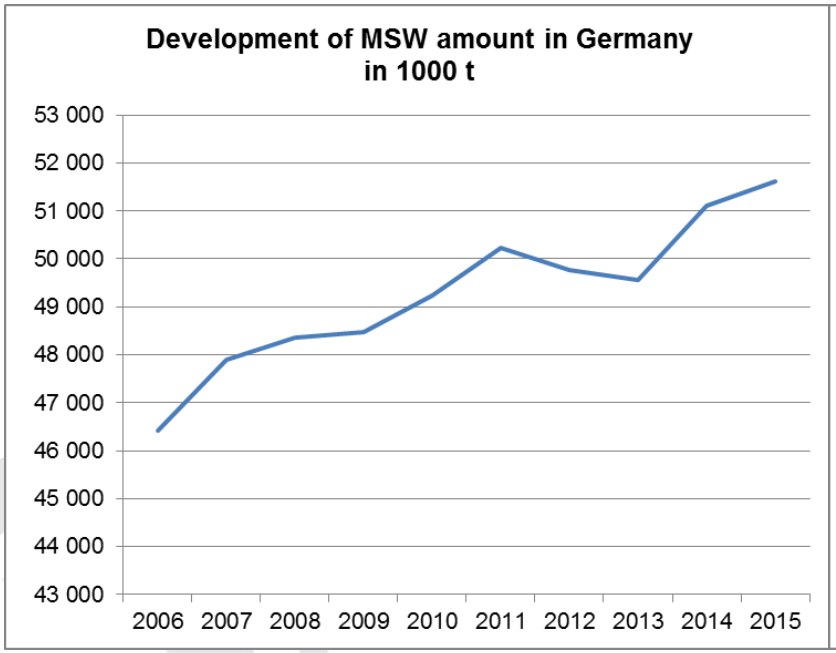
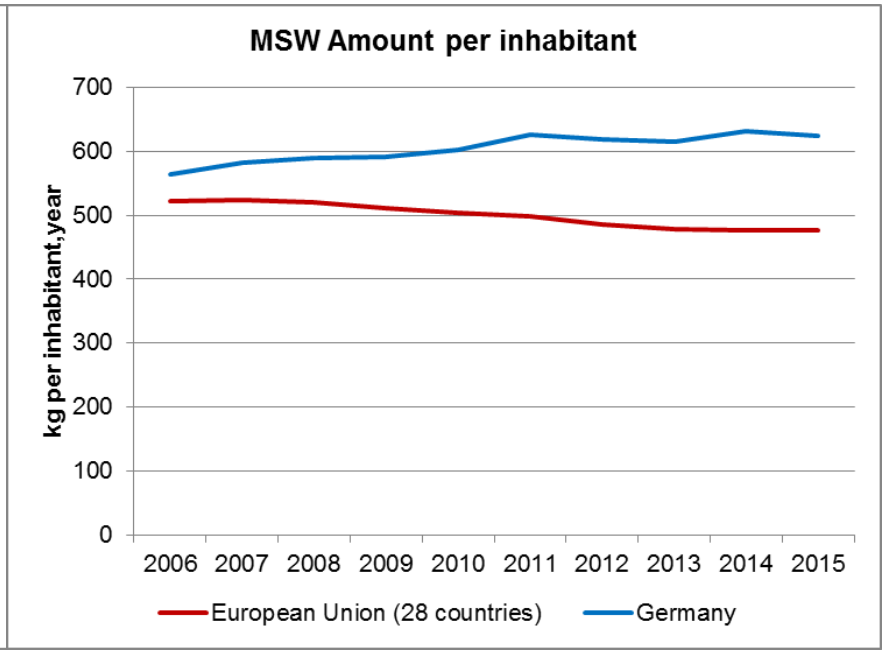
- All effort in increasing the recycling quota will possibly be compensated by the growth of the total arisings of MSW,
- Waste prevention has to be much more intensified.





Sources for calculating recycling quotas Slide 13

1 Auswertung Input/Ouput von Mechanisch biologischen Anlagen nach Abfallentsorgung 2015, Fachreihe 19 Reihe 1, Statistisches Bundesamt, Wiesbaden 2017

2 Auswertung Input/Ouput von Biologischen Behandlungsanlagen nach Abfallentsorgung 2015, Fachreihe 19 Reihe 1, Statistisches Bundesamt, Wiesbaden 2017

3 Prozentualer Anteil von Bioabfall bzw. Grünabfall am Gesamtinput in Vergärungsanlagen aus: G. Rettenberger, S. Urban-Kiss, R. Schneider: "Handbuch Bioabfallbehandlung", UBA-Texte 54/2012"

4 Schüler, K.: "Aufkommen und Verwertung von Verpackungsabfällen in Deutschland im Jahr 2014", UBA-Texte 64/2016"

5 J. Korolkow: "Konsum, Bedarf und Wiederverwendung von Bekleidung und Textilien in Deutschland", bvse, 2015

6 Prozentualer Anteil der Einzelfraktionen am Input von Sortieranlagen nach Abfallentsorgung 2015, Fachreihe 19 Reihe 1, Statistisches Bundesamt, Wiesbaden 2017

7 I. Dehne, R. Oetjen-Dehne, N. Siegmund: "Stoffstromorientierte Lösungsansätze für eine hochwertige Verwertung von gemischten gewerblichen Siedlungsabfällen", UBA-Texte 18/2015

8 eigene Schätzung, TOMM+C

9 DKR (Deutsche Gesellschaft für Kunststoffrecycling mbH), Prof. Dr. Friege

10 Fachserie 19 Reihe 1, Abfallentsorgung 2015, Statistisches Bundesamt (Destatis), 2017

11 Alwast, H.; Riemann, A.: „Verbesserung der umweltrelevanten Qualitäten von Schlacken aus Abfallverbrennungsanlagen“, UBA-Texte 50/2010, Umweltbundesamt, Okt. 2010

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