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

Thomas Obermeier, Sylvia Lehmann
German Association of waste management
Content

- 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**
  
  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 calculating the recycling rates

![Bar chart showing recycling rates for different methods in 2015.]

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

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.
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, CO₂ 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

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 recycled.

- On the other hand 8% metals are recycled from bottom ashes from incinerators.
Calculating with input waste streams overestimates recycling (67%)
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Targets of the Circular Economy Package
Status: August 2017

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

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</thead>
<tbody>
<tr>
<td>Share of municipal waste prepared for reuse and recycling*</td>
<td>60%</td>
<td>65%</td>
<td>60%</td>
<td>70%</td>
<td>50%</td>
<td>60%</td>
<td>60%</td>
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<tr>
<td>Share of bio-waste prepared for recycling</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>50%</td>
<td>50%</td>
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<tr>
<td>Share of municipal waste landfill</td>
<td>-</td>
<td>10%</td>
<td>-</td>
<td>5%</td>
<td>-</td>
<td>10%</td>
<td>-</td>
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<tr>
<td>Share of packaging waste prepared for reuse or^1/ and^2 recycling</td>
<td>65%</td>
<td>75%^1</td>
<td>70%^2</td>
<td>80%^2</td>
<td>70%</td>
<td>80%</td>
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<tr>
<td>Share of packaging waste prepared for reuse</td>
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<tr>
<td>Share of plastic packaging prepared for reuse and recycling</td>
<td>55%</td>
<td>-</td>
<td>60%</td>
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<tr>
<td>Share of wood packaging prepared for reuse and recycling</td>
<td>60%</td>
<td>75%</td>
<td>65%</td>
<td>-</td>
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<tr>
<td>Share of ferrous metal packaging prepared for reuse and recycling</td>
<td>75%</td>
<td>85%</td>
<td>80%</td>
<td>-</td>
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<tr>
<td>Share of aluminium packaging waste prepared for reuse and recycling</td>
<td>75%</td>
<td>85%</td>
<td>80%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Share of glass packaging prepared for reuse and recycling</td>
<td>75%</td>
<td>85%</td>
<td>80%</td>
<td>-</td>
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<td>-</td>
</tr>
<tr>
<td>Share of paper and cardboard packaging waste prepared for reuse and recycling</td>
<td>75%</td>
<td>85%</td>
<td>90%</td>
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</table>

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
New Calculation Method for recycling targets¹

• 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


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

- 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
<table>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Recycling plants R2 - R13 percentage of waste amount Input R2 - R13 in 1000 tonnes percentage of waste amount Output R2-R13 in 1000 tonnes</td>
</tr>
<tr>
<td>Household wast</td>
<td>20030101, ex 20030100</td>
<td>Household waste, similar commercial waste</td>
<td>14,147</td>
<td>MBT / mechanical-physical drying (MPS) 2,443</td>
</tr>
<tr>
<td></td>
<td>200307</td>
<td>Bulky waste</td>
<td>2,495</td>
<td>Sorting plant 1,434</td>
</tr>
<tr>
<td></td>
<td>20030104</td>
<td>Bio-waste</td>
<td>4,232</td>
<td>Composting/digestion plants 4,147</td>
</tr>
<tr>
<td></td>
<td>200201</td>
<td>Green and garden waste</td>
<td>5,771</td>
<td>Composting/digestion plants 5,623</td>
</tr>
<tr>
<td></td>
<td>150107, 200102</td>
<td>Glass</td>
<td>2,553</td>
<td>Sorting plant 2,550</td>
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<tr>
<td></td>
<td>150101, 200101</td>
<td>Paper, cardboard</td>
<td>8,103</td>
<td>Sorting plant 8,047</td>
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<tr>
<td></td>
<td>150102, 15010600, 15010601, 20019901, 200139</td>
<td>Light weight packaging / plastics</td>
<td>5,952</td>
<td>Sorting plant 4,925</td>
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<tr>
<td></td>
<td>200123*, 200135*, 200136</td>
<td>Waste Electrical and Electronic Equipment (WEEE)</td>
<td>591</td>
<td>Sorting plant 590</td>
</tr>
<tr>
<td></td>
<td>150103, 150104, 150105, 150109, 200110, 200111, 200113*, 200114*, 200115*, 200140, 20019900, 200399, 200117*, 200119*, 200126*, 200127*, 200128, 200129*, 200130, 200131*, 200132, 200133*, 200134, 200138</td>
<td>Others (composite material, metals, textile, etc.)</td>
<td>2,087</td>
<td>Sorting plant 1,528</td>
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<tr>
<td>Other MSW</td>
<td>20030102, ex 20030100</td>
<td>Commercial waste similar to household waste, separate collection</td>
<td>3,506</td>
<td>Sorting plant 1,365</td>
</tr>
<tr>
<td></td>
<td>200202, 200203, 200303</td>
<td>Road sweepings / garden and park waste (soil, stones)</td>
<td>986</td>
<td>k.A. 717</td>
</tr>
<tr>
<td></td>
<td>200108</td>
<td>Biodegradable kitchen waste</td>
<td>928</td>
<td>Digestion plant 875</td>
</tr>
<tr>
<td></td>
<td>200302</td>
<td>Market waste</td>
<td>60</td>
<td>Composting/digestion plants 50</td>
</tr>
<tr>
<td></td>
<td>200121*</td>
<td>Fluorescent tubes and other mercury containing waste</td>
<td>11</td>
<td>Sorting plant 10</td>
</tr>
<tr>
<td></td>
<td>150110*, 150111*, 200125, 200137*, 200141, 200304, 200306</td>
<td>Other separate collected fractions</td>
<td>205</td>
<td>Sorting plant 147</td>
</tr>
<tr>
<td>Municipal solid waste (MSW), total</td>
<td></td>
<td></td>
<td>51,625</td>
<td>Metal recycling from Waste to Energy plants 34,453</td>
</tr>
</tbody>
</table>

Recycling quotas including metal recycling 47% - 52% 24,234 - 26,617
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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

• 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

- 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.
• 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 DWMA

ITAD = Interessengemeinschaft der Thermischen Abfallbehandlungsanlagen in Deutschland e.V.
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Activities in Germany to increase recycling

• 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

- 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

• C&I waste, GewAbfV* (commercial waste regulation)

  – Commitment for separate collection of recyclables 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%.

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<tr>
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<th>Status quo 2015</th>
<th>Implementation GewAbfV</th>
</tr>
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<tbody>
<tr>
<td><strong>Mixed Commercial waste 2015</strong></td>
<td>6.23 million tonnes per year</td>
<td>6.23 million tonnes per year</td>
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<tr>
<td><strong>100%</strong></td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td><strong>Sorting plants</strong></td>
<td>2.80 million t/a</td>
<td>2.5 million t/a</td>
</tr>
<tr>
<td></td>
<td>45%</td>
<td>40%</td>
</tr>
<tr>
<td><strong>0.42 million t/a</strong></td>
<td>15%</td>
<td>0.3 million t/a</td>
</tr>
<tr>
<td><strong>2.38 million t/a</strong></td>
<td>85%</td>
<td>3.4 Mio. Mg/a</td>
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<tr>
<td><strong>Energy Recovery</strong></td>
<td>&gt; 5.50 million t/a</td>
<td>2.0 million t/a</td>
</tr>
<tr>
<td></td>
<td>&gt; 88%</td>
<td>32%</td>
</tr>
<tr>
<td><strong>Recycling</strong></td>
<td>0.42 million t/a</td>
<td>3.7 million t/a</td>
</tr>
<tr>
<td></td>
<td>7%</td>
<td>60%</td>
</tr>
</tbody>
</table>

WtE plants
> 3.12 million t/a
> 50%

Disposal
0.5 million t/a
8%
Risk that the reduction of the total amount of residual MSW in Germany fails

- 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/Output von Mechanisch biologischen Anlagen nach Abfallentsorgung 2015, Fachreihe 19 Reihe 1, Statistisches Bundesamt, Wiesbaden 2017


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

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