

Taking the lead in Waste Management – an UAE and a Bavarian Perspective
14th of November 2023

Overview on Waste Management in Bavaria

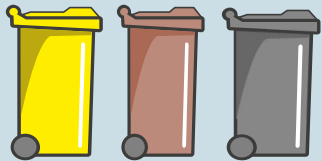
Dipl.-Ing. Katharina Reh
Head of Department Secondary Resources and Assessment
Fraunhofer UMSICHT, Institute branch Sulzbach-Rosenberg

Waste management in Bavaria

Waste collection

Households

Collection at households



Recycling spots (~ 70,000 containers)



Recycling yards (1,537)



Commercial waste generators

- »Commercial Waste Ordinance«
- Separate collection of 8 fractions
- Sorting of mixed waste (if share > 10 %)
- Documentation to authorities

Image sources:

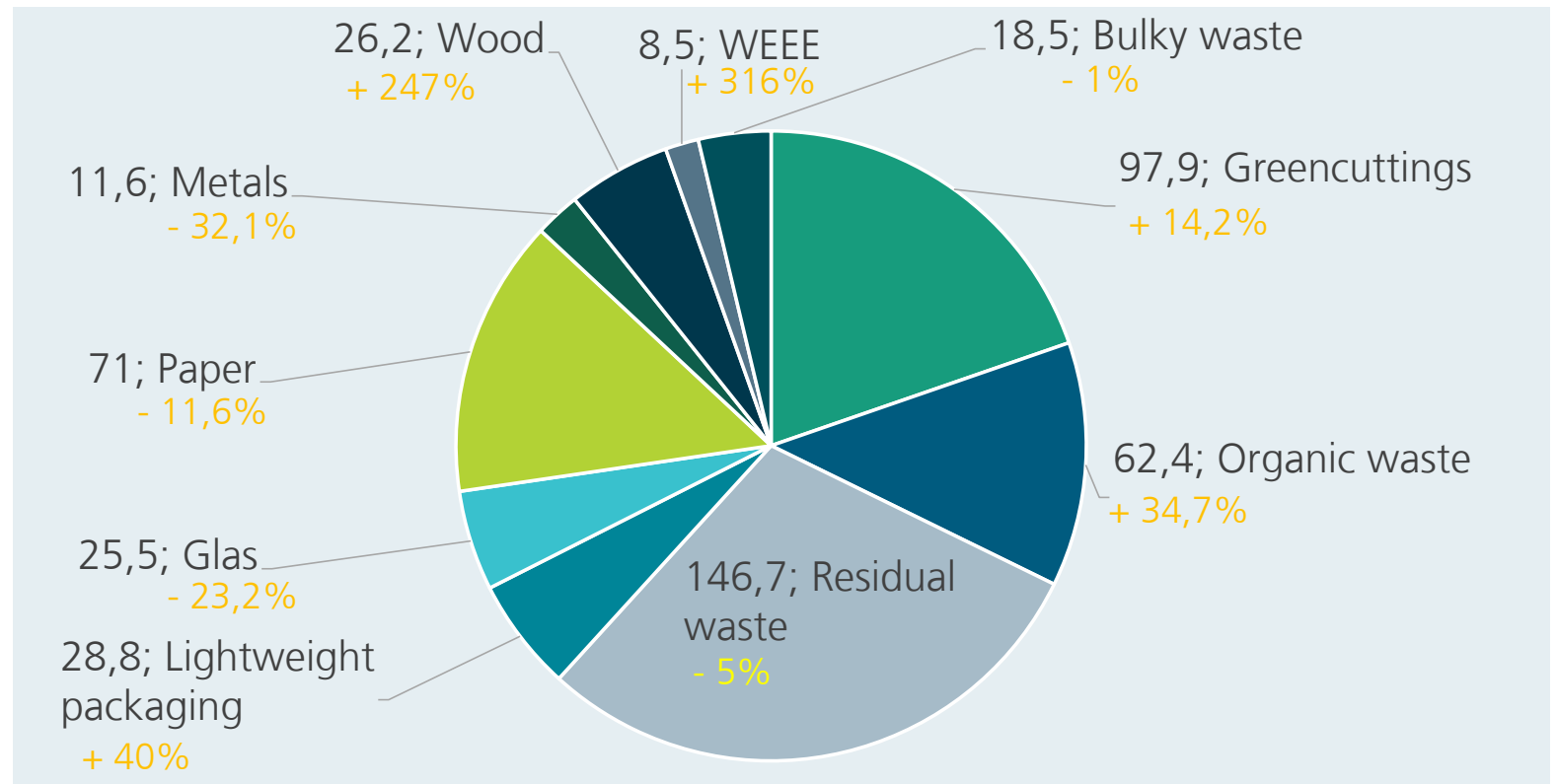
<https://www.flaticon.com/free-icons/container> title="container icons">Container icons created by Freepik

Source: Landesamt für Umwelt (LfU) 2022: Hausmüll in Bayern – Bilanzen 2021. UmweltThema. Augsburg.

Waste management in Bavaria

Waste from households

Amounts per collected fraction in 2021 [kg/person] and development since 2000 in %



Sources:
Landesamt für Umwelt (LfU) 2022: Hausmüll in Bayern – Bilanzen 2003. UmweltThema. Augsburg.

Waste management in Bavaria

Waste treatment plants (2021)

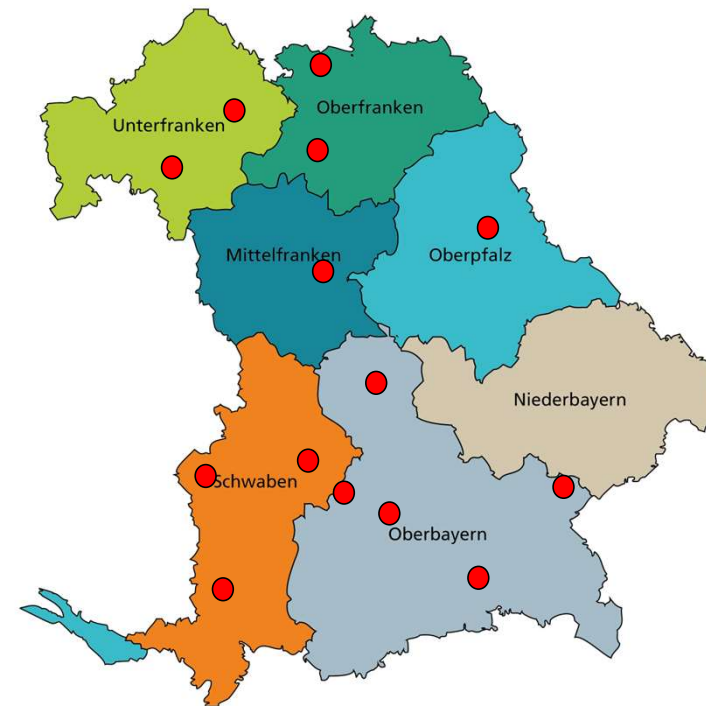
Type of plant	No.	Capacities (Mio Mg/a)
Sorting	68	0,22
Mechanical-biological treatment plant	1	0,03
Other pre-treatment	138	1,02
Composting*	285	2,01
Anaerobic digestion*	28	0,61
Thermal treatment	14	2,40
Recycling and other recovery	123	0,63
Landfills Class 0	247**	1,33***
Landfills Class I & II	30	0,52***

* Overlap with recovery plants

** 2016

*** Disposed amount

Example: Thermal treatment plants in Bavaria:



Sources: Landesamt für Umwelt (LfU) 2022: Hausmüll in Bayern – Bilanzen 2021. UmweltThema. Augsburg.
Landesamt für Umwelt (LfU) 2018: Fortschreibung Bedarfsprognose Deponien der Klassen 0, I und II in Bayern.

Waste management in Bavaria

MSW streams and quota (2021)

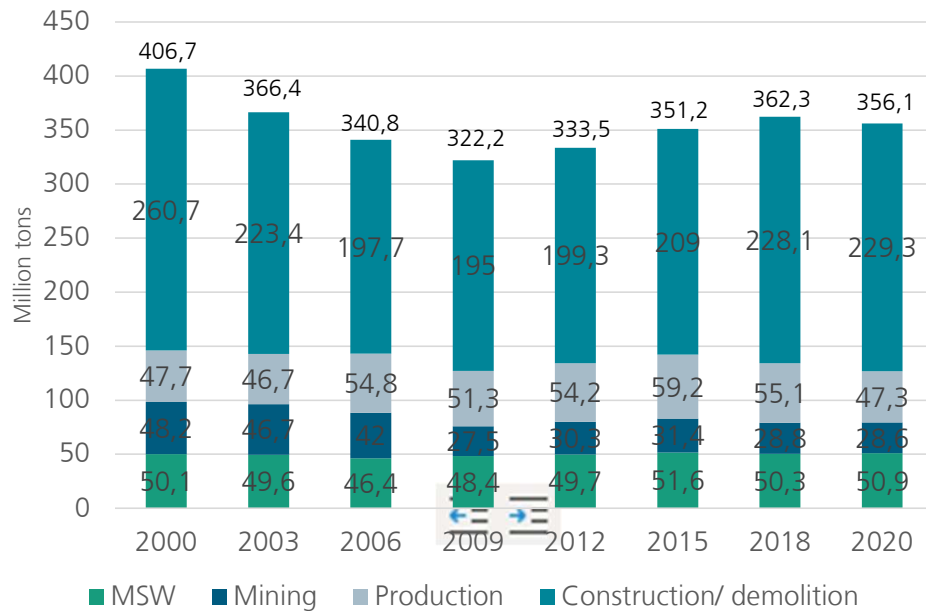
- 4,51 Mio t. recyclables
 - 2,26 Mio t. Recycling
 - 1,95 Mio t. Biological treatment
 - Minor amounts into thermal treatment, preparation for reuse
 - Overall **recycling quota: 67,6 %**
- 2,43 Mio t. mixed waste
 - 2,4 Mio t. thermal treatment
 - Minor amounts into MBT
- 3,63 Mio t. of thermal treatment (both recovery and disposal)
 - From recyclables, mixed and other waste sources
- 0,52 Mio t. landfilled waste
 - E.g. residues from thermal and MBT treatment

Source:
Landesamt für Umwelt (LfU) 2022: Hausmüll in Bayern – Bilanzen 2021. UmweltThema. Augsburg.

Waste management in Germany

Amounts and Quota

Waste generation in Germany (2000 – 2020)



Source:
BMUV (2023): Abfallwirtschaft in Deutschland 2023 –
Fakten, Daten, Grafiken

→ Example Post-Consumer Plastics: (2021)
- 45 % is sent to Recycling Plants
- 28 % loss in Recycling Plants

https://www.bvse.de/dateien2020/2-PDF/01-Nachrichten/03-Kunststoff/2022/Kurzfassung_Stoffstrombild_2021_13102022_1_.pdf

Recycling quota by waste type (2012; 2020)



Source:
Statistisches Bundesamt (2023): Kurzübersicht Abfallbilanz – Zeitreihe; own calculation
<https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Umwelt/Abfallwirtschaft/Tabellen/liste-abfallbilanz-kurzuebersicht.html#613014>

Waste management in Germany

Future goals and measures

Waste hierarchy



Examples

- ➔ Improve Product Design, e.g. USB-C-interface for radio equipment
- ➔ »Close the loop«: e.g. minimum content of recycled plastics in new products (packaging, construction materials, vehicles)
- ➔ Expansion of Extended Producer Responsibility: Textiles
- ➔ Development of Recycling Technologies, e.g. Chemical Recycling of Plastics ([Web](#))

Source: [https://ec.europa.eu/environment/topics/waste-and-recycling/waste-framework-directive_de]

Waste management projects of UMSICHT

MENA region and central Africa

Recent project examples:

Title	Duration	Funding
Waste and landfill survey and strategy for Kuwait (eMISK _{Waste} , Web)	2017-2021	
WEEE Recycling concept for Ghana (EAG2Rec, Web)	2021-2023	 Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz
Sustainable Waste Management for Tunisia (EGIDD, Web)	2018-2022	 State chancellery of Bavaria
MSW management plan for 2040	2023	



Workshop on waste sampling during eMISK_{Waste}



Installation of e-waste treatment plant in Tunis

Kontakt

Dipl.-Ing. Katharina Reh
Head of Department for Secondary Resources and Assessment
katharina.reh@umsicht.fraunhofer.de

Fraunhofer Institute for Environmental, Safety, and Energy Technology UMSICHT
Institute Branch Sulzbach-Rosenberg
An der Maxhütte 1
92237 Sulzbach-Rosenberg
www.umsicht-suro.fraunhofer.de

