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Pretreatment of industrial and commercial waste

Production of energy and fertiliser from organic waste

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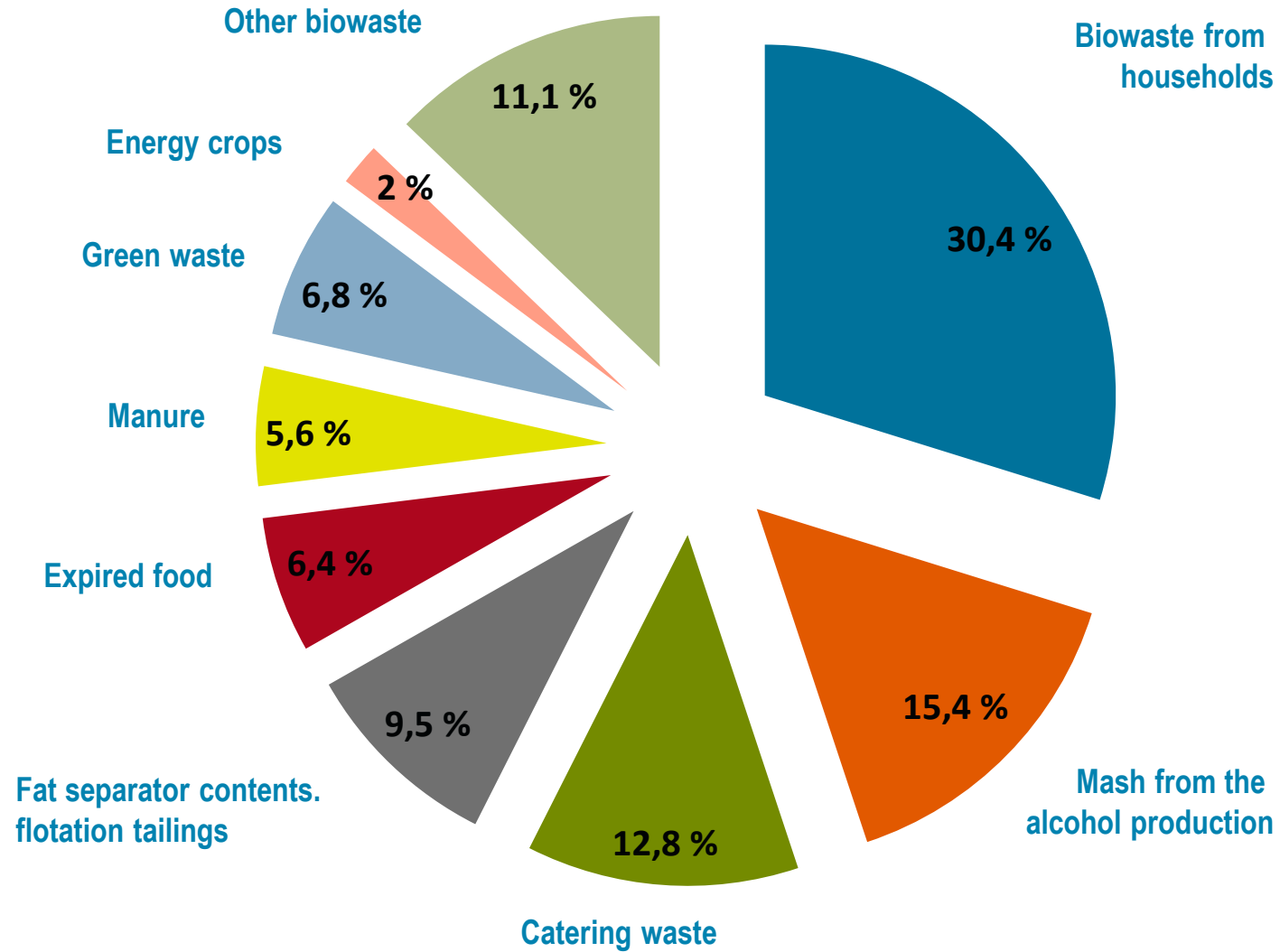
Waste digestion plants in Germany



- 350 – 400 waste digestion plants
-  135 plants for **biowaste from households**
-  250 plants for **industrial and commercial wastes**
-  40 plants for **packaged foodstuff**
-  10 MBT plants **without use of digestate as fertilizer**
-  **Vegetable by-products** in agricultural plants
- 8.9 Mio. t/a approved input capacity
Approved input capacity between: 510 and 500.000 t/a
- 351 MW installed electric capacity
Average installed electric capacity: 975 kW

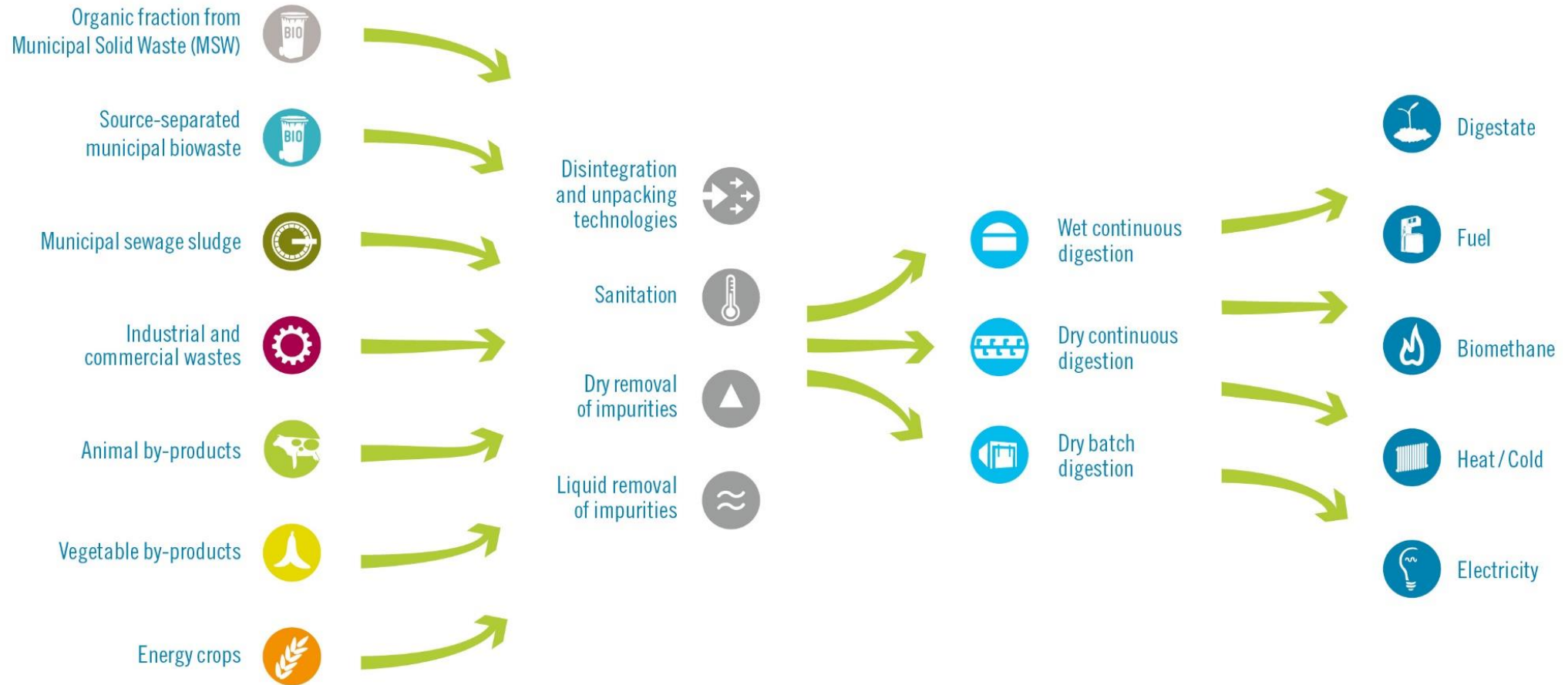


Distribution of waste input in Germany

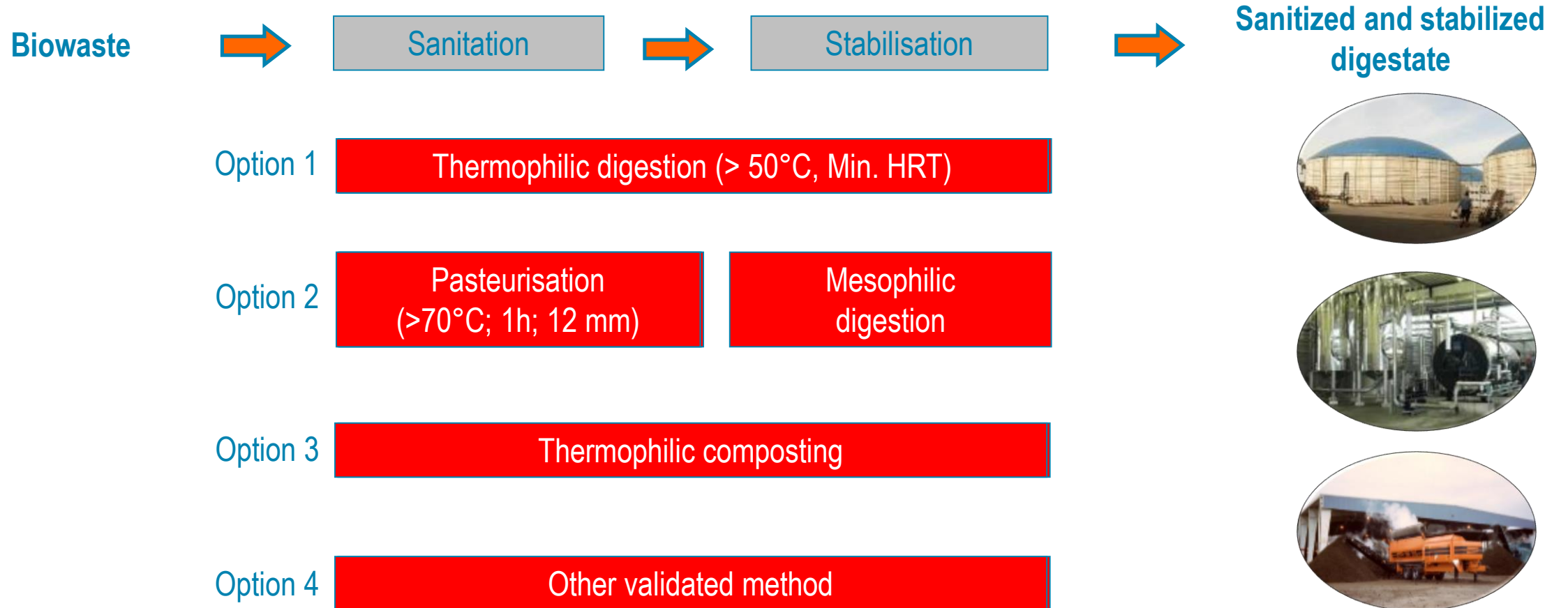


Biowaste to Biogas

The production of energy and fertilizer from organic waste



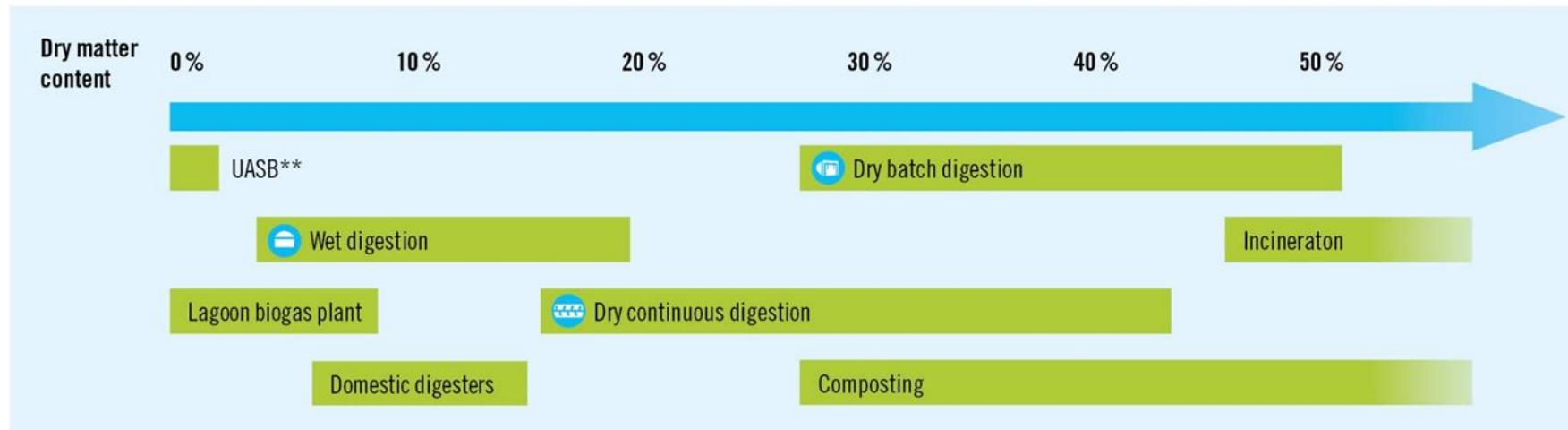
Sanitation and stabilisation of biowaste



Used technologies for the waste digestion

Digestion technology has to be suitable for the input material
(e.g. water content, waste amount, percentage of impurities)

Overview of technologies depending on dry matter content for the possible operating mode*



*Almost all feedstocks can be diluted to the needed dry matter content of each digester technology.

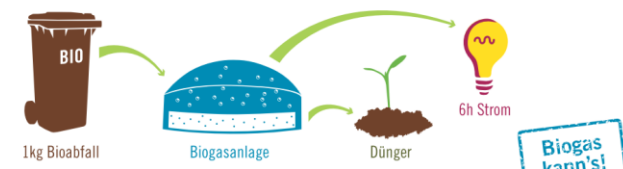
**UASB: Upflow anaerobic sludge blanket technology is a form of anaerobic digestion designed for materials with high water content (e.g. waste water or process water treatment).

Feedstock quality is key

- To **avoid malfunctions** in the biogas plant by impurities and oversized components
- To produce a **high quality organic fertilizer** (without contaminants like heavy metals)
- Maintain **public acceptance** for biowaste recycling (without plastic impurities)
- **Experiences** with separate biowaste collection in Germany **since 1982**



Vielen Dank, dass Sie trennen!*



*Aus einem Kilogramm Bioabfällen produziert eine Biogasanlage 240 Wh Strom.
Je weniger Plastik in der Biotonne landet, desto sauberer der Dünger und desto höher die Energieausbeute! www.biogas.org

Technical challenges

Classification and influence of the material



- Plastik: leightweight packaging, compound, hardplastik
- Metal
- PPK: paper, cardboard (z.B. newspapers, paper packaging and bags, Handling packaging made of cardboard)
- Glas: disposable glas, bottles, porcelain
- Wood: fruit crate

Technical challenges

Classification and **characteristics of the Material**



- Rough: oversized contaminants (e.g. paletts, roots, meat hooks)
- Spinning: stretchy (nets, tapes, enrolled plastics, ropes, animal skins)
- Sand: fine mineral components
- Grit: stones, gravel, glasfragments, bones, eggshells, small metalparts, seashells
- Mixture: mixed packaging afore mentioned (e.g. glas + wood cover + metal)
- Wild throw: clothes, dekoration articles, beauty care products

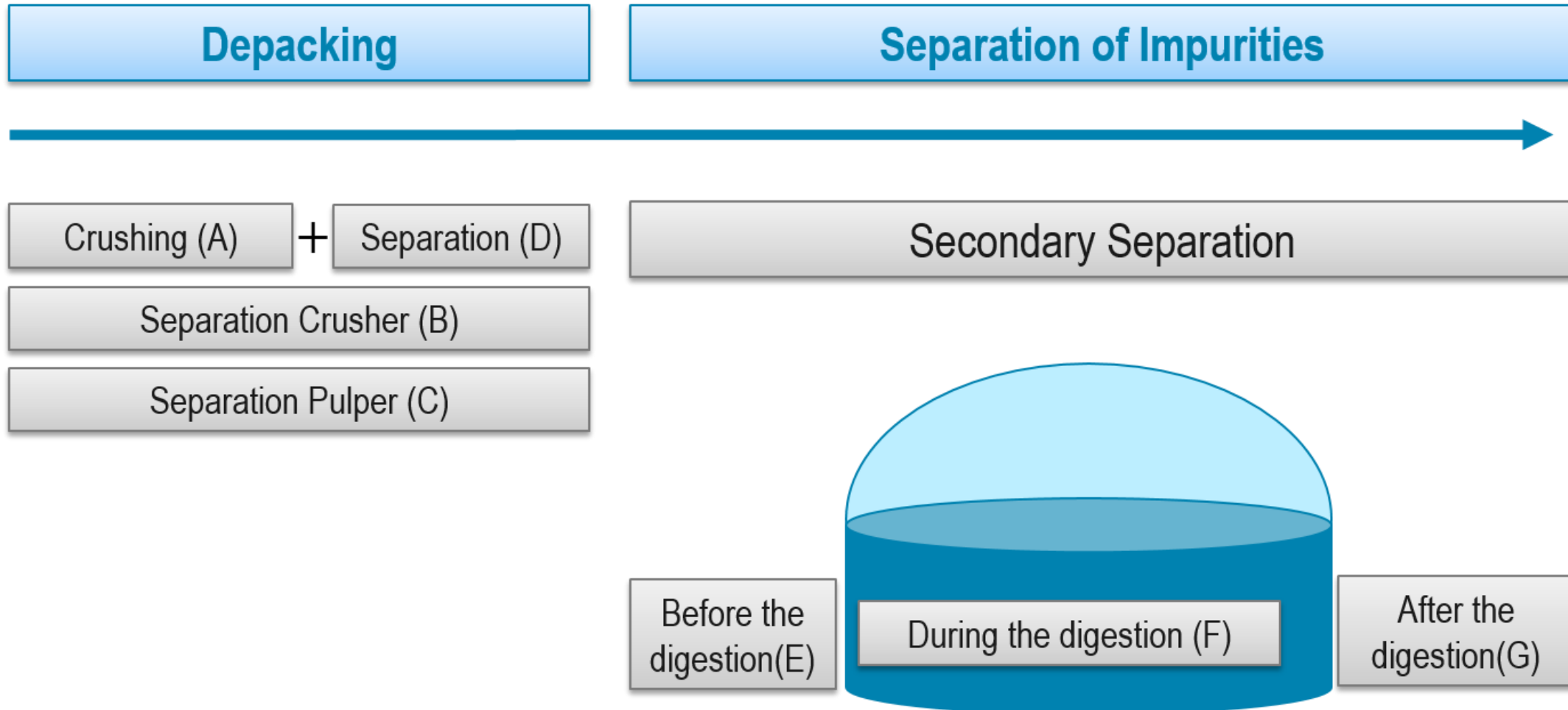
Technical challenges

Classification and characteristics of the waste (source)



- Fluid foodwaste: beverages, industrial slurry, fatty products, oil, marc
- Soft foodwaste: fruits, vegetable, cheese, sausage, dairy products, pastries, dough
- Hard foodwaste: meat and slaughterhouse waste, frozen convenience products, uncooked vegetarian food
- Kitchen and catering waste: separate collected
- Swelling foodwaste: dry food, uncooked food (e.g. pasta)

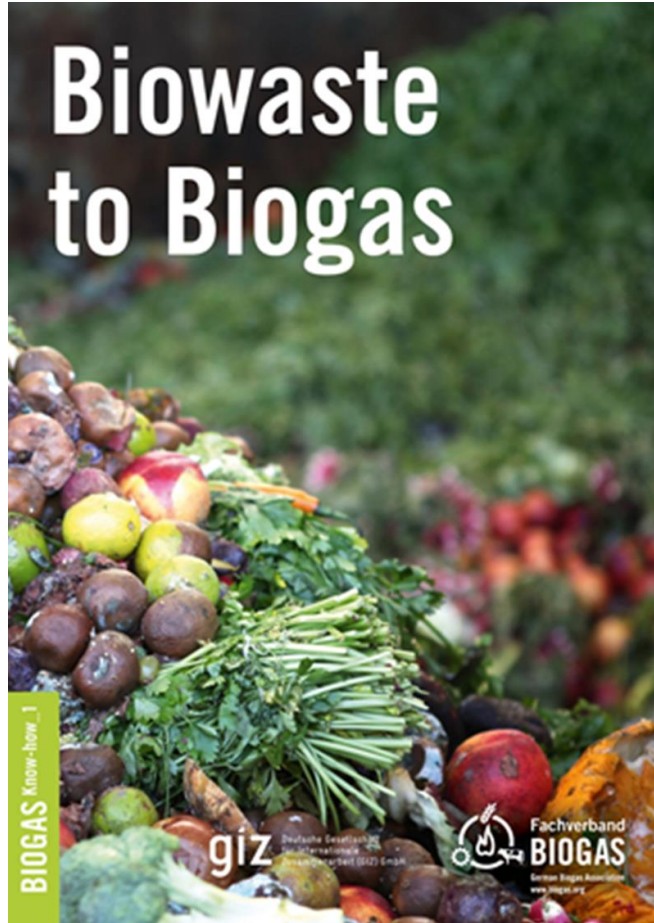
Removal of impurities (Wet AD expired food)



Conclusions

- **Fast increase** of biogas plants **based on energy crops** in Germany
 - Waste digestion only a share of 5 % (350-400 plants)
- Various **technologies are available** for the digestion of wastes and residues
 - Concept has to **depend on amount and kind of waste** (DM content, impurities, etc.)
- **Purity** of biowaste important
 - for **avoiding malfunction** of the plant
 - production of **high quality fertilizer** for closing nutrient circles and reducing waste volume
 - **Separated collection** vs. mixed waste

Further informations



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for your attention!



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