Material flow specific Mechanical-Biological Waste treatment method
(Oral Presentation)

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The management of residual substances in the industrial countries at the beginning of the 21st century is characterised through End-of-Pipe techniques whose aims are in general not in agreement with a closed-circuit system, but rather with the extraction of waste from the material flow. In Germany in1997 24,05 million Mg (approx. 42%) of the 56,3 million Mg municipal solid waste was landfilled without pretreatment. EU-wide in 1998 64% of the municipal waste was landfilled.

Many of these landfills have neither a base sealing nor collecting systems for the emerging seapage water and landfill gas. A direct infiltration, of the pollutants present or synthesised in the waste, into the ground water or release into the atmosphere is uncontrolled. The landfills which have sealing systems prevent the appearance of pollutants for a certain time period but, without a pretreatment of the residual waste, however, the pollutant potential remains in the landfill body. Today's waste management problems are in this way only burdened on the following generations. The Mechanical-Biological waste treatment is able to minimise the contamination potential of the residual before it is landfilled. The seapage water concentrations and the gas formation are substantially reduced. If the mechanical-biological residual waste treatment is integrated into a overall plan for material-flow specific waste treatment, then material streams for utilisation (material and energetic) and for nature integration can be won. When the residual waste is seen as a heterogeneous substance mixture, then the utilisation potential of the residual waste can then be exploited.

The characteristics of the complete waste vary seasonally and regionally causing the waste composition to deviate within a large frequency range. The material characteristics of the specific waste streams change thereby little or even remain constant. If the separation of the residual waste into specific material streams of high quality can be achieved, the arising value substances can be utilised industrially or reintegrated in nature.

The considerations for the separation of the material streams after a biological stabilization lead to the conception of a material flow specific residual waste treatment system, with the biological stabilization as central component. This conception developed by the Institute for Landscape Construction and Waste Management of the University of Rostock, contains a waste treatment system with three separation steps. After the mechanical treatment (1st separation step) with the removal of bulky materials and contaminants comes the biological treatment (2nd separation step) which creates the conditions allowing for a further treatment. In the biological step the natural organic substances are decomposed to carbon dioxide and water as well as largely water insoluble mineral and humus substances which do not adhere to synthetic materials. The prerequisites for a third separation step are thereby fulfilled. Here the stabilized residual waste is

separated to such a degree, that substance streams in industry quality can be achieved (Fig. 1). The separation can partly be carried out with available separating systems (screening, air separator) or newly developed systems (wet separation).

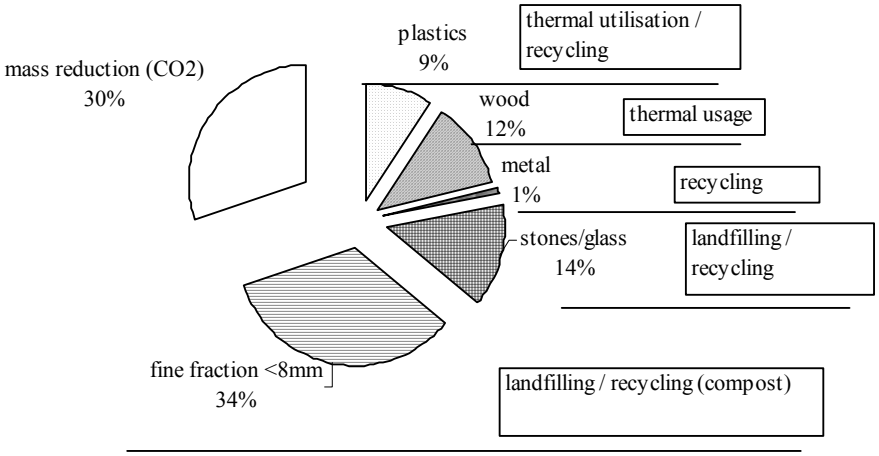

Fig. 1: Material streams and Recycling path

Potential pollutants are concentrated in the arising fine fraction. The heavy metals can be fixed in the context of the biological treatment into the Humus substances, so that insoluble metal organic complexes are created. If the load of the fine material with organic and/or inorganic pollutants so great that a utilisation (e.g. as recultivation layer in landfills) is excluded, then it can be landfilled or treated thermally in a soil treatment plant. Through the biological treatment the material is stabilized to such a degree that, in the case of landfilling, practically no gas building or seapage water load are to be expected. The oxygen demand and gas formation could be reduced to such a degree that they were under the detection limit (AT_4 <1 mg O_2/g dry substance, GB_{21} < 5 Nl/kg). This stabilization has already been technically proofed on a large scale in Bad Kreuznach and Stendal (Germany).
After the biological treatment and material stream separation using material flow specific treatment, from the original volume (masse) only approx. 30 %**,** which if highly contaminated must be treated or landfilled. Through this valuable landfill volume and treatment costs are spared.