Landfilled materials composition at the landfill site in Halbenrain (Austria)

C. Garcia Lopez[1], B. Küppers[2], D. Höllen[2], A. Clausen[1], T. Pretz[1].

[1]Department of Processing and Recycling, RWTH, Aachen, 52062, North Rhine-Westphalia, Germany.
[2]Montanuniversitaet Leoben, Leoben, 8700, Austria

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Presenting author email: garcialopez@ifa.rwth-aachen.de

Europe has somewhere between 150,000 and 500,000 landfill sites, where only around 10% fulfil the requirements of the EU Landfill Directive of 1990. Older landfills often are filled with municipal solid waste (MSW) and often lack any environmental protection technology. In order to avoid environmental and health problems, many of these landfills will soon require expensive remediation measures.

Landfill Mining, i.e. the excavation of waste from landfills for material and energy recovery, was first introduced in Israel in 1953, but mostly limited to pilot-scale attempts. The economic feasibility of landfill mining under the current conditions using available technologies is mostly not given. This fact does present us with an opportunity to create the fundamentals for the development of innovative exploration, processing and valorization technologies.

The New-Mine project is formed by skilled scientists, engineers, economics and policy makers, which are working together for the adoption of Enhanced Landfill Mining (ELFM) in the European Union. Previous investigations have shown that each landfill site has its own potential with regard to landfill mining. Factors such as the age of the landfill, type of landfill and the region where the landfill is located might have an impact on the type of materials stored in the landfill and their valorization potential.

We present fundamental data on material composition of a MSW and industrial waste landfill in Halbenrain, Austria, which is the first case-study of five in the EU-funded project New-Mine.

Within a sampling campaign, a waste characterization was performed in order to analyze the waste properties and its resource potential. The location and procedure of the excavations were based on reports and the expertise of previous employees. The material was then treated in a continuous process, using MBT-technology, and each output fraction was sorted manually.

The results show the mass balance of the MBT plant as well as the material characterization by categories and particles sizes. For plastics, paper/cardboard, wood, textile and residuals recovered in this case, waste to energy is the most sustainable route since the impurity of the excavated material is too high to allow adequate material recycling. This underlines the requirement to develop innovative technologies, e.g. sensor-based sorting, to increase material purity and yield. For metals, inerts and glass/ceramic, the waste material valorization might be economically possible if the materials are properly separated.