Enhanced Landfill Mining in view of multiple resource recovery: a critical review.

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Review

Enhanced Landfill Mining in view of multiple resource recovery: a critical review

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Abstract

In a circular economy material loops are closed by recycling of pre-consumer manufacturing scrap/residues, urban mining of End-of-Life products and landfill mining of historic (and future) urban waste streams. However, in the past landfill mining was not performed with a focus on resource recovery. This paper addresses this gap by introducing the concept of Enhanced Landfill Mining, defined as the safe conditioning, excavation and integrated valorization of landfilled waste streams as both materials and energy, using innovative transformation technologies and respecting the most stringent social and ecological criteria. The feasibility of ELFM is studied by synthesizing the research on the Closing the Circle project, the first ELFM project targeting the 18 million metric ton landfill in Houthalen-Helchteren in the East of Belgium. It is argued that Environmental Impact Assessments of ELFM projects should be wide in scope and

time. Embedded in a broad resource management perspective, the worldwide potential of ELFM is highlighted, in terms of climate gains, materials and energy utilization, job creation and land reclamation. The potential is quantified for the EU-27 with its 150,000â€"500,000 landfills. However, for ELFM to reach its full potential, strategic policy decisions and tailored support systems, including combined incentives for material recycling, energy utilization and nature restoration, are required.

Keywords

Enhanced Landfill Mining; Resource recovery; Carbon footprint; Waste-to-Energy; Waste-to-materials; Biodiversity

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