

Remediation and revitalization of abandoned landfills for circular economy

JURIS BURLAKOV¹, MAGDALENA WDOWN¹, MAIT KRIIPSALU², MIKELIS CERPINS³, RUTA OZOLA-DAVIDANE³, VITA RUDOVICA³, IVAR ZEKKER⁴ AND MARIS KLAVINS³

¹Mineral and Energy Economy Research Institute of the Polish Academy of Sciences

²Estonian University of Life Sciences

³University of Latvia

⁴University of Tartu

Presenting Author: juris@geo-it.lv

The product's life cycle ends up with waste going to the landfill, earlier times – a dumpsite, the least manageable waste disposal site. Circular Economy Action Plan provides continuing the monitoring of old dumpsites as those produce emissions of greenhouse gases having significant adverse effect on global climate change. The methane emissions from the waste sector are 18% of the global, consisting of mainly CH₄ and CO₂. Waste-to-energy solves part of the problem, but residual methane, however, is still released into the atmosphere. It could be avoided by using biological methane degradation technology with engineered biocovers [1]. The fine fraction of sorted and landfill mined residual material constitutes 40-60% of all the landfill mass and may serve as a functional construction material - cover material. Various landfill remediation technologies exist, but the only one that considers resources recovery symbiotically with remediation objectives is landfill mining (LFM). It is process of extracting minerals or other solid natural resources from waste that previously escaped anthropogenic loops. It saves the landfill space, reduces landfill area, eliminates potential source of contamination, mitigates an existing contamination source, provides energy recovery, recycles recovered materials, reduces management system costs and revitalize sites [2]. I.e., amount of critical elements might become of industrial interest if a feasible landfill mining approach for remediation of landfills and degraded industrial soils would be applied together with innovative recovery methods. The LFM approach in former dumpsites might play an essential role in the recycling of so-called lost material – it can be called "hunting the valuables". Moreover, the regaining and revitalization of land as a real estate asset is in larger perspective if LFM is applied [3]. The research project GeoReco is funded under PASIFIC program co-financed by H2020 on the basis of agreement No. 847639, under the SEA system number 260780.

[1] Jain et al. (2013) *Waste Management* 33, 109-116. [2] Krook et al. (2012) *Waste Management* 32, 513-520. [3] Burlakovs et al. (2018) *Journal of Cleaner Production* 186, 81-90.