Materials Recovering Feasibilities from C&D Waste Landfill, JS "Bionovus", Vilnius, Lithuania

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Three equally spaced points on the landfill were chosed as sampling points:
Nr. 1 – N 54.6306803; E 25.3133167;
Nr. 2 – N 54.6314789; E 25.3127156;
Nr. 3 – N 54.6318637; E 25.3125094.

During excavation in 2018, after re-cultivation, at selected points the Doosan DX300Lc (bucket volume 1.9 m3) excavated pits with an average dimensions of 2.5x2x2 m. The depth of the pits was up to 2 m. The thickness of the removable soil cover ranged from 0.5 to 0.8 m. The volume of the excavated waste was determined by additional measurements by roulette. taking into account the geometry of the pit. Valuable materials (including metals) were picked out before recultivation.
Immediately after excavation. the waste contents were dumped into a bucket of the CASE 821E (3.5 m3). which records the mass of the excavated contents. By mass to volume ratio density of waste was estimated. Further. the excavated waste was loaded by a forklift truck into a Kestrack Novum STD self-propelled hopper sieve with two sections of 24x36 mm and 12x18 mm respectively. The waste was sifted into the following granulometric fractions:
- fine fraction (mainly soil). particle diameter d<17 mm;
- medium fraction (mainly stones. pieces of concrete and bricks); 33 mm<d<17 mm;
- coarse fraction; d> 33 mm.

Two pilot excavations were made in Construction and Demolition Landfill „Bionovus" LLC, Vilnius, Lithuania - before and after the re-cultivation, in 2015 and 2018. Coarse fraction before and after re-cultivation was analyzed.
1. Before recultivation, recyclable plastics made up 8.78%, inert fraction – 18.89%, energy fractions (wood, textile, rubber, paper) – 32.59%, metals – 12.34%.
2. Concrete-brick-stone fraction is dominant in the coarse fraction - 83.16%, energy fractions (wood, textile, rubber, paper) present at 6.66%, 6.30% for recyclable plastics (soft plastics, hard plastics, PS foams), metals (mainly ferromagnetic) - 2.32%, non-recyclable inert fractions (glass, ceramic, mineral wool) - 1.56%.
Three possible economic scenarios were calculated for mining of recultivated landfill (it was assumed that top 3 meters of the landfill will be mined). It is clear that even the most optimistic scenario would yield negative balance.

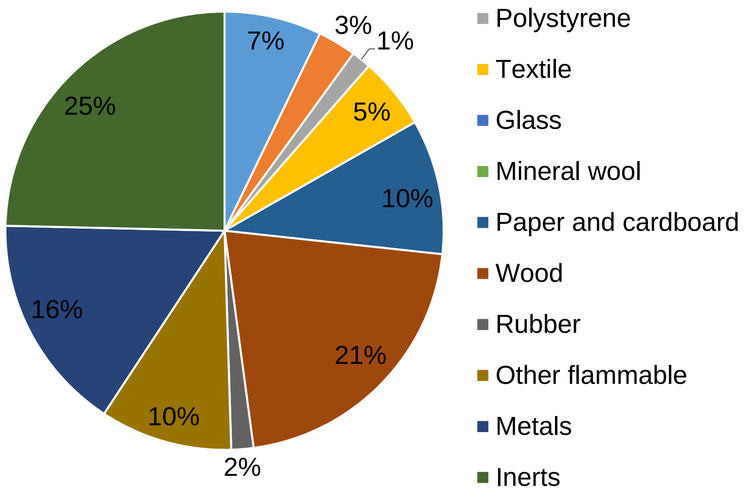
Economic scenarios for mining of „Bionovus" landfill after re-cultivation

Management features	Scenarios		
	Pesimistic	Average	Optimistic
Portion of metals to be sold %	50	75	100
Portion of inerts to be solds %	50	75	100
Portion of recyclable plastics to be sold, %	0	25	50
Portion of plastics to be incinerated, %	100	75	50
Portion of other flammables to be incinerated, %	100	100	100
Total amount to be incinerated, t	27840	26730	25619
Number of trips to incineration, 25 t truck	1114	1069	1025

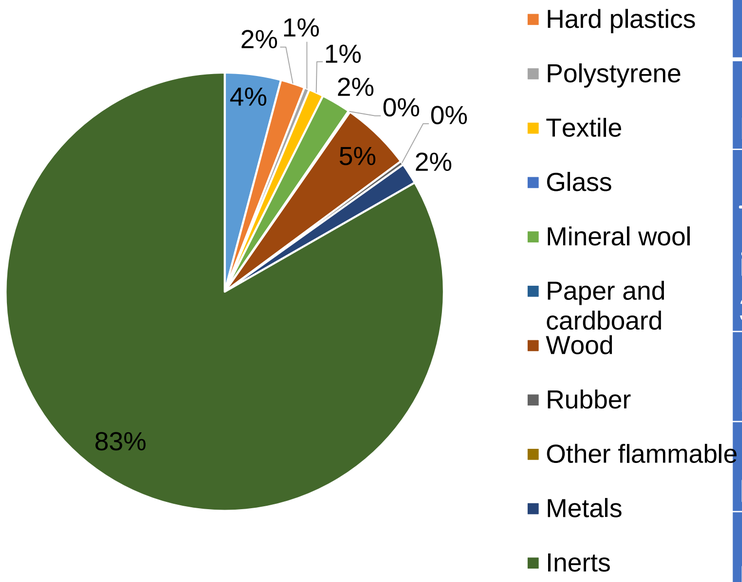
Financial balance sheet for „Bionovus" landfill mining economic scenarios

Expenses/incomes	Scenarios		
	Pesimistic	Average	Optimistic
Excavation expenses	512056	512056	512056
Transportation to incineration expenses. 300 €/trip	334200	320700	307500
Revenue from metals	242329	363493	484658
Revenue from inerts	35327	52991	70655
Revenue from recyclable plastics	-	38200	76401
Balance	-568600	-378072	-187842

Before recultivation, %

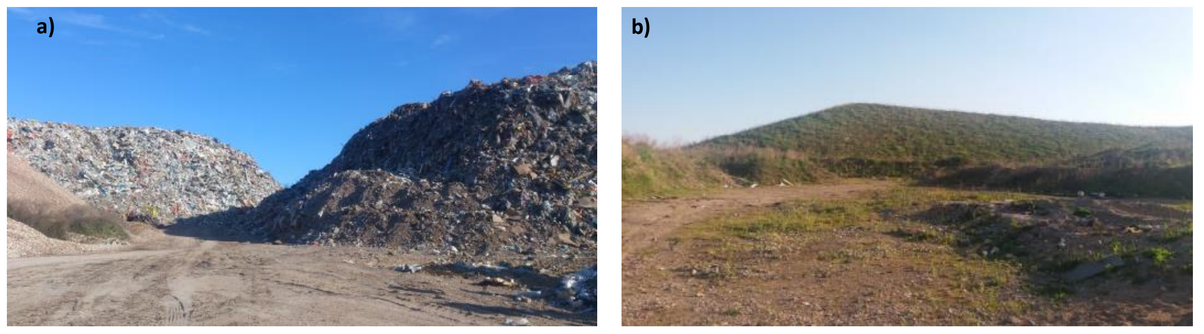


After recultivation, %



Location of „Bionovus" C&D Landfill in Lithuania

Location of Lithuania in Europe



View of "Bionovus" landfill before recultivation (a, 2015 year), and after recultivation (b, 2018 year).

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