

Waste Management and Landfilling Situation in Lithuania

WG 2 meeting, Tallinn, Estonia 9-11 August 2017

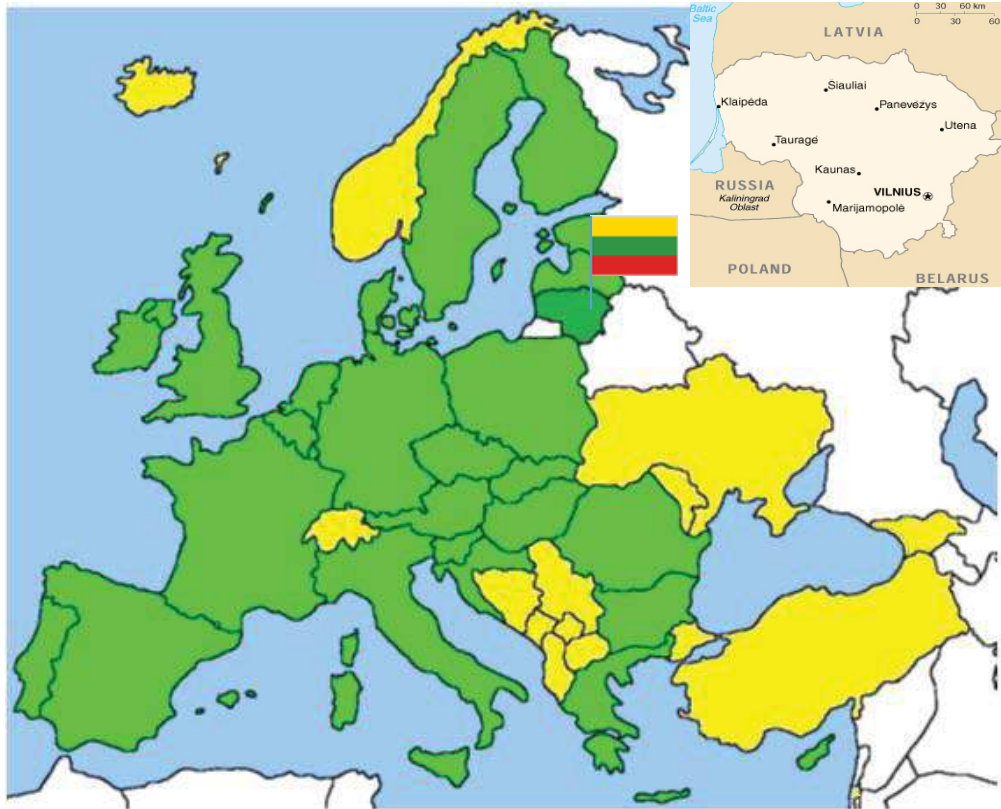


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MINING the
EUROPEAN
ANTHROPOSPHERE





EU and EU-associated countries

Republic Lithuanian:

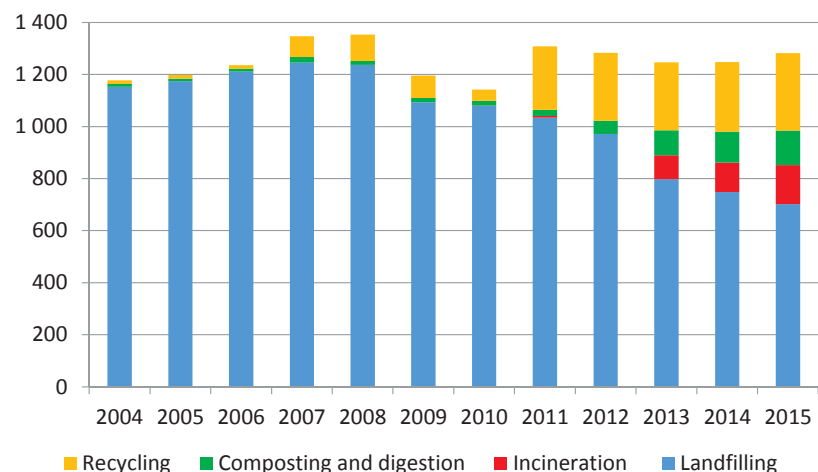
Year of EU entry: 2004

Total area: 65 300 km²

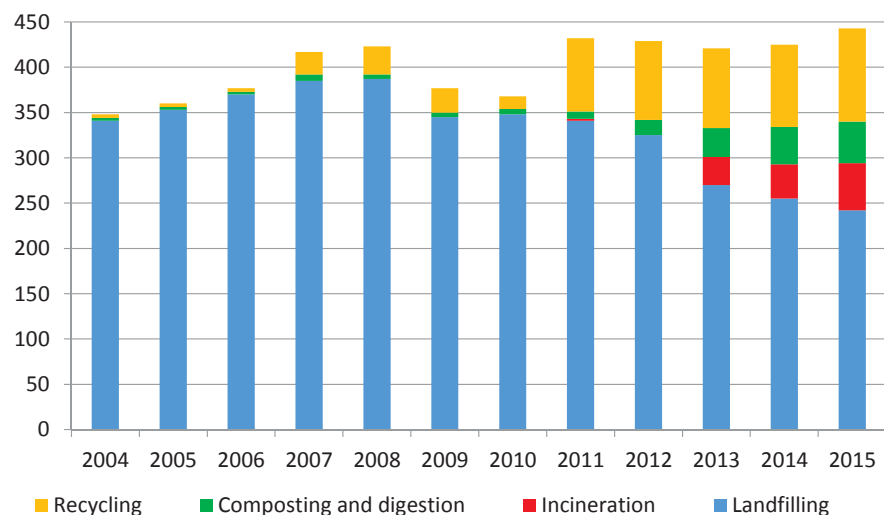
Population (2014):
2,943,472

GDP:
~12 320 €/per capita

1. MSW generation and treatment



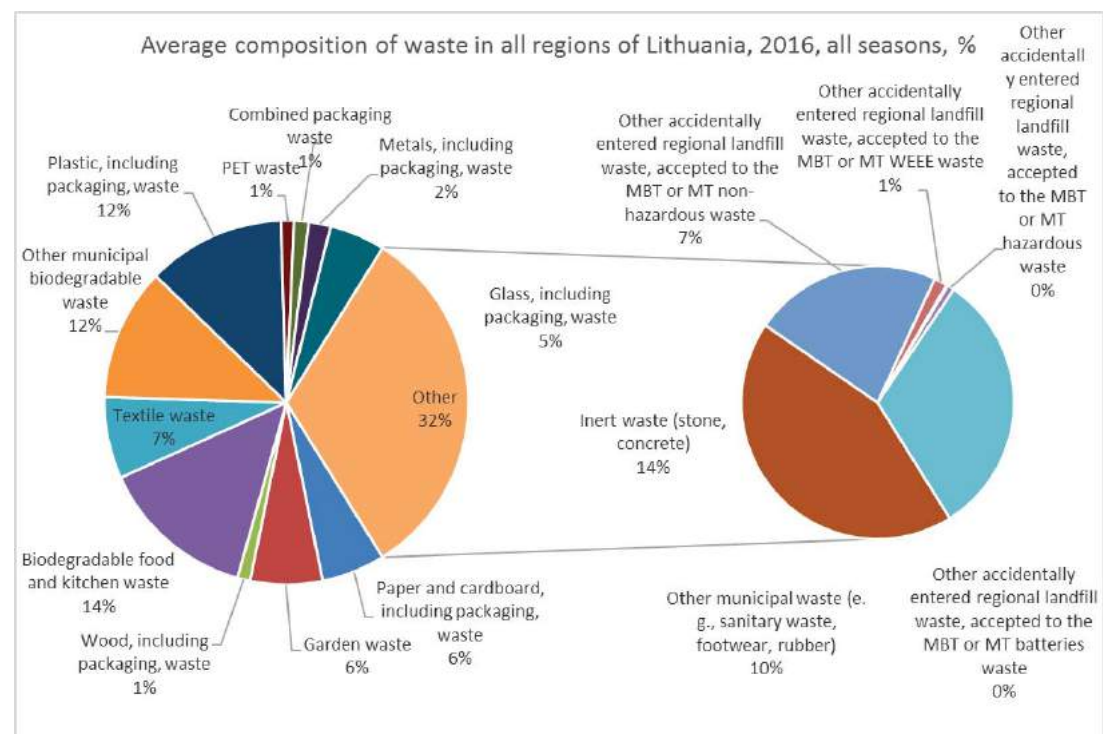
Lithuanian MSW generation and treatment, thousand tonnes

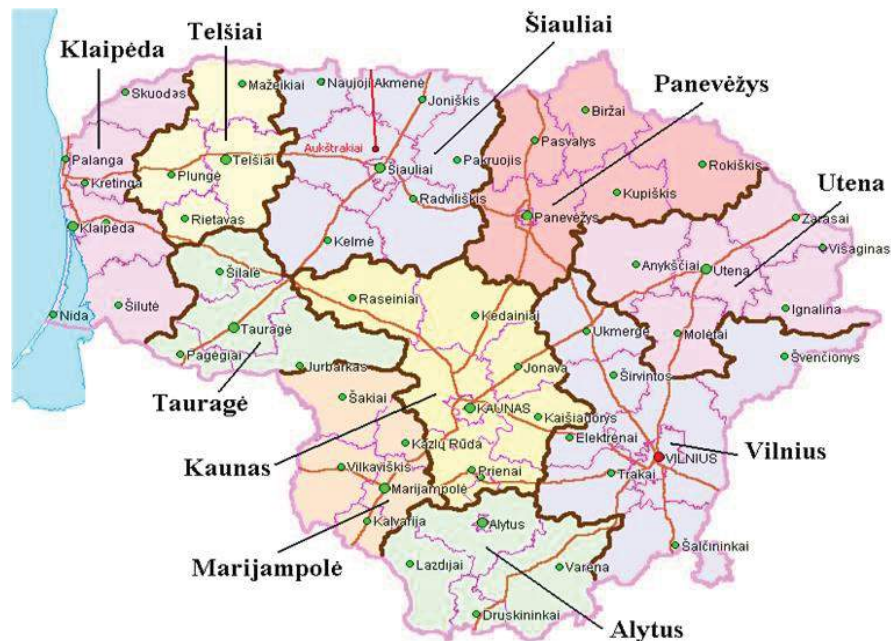


Lithuanian MSW generation and treatment, kg per capita

Waste collection and processing situation in Lithuania, 2016				
Collected in containers, t	Collected as bulk waste, t	Container-less collection, t	Other systems of collection, t	Total, t
929 876	66 420	37 524	80 706	1 115 045
Processed waste, t	Processed waste, %	Landfilled waste, t	Landfilled waste, %	
598 682	53,7	439 008	39,4	

http://atliekos.gamta.lt/files/Apibendrinta%20informacija%20apie%20komunaliniu%20atlieku%20tvarkyma%20Lietuvos%20savivaldybese%202016%20m_04_26.xlsx



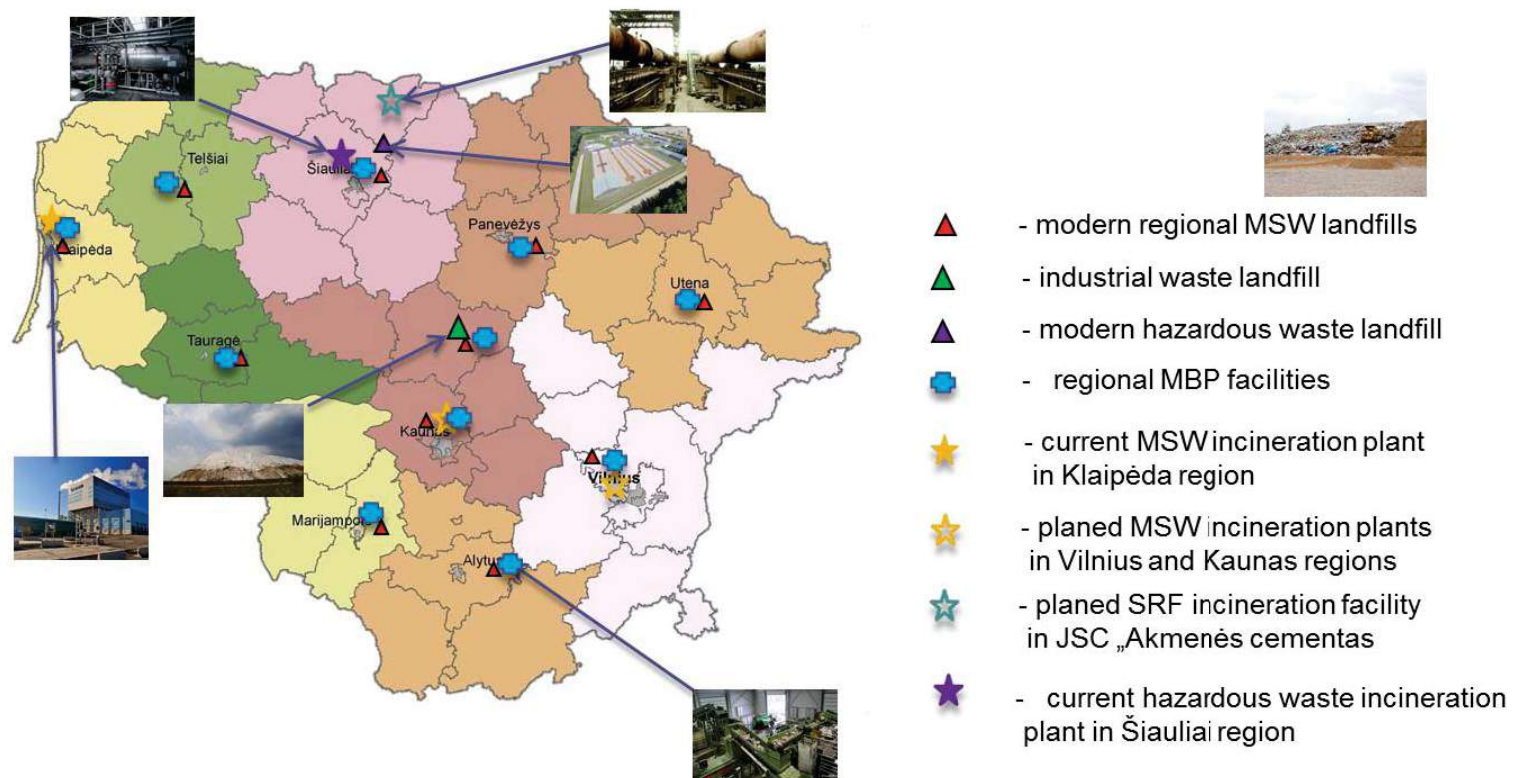


10 MUNICIPAL WASTE MANAGEMENT REGIONS



10 REGIONAL WASTE MANAGEMENT CENTERS

Regional waste management centers – waste management companies, established by municipalities and fulfilling functions of municipal waste management organisation in the area of municipalities.

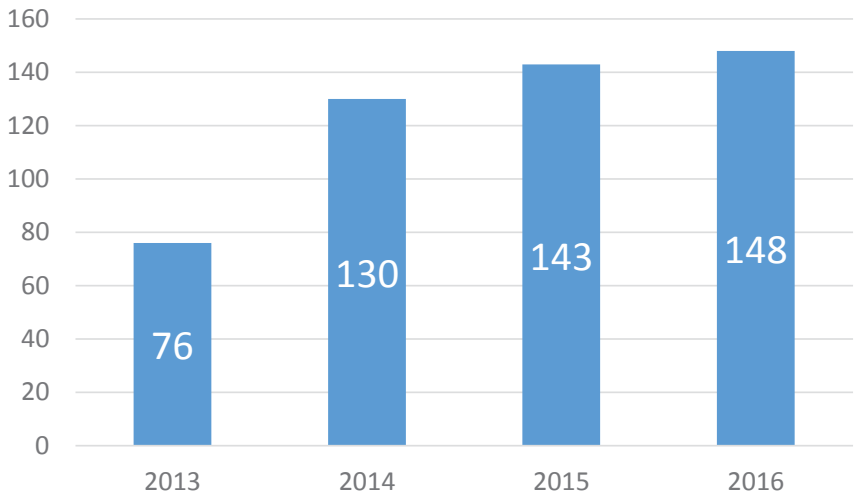


Locations of main current and future MSW treatment and disposal facilities in Lithuania.

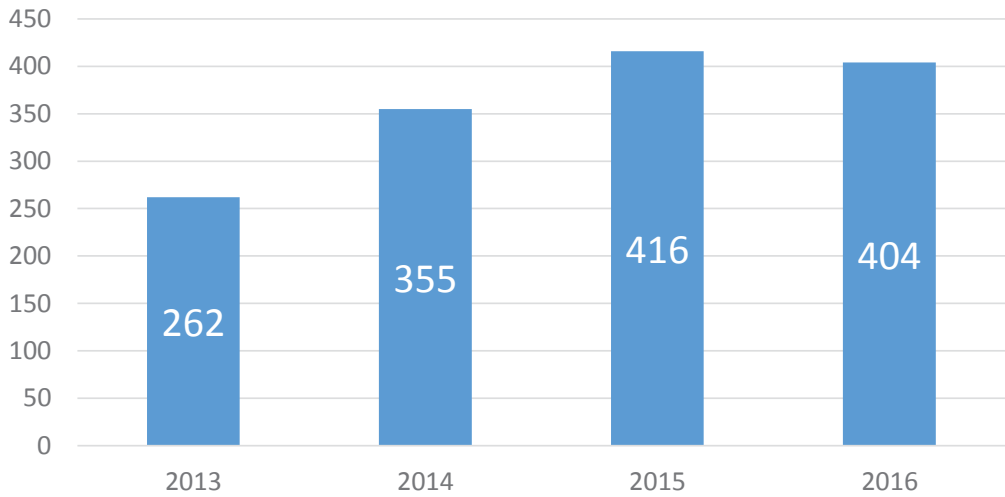
Landfilled waste, t/years			
2012	2013	2014	2015
1 050 473	947 045	887 014	531 035

Incinerated waste (with heat energy/electricity production), t/years			
2013	2014	2015	2016
91000	142000	180000	256000

ELECTRICITY GENERATED FROM WASTE INCINERATION, GWh



HEAT ENERGY GENERATED FROM WASTE INCINERATION, GWh



Fortum’s focus in Lithuania is on heat and power generation. The waste-to-energy plant in Klaipėda, commissioned in spring 2013, is the first project of its kind in the country. Reducing environmental impacts and the use of local fuels are a key factor in our operations. We have been operating in Lithuania since 1999, where we currently employ about 100 people. Combined heat and power plant in Klaipėda
 The Klaipėda CHP plant uses non-hazardous municipal and industrial waste as fuel. The plant’s boiler can incinerate 255,000 tones of waste and biofuel annually and its energy efficiency is almost 90%.

The generation of energy from non-hazardous municipal and industrial waste is an important part of Fortum’s strategy; using waste as a local resource reduces environmental pollution caused by the emission of gases from waste dumps. The power plant operations are consistent with the objective of the city of Klaipėda to establish a new waste management system in the region that meets European Union environmental standards.



2. Waste policy and regulatory frameworks

Every season in each municipality mixed MSW composition has to be determined (Alytus city).

MSW fraction	%
Paper and cardboard	14,67
Kitchen waste	23,33
Textile	7,00
Other biodegradable	3,33
Plastics	22,67
Metals	2,00
Glass	2,67
Other	24,33

Average gate fees in different waste management regions of Lithuania (mode) and Fortum Klaipėda waste incineration plant

City	Gate fees in regional landfills (MBT) and incineration plant
Vilnius	71,13 Eur/t (before MBT was 37,64 Eur/t)
Kaunas	MSW – 17,2 Eur/t individuals, 57,45 Eur/t companies. Other waste – 57,45 Eur/t for all.
Klaipėda	54,63 Eur/t
Šiauliai	40,34 Eur/t
Panevėžys	39,95 Eur/t
Utena	MSW – 66 Eur/t, separately collected – 50,08 Eur/t
Marijampolė	45,43 Eur/t
Tauragė	80 Eur/t
Telšiai	MSW - 56,7 Eur/t
Fortum Klaipėda	~30 Eur/t

- 1) The Lithuanian Republic legislation, which regulates waste treatment, does not sufficiently define the responsibility and functional distribution of the institutions participating in the implementation process;
- 2) In order to implement the assigned duties of waste treatment, institutions participating in the process of waste treatment policy implementation have problems with administrative skills and qualification and lack of professionals;
- 3) The problem of EU funding use in the area of waste treatment is still relevant, however the risk of unused resources is smaller as the use of funding has increased;
- 4) In the case of establishment of landfills, there are two main interest groups, which influence the efficiency of waste treatment policy implementation. They are citizens, communities and business interest groups. Discontent of citizens, due to the construction of a landfill nearby their residence impacted the establishment process of regional waste treatment systems and implementation of waste projects. The efficiency of waste treatment policy implementation has been impacted by business interest groups in terms of litigation;
- 5) The efficiency of waste treatment policy implementation is influenced by external economic and social factors, the main ones are: rise of prices, lack of technical professionals and bad work quality.
- 6) Producers in Lithuania are responsible for management of packages and packaging waste. They financing the management by paying pollution tax either presenting certificate from waste management company.

Type of landfilled waste	Landfill tax, Eur/t deposited waste (law from 2016-01-01)				
	2016	2017	2018	2019	from 2020
1. Deposited in non-hazardous waste landfill waste, except deposited in non-hazardous sections asbestos residues	3	3	5	21,72	27,51
2. Deposited in inert materials landfill waste and deposited in special sections of non-hazardous landfill asbestos waste	7,24	13,03	18,83	24,62	30,41
3. Deposited in hazardous waste landfill waste	47,79	53,58	59,37	65,16	70,96

3. Overview of available data on landfills

Urban areas in Lithuania were geochemically mapped for contamination in 2007

Main centralized information about waste in Lithuania is managed by the Ministry of the Environment

<http://www.am.lt/VI/en/VI/index.php>

But more information is in Lithuanian language

<http://www.am.lt/VI/index.php>

And Environmental Protection Agency

<http://gamta.lt/cms/index?lang=en>

It has information about waste generation, collection, treatment

<http://atliekos.gamta.lt/cms/index?rubricId=583649ff-8ed3-457b-b0a5-41678e86529f>

Also waste composition and amount of waste, deposited in regional landfills

Data about amounts of waste, deposited in the regional landfills have regional waste management centers



ANALYTICAL PROCEDURES PERFORMED:

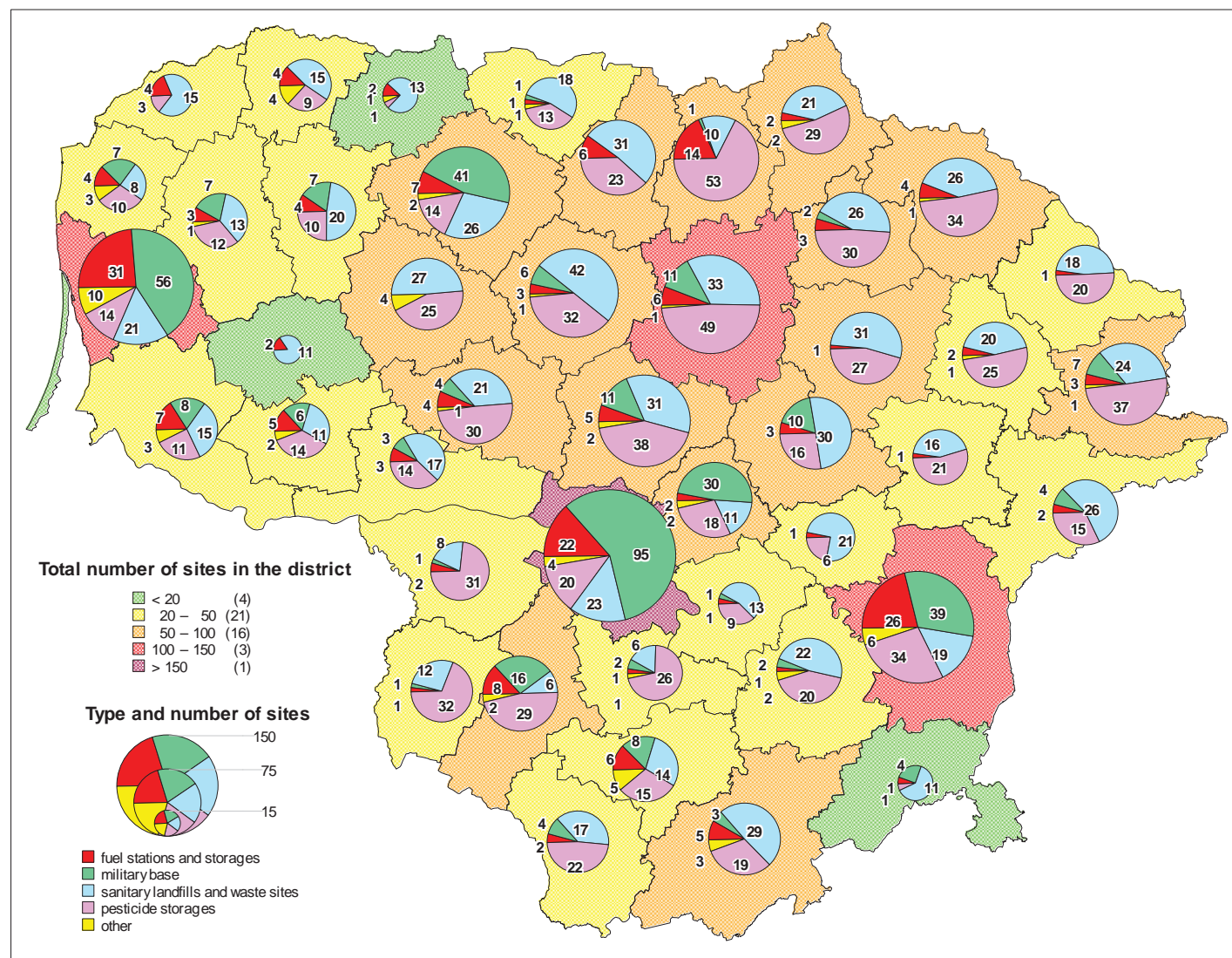
Formal procedures:

- Total contents of macro- and trace elements (Al, Ca, Fe, Mg, Ag, B, Ba, Be, Bi, Cd, Ce, Co, Cr, Cu, Ga, Ge, Hf, La, Li, Mn, Mo, Nb, Ni, P, Pb, Sb, Sc, Sn, Sr, Ti, V, W, Y, Yb, Zn, Zr)
- LOI, pH

Extra procedures, subject to suspected type of contamination:

- Hg, As, other extractable forms (aqua regia, bioavailable) of toxic heavy metals
- aromatic hydrocarbons, PAH, oil products
- PCB, EOX, pesticides
- ions of sulphate, nitrate, fluoride and potassium chloride

https://clu-in.org/slovenia/download/Other_Topics/Gregorauskiene.pdf



Distribution of potential pollution sites in districts of Lithuania (Geological Survey of Lithuania)

Overview of groundwater and soil contamination in Lithuania was conducted in 1996 by Geological Survey of Lithuania.

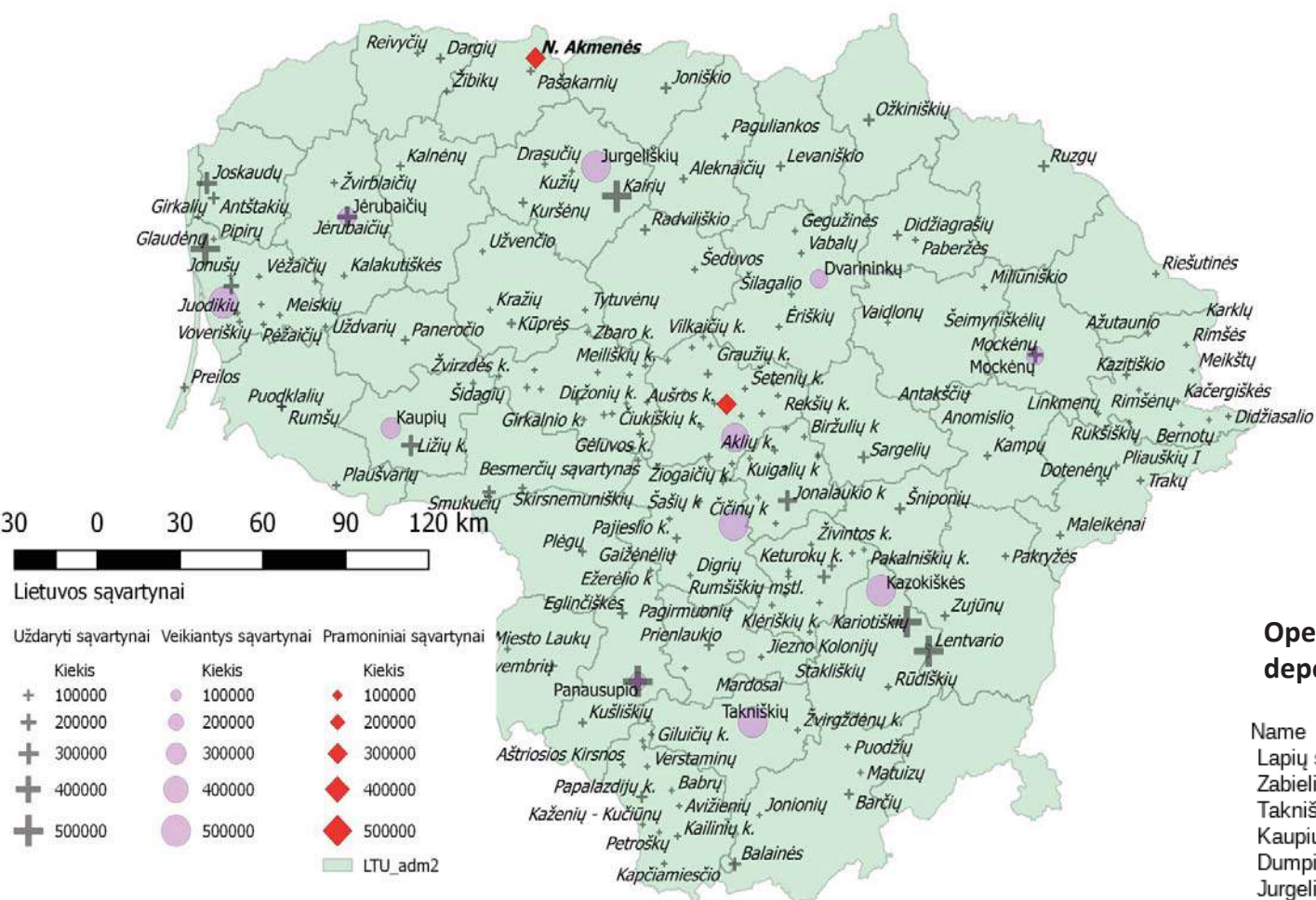
Inventory of sanitary landfills and waste sites carried out in 1993; Totally 636 sites find out;

In 264 sites storage of chemical wastes were ascertained; Detail investigation carried out in 36 sites;

Calculation of remediation for 8 sites - 1,5 bil. USD

http://esdac.jrc.ec.europa.eu/Library/Themes/Contamination/workshop_Nov2003/cp/LithuaniaCountryProfile.ppt

4. Landfill situation – specific data on MSW landfills



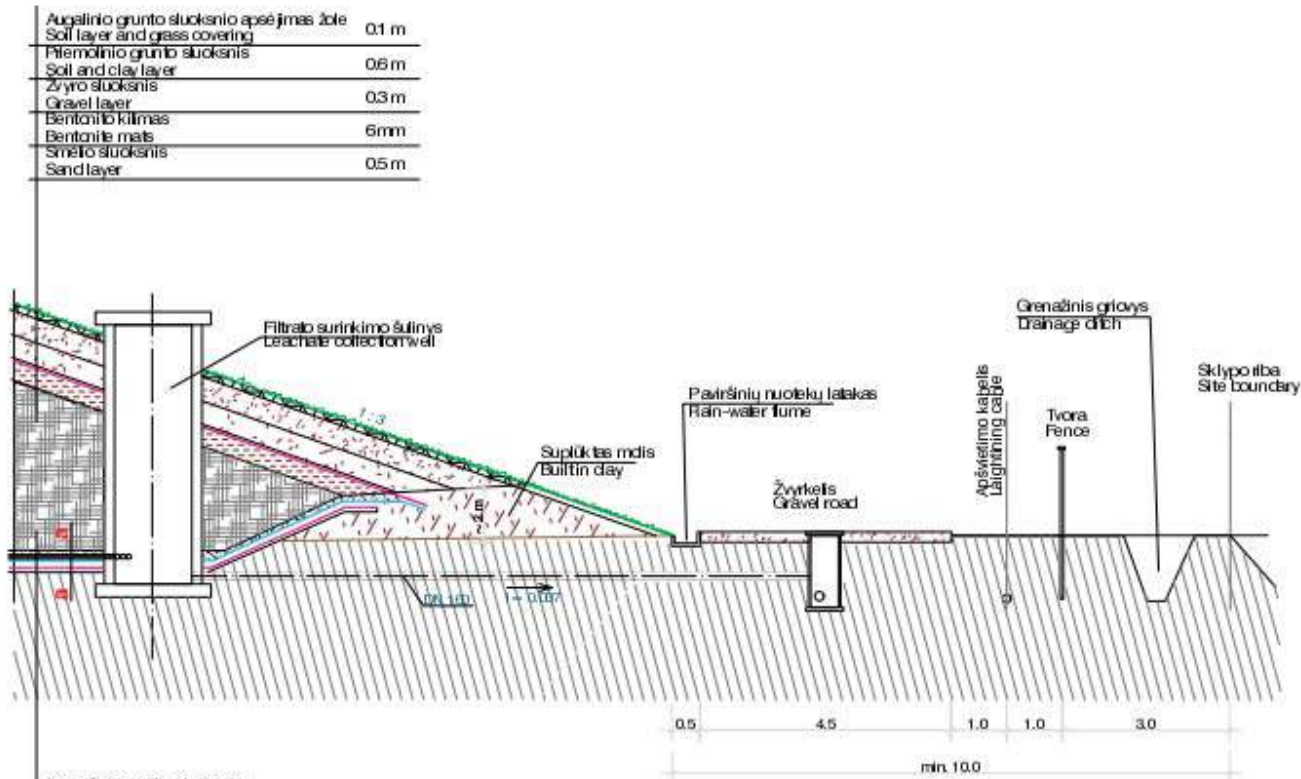
There are 182 known for us and mapped closed landfills with about 14637054 tones of waste (including closed sections of operating landfills), and about 700 hundred small or remediated landfills. Usually landfill remediation consisted of excavating of small landfill and transporting all it's waste to bigger landfill.

Operating landfills in Lithuania, total amount of deposited waste is about 8850000 tones

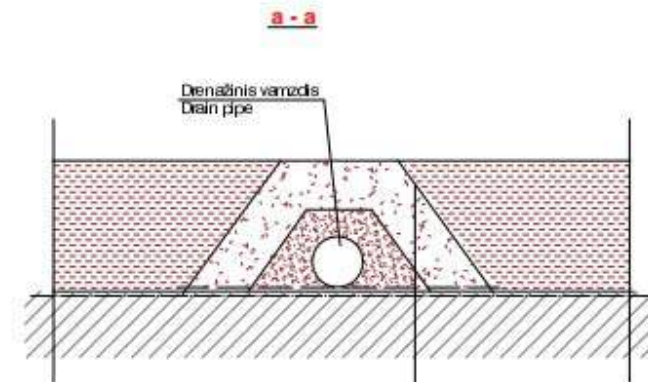
Name	Lat	Long	Amount, t
Lapių sąvartynas	54.99722222	24.02194444	2430000
Zabieliškio k.	55.248511	24.02935	449690
Takniškių	54.422898	24.124897	583652
Kaupių	55.27598	22.166826	300000
Dumpiai	55.633443	21.2606	1200000
Jurgeliškių	56.019375	23.277459	900000
Dvarininkų	55.701507	24.483578	250000
Mockėnų	55.482951	25.654311	250000
Jėrubaičių	55.877224	21.931028	250000
Kazokiškės	54.80719	24.81999	2000000
Panausupio	54.541994	23.503191	240000

5. Landfill technology and practice

ATLIUKŲ KAUPŲ KONSTRUKTYVINIS PĖJŪVIS
CONSTRUCTIONAL CROSS-SECTION OF THE LANDFILL

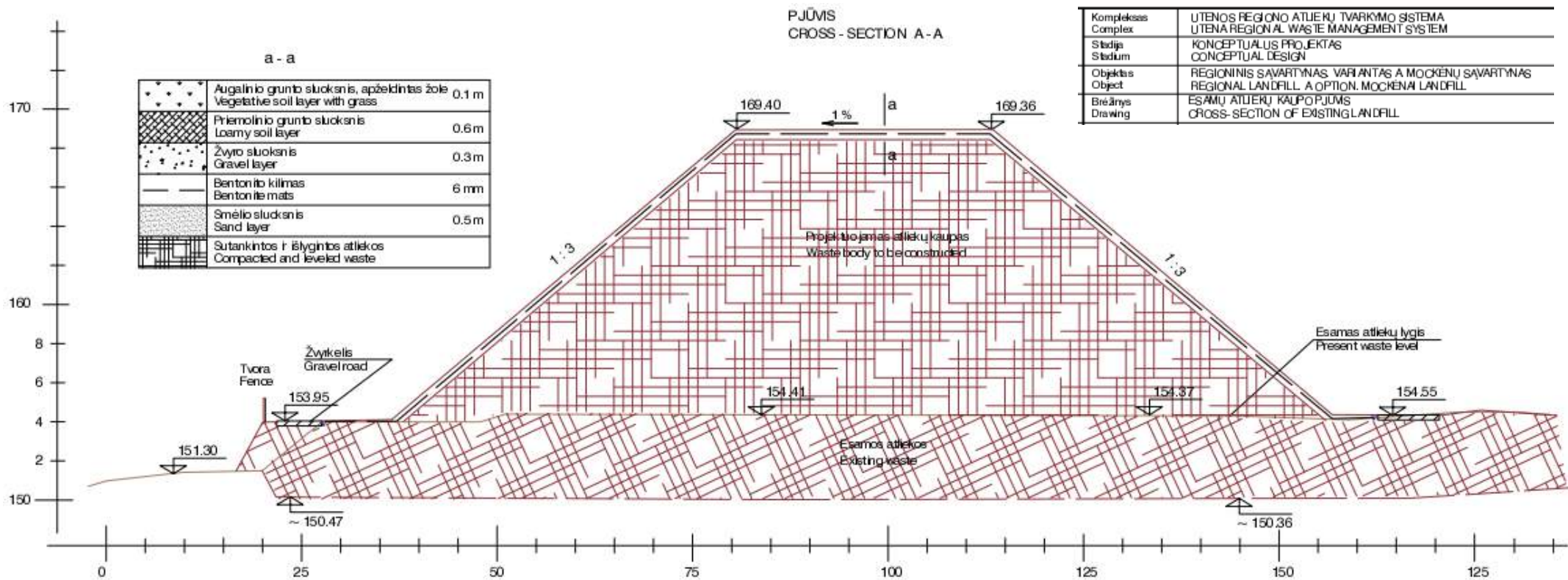


Drenažinis smėlio sluoksnis	0.5m
Drainage sand layer	
Geotekstilis	
HDPE membrana	
HDPE membrane	
Bentonito kilimas	6mm
Bentonite mats	
Pliemolinio grunto sluoksnis	0.5m
Soil and clay layer	
Sutankintas esamas gruntas	
Built in soil layer	

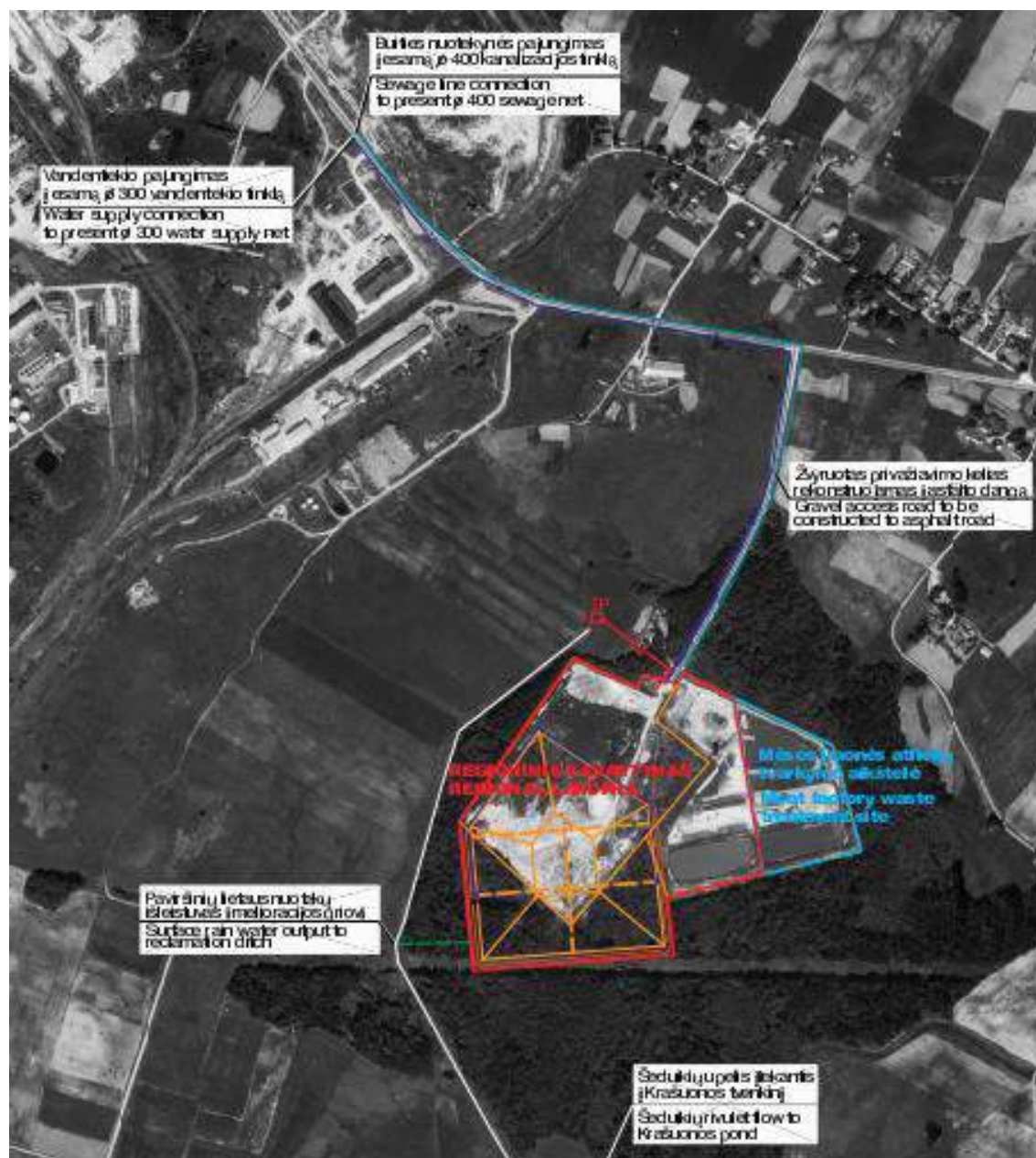


Filtracinis smėlis	
Drainage sand	
Rupaus žvyro sluoksnis	
Coarse drain gravel layer	
Vidutinio rupumo žvyro sluoksnis	
Medium coarse grain gravel layer	
Geotekstilis	
HDPE pėvelė	
HDPE liner	
Bentonito kilimas	
Bentonite mats	
Molio sluoksnis	
In site clay layer	

Mockėnai landfill (Utena region) cross-section drawing (2)



Mockėnai landfill (Utena region) cross-section drawing (2)



LEGEND

—	Regioninio savitarnos sklypo riba Site boundary of the regional landfill
---	Mėsos įmonės atliekų tvarkymo aikštelė Meat factory waste treatment site
—	Projektuojama buities nuotekų savitekinė linija Sewage line to be constructed
---	Projektuojama buities nuotekų slėgnė linija Press sewage line to be constructed
—v—	Projektuojama vandentiekio linija Water supply line to be constructed
---	Projektuojama lietaus nuotekynė Surface water line to be constructed
—0+—	Projektuojama 0.4 kV elektros tiekimo linija 0.4 kV electricity power supply line to be constructed

6. Experiences from landfill reclamation and/or landfill mining projects

In Alytus waste management region until the end of 2011 all landfills not complying with the environmental and public health safety requirements were closed. There were 22 abandoned landfills in Alytus region, which did not comply with basic environmental and hygienic requirements - and caused direct and indirect risks to human health and the environment by polluting the air, surface, ground water and soil. Their places were arranged without regard to these specific items on the environment, without a sufficient assessment of natural and socio-economic conditions. Moreover, all of these landfills have been installed without protective layer. In order to create a modern and efficient waste management system, it was necessary to close 22 landfills in Alytus region. Taking into account the specific conditions of each landfill 11 were provided to liquidate with the removal of waste to other closed landfill areas and rehabilitating them by sowing grass.

After managing of 22 landfills minimal negative impact on the environment, conserve natural resources, prevent the spread of infectious conditions the protected landscape of the organic, physical and chemical contamination were ensured. After the closure of 22 old landfills ground water and soil pollution, and negative impacts on human health were decreased. ~ 39 ha (closed landfill waste occupied the total area of ~ 22 hectares, re-cultivated, cleared from the waste total area of ~ 17 ha.) of landfill sites arranged and in terms of natural approach from polluted and dangerous areas became non-hazardous, "green" areas.

Current Alytus regional landfill was established in the place where old city of Alytus resided, near the village of Takniškiai, where old landfill site existed. By setting up regional landfill stage I of the closure of the old landfill has been implemented, and a waste field with the leachate collection and removal system as well as rain water drainage from waste system was formed. Second phase of the closure of old landfill was implemented by covering landfill with spooler coating with layers of gas drainage, insulation, percolated rainwater filtration, groundwater and vegetable lawn layers, installing the service roads and drainage system, accordingly reconstructing the leachate and rain water drainage systems, as well as rehabilitating the work zone area

Old Takniškiai Alytus regional landfill closure work is completed at the end of 2013.



1st (operating) section of Alytus regional non-hazardous waste landfill, 2016 (Takniškiai v., Alytus dist.)



Papalazdijų landfill after closure (Lazdijai)

Closure of scrap-heaps

While developing a modern waste management system in 2013, 69 scrap-heaps were closed in the region of Alytus (instead of the planned 71) in two counties: Alytus County - Alytus district (25), Lazdijai district (6) and Varėna district (38), in municipalities of Kaunas County - Prienai district (2). Taking into account the specific conditions of each scrap-heap, 68 were liquidated, removing all waste to 3 closed landfills (while reconstructing them), and rehabilitated in their territory. Three scrap-heaps to were closed and cleaned up in existing sites.

It was decided to abandon Akalyčios and Liškiavos scrap-heaps. Liškiavos scrap-heap is a private forest land, and the land owner did not gave consent for trash clearance. Akalyčios scrap-heap is also a private forest land and land owner did not gave consent for trash clearance. Waste is not deposited in above mentioned scrap-heaps for the following few years, there is no threat to the environment. Failing to get the acceptance of the Liškiavos and Akalyčios scrap-heaps management work in private lands, the Contractor can not fulfill contractual obligations and carry out all the terms of the works volumes, so the work was abandoned.

The project was cost saving, and additional scrap-heap was closed in Pilvingiai v., Varėnos dist. and a large composting area equipped in town of Birštonas.

Total 70 scrap-heaps in Alytus region were remediated and closed.

Similar activities were performed or are planned to perform in all (10) waste management regions of Lithuania.

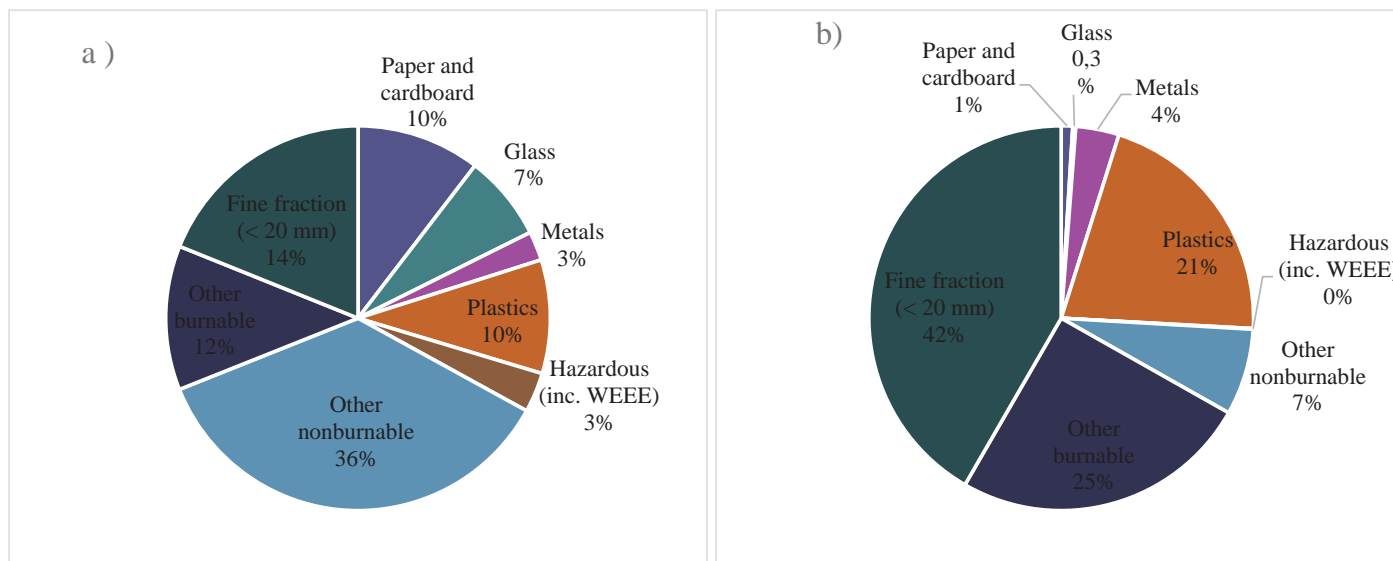


Closed section (old heap) of Takniškiai landfill, 2016
(Takniškiai v., Alytus dist.).

Alytus regional non-hazardous and inert waste landfill – first section, 2014



Alytus regional non-hazardous and inert waste landfill – first section, 2014



Morfological content of excavated waste in mass %:

a) determined theoretically by revers forecast; b) determined by investigation of samples