



Decade of the Landfills: Implementation of EU Landfill Directive in Estonia 1999-2009

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Peeter Eek

*Waste Department
Ministry of the Environment of Estonia*

peeter.eek@envir.ee

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Basic information

ESTONIA

Population 1.36 million

Area 45,2 th km²



ESTONIA'n Economy

GDP (PPP) 2007 estimate Per capita **\$21,800**

GDP (nominal) 2007 estimate Per capita **\$18,310** (41st)

Average monthly salary 2008 ca **770 €**

but there are remarkable differences between regions

Thus, on 1991-92 average salary was about **50 €**

This all still affects as well on WASTE MANAGENT!



Topics covered

- **General background**
- **Transposition of the EU landfill directive on 2001**
- **practical implementations : New Waste management Centres, closure of old landfills**
- **Challenges with the industrial (oil-shale industry) landfills**
- **Diverting waste away from landfills**
- **Cost of Landfilling and financial issues**
- **Lessons learned/conclusions – Challenges ahead**



General Remarks – waste management

Estonia, as most of the Central- and Eastern European Country's heritaged on 1990-s under developed and landfilling based waste management system.

There was ca **350** landfills (actually dumpsites without any environmental measures taken) often in abandoned sand- and gravel pits. For long time there was in fact no proper control about waste types or amounts taken to landfills.

Beside bio-degradable waste, containing in household and similar non-hazardous waste, there was landfilled as well big quantities wooden waste (saw dust, wood park etc.), sewage sludge, even major part of 'green and park waste'

There was landfilled as well waste tyres, different liquid waste, untreated medical waste etc.

- **AND littering (illegal dumping of waste) was problem all the time too!**



General Remarks – Institutional aspects I

Starting point on 1990-s: all waste management companies and dumpsites where municipal

During the 90-s, there took place general Privatization of economy
-also the waste management sector was Privatized near 100 % -
nobody didn't want to take as property the dumping sites, as those are mainly 'just obligations'.

It have had different effects:

PRO – fast investments to the collections equipments, service based approach

CON – difficult to steer waste management towards the recovery, general control issues, doubts of 'price deals' etc.

After privatisation there was relief from municipalities ' we are off' (from waste management), but – it was an illusion...

After 2000, continuous pressure – to bring the municipalities back to the Waste **management** – otherwise nothing happens !



General Remarks – Institutional aspects II

After 2000:

Regional waste management Centres (new landfills, with growing part of recovery operations) were established

The prizes for landfilling are determined by those companies (= by representatives of municipalities)

On different (mainly financial, when it was established) reasons majority of municipalities are not involved to those Companies

As all general waste management issues need to be solved (regional waste management plans, local waste management ordinances setting requirements for source separation, organized waste collection etc) – several non-profit organisations between municipalities were established do deal with those Q-s

The level of co-operation of municipalities still below satisfactory

Main considerations Landfill Directive transposition 2001

- Landfill Directive is **not at all** 'just about landfills' – AS
REQUIRES principal changes in whole waste management
system!

Several waste types are banned to landfill, for bio-
degradable waste there is serious task to reduce landfilling
etc. -> alternative treatment options needed

- 'ownership' (responsibility) on landfills – closure of old
landfills and developing new landfills

- site selection for new landfills ('nearly impossible')

- 'polluter pays' principle and landfill 'gate fees'



Landfill Directive transposition on 2001

As the EU Landfill Directive was implemented on 2001, then majority of the small countryside landfills was closed after.

As a result there is a nearest landfill in distance of tens of km-s. Replacing waste management infrastructure as local waste stations (Public amenity sites, recycling centres etc.) have not been developed as fast as was expected





Landfill Directive – High Costs Burden ahead

The whole waste management issue requires huge financial effort. **But on the 'helicopter view' there is on ' a situation, where all the cost of the past (old landfills to be covered) and investments to the Future (infrastructure for ca 20-30 years), should be covered by approx. 10-15 years.**

This is more then difficult. In addition there is on-going dispute on which level and in which form should the new waste management projects be developed? Should it be 'Government Authorities' (Ministry) level or perhaps thus the regional and local level – different co-operations structures of the local municipalities together with different private firms, who could be interested about waste management?

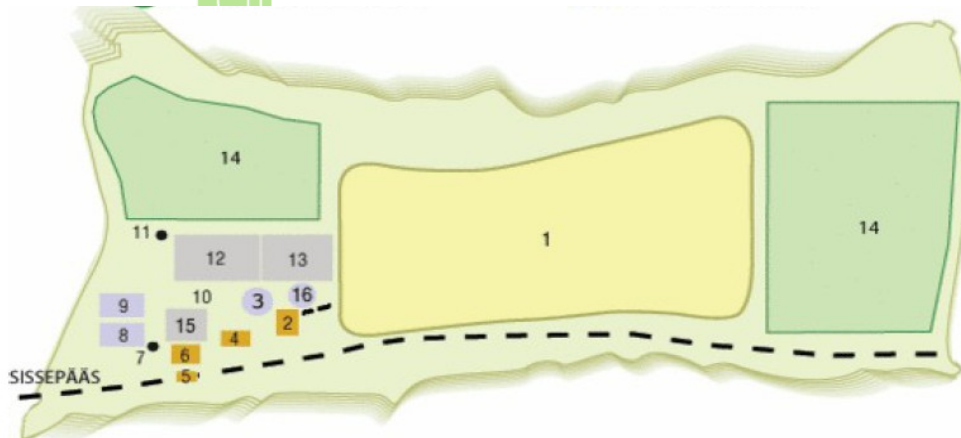


Tallinn new landfill – PPP model, opened 2003



Site selection since 1980-s to 2001

- landfill site on the area of former mining area ca 20 km E from the Tallinn, ca 67 ha
- Tallinn city formed Company (35 % Tallinn City, 65 % Cleanaway)
- financing on two different projects 1) inside 'landfill fence'- landfill company ca 8 M€
2) 'out-side' (access road + leachate pipeline ca 8 km) Tallinn city ISPA project ca 6 M€



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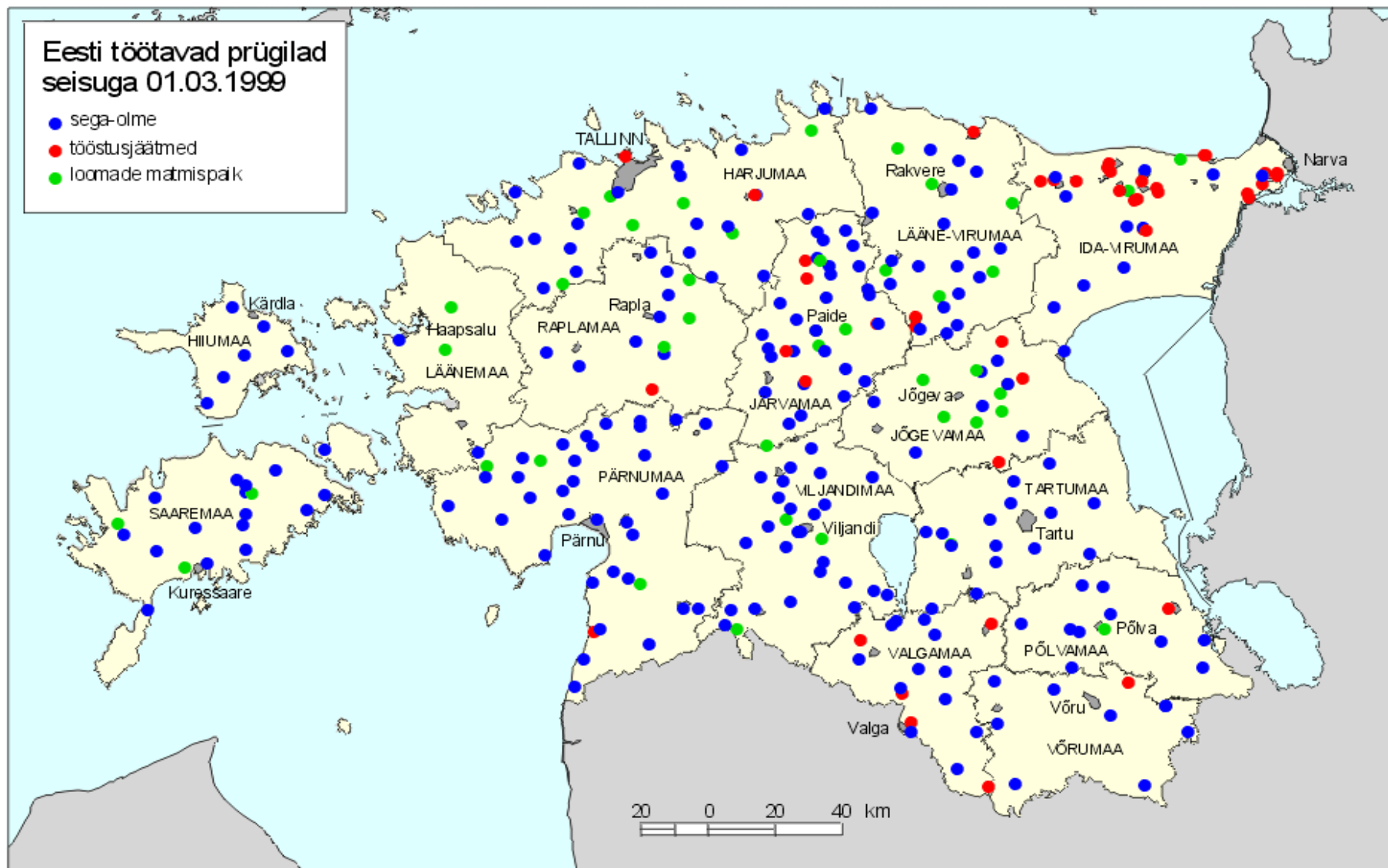
**New WM Center near Pärnu (S-W of Estonia),
opened 2006, financed 67 % by ISPA**



**Väätsa Landfill (Waste management Centre) –
financed in major part by Estonian Env.
Investments Centre, State Budget etc.)**



Landfills on 1999- 'just behind the corner' and often 'free of charge'





Financial issues of closure of old landfills

There was counted up to 350 small landfills on 1990-s

- majority from those are closed and covered by now
- as majority was < 1-2 ha, then simplified closer procedures was applied, based on local conditions and EIA (if needed)
- closure layers on average up to 1 m different soils + topsoil or compost for greening
- as most of the landfills was on sites with relatively good filtration, then leachate collection have been establishen only on few places



Financial issues of closure of old landfills - II

- cover with plastic liner etc. only exceptional, if clear danger to groundwater - then cost level ca 100 th.€/ha
- closer cost for bigger landfills > 5 ha up to 300 th.€/ha
- average cost of closure of small landfills ca 20 th.€/ha

Financing scheme typically :

- 10 % local municipality(s),
- 90 % Environmental Investments Centre (State)
- since 2004 as well ERDF, now Cohesion Fund

Total costs of closure of landfills until 2007 – ca 32 M€
(ca 22,8 €/person)



Main problems related to closure of old landfills

Ownership disputes – about land as property, but also about responsibility

On most cases had'nt the local municipalities collected any closure fund – so the state aid was 'unavoidable'

Even if closed, then problems with landfill aftercare – there are examples, where there is still waste dumped, on some cases have run-off waters damaged the covering layers, etc.

Landfill-gas collection with energy recovery still only on Tallinn Pääsküla landfill as all other municipal waste landfills have been estimated as 'low level gas generating'

On future planning restrictions purposes, are still not all old landfills marked on digital maps



Example: 'Old dumping site' – 2004, Saaremaa island
- thin layer, often 1-2 m, aerobic conditions:
Is it a 'aerobic treatment' or 'waste field' ?



***Ditch at the Tallinn
Pääsküla landfill, 2004***



**Tallinn Pääsküla Landfill,
closed 2006, financed by ISPA**





Alternative solution after closure of local landfills and to the littering issue is...

.... mandatory joining
to the municipal waste
collection scheme

+

sufficient network of
waste stations
(recycling yards or
public amenity sites
etc.)



**The EU Membership Treaty : Estonia shall stop
landfilling of the oil-shale ash as a liquid and
corrosive waste by 16.07.2009 . . .
cost estimate ? M€**



**Oil-shale oil production waste (oil-shale semi-coke)
landfills : cost estimate for closure ca 55 M€**



***Oil-shale semicoke:
Ski-Resort or HasW landfill ?***



Thermal processes in the landfill





Diverting waste away from landfills: Separate collection – when and how and why?

There is wider experience, that for diverting waste away from landfilling towards recovery there must be as economic incentives as well as regulatory support.

In Estonia nowadays landfilling of waste costs ca 40 €/t (thus less on some 'old landfills', still in operation).

The landfill tax (ca 10 €/t on sanitary new landfill and ca 30 €/t on 'old-ones') is included in the 'gate fees of the landfills'.

For the households is the average waste management service fee ca 65 €/t, but on the average household basis ca 4-8 € in month, what is ca 3-5 % from living rooms related costs in central heated dwelling houses.

There are opinions raised on the same time, that waste management is already too expensive for the average household – but also, that this all is too cheap to motivate source separation.

As well waste management companies were mainly on the opinion, that low landfilling price didn't motivate to deal with alternatives to landfilling – the situation is changing, as on 2006 the landfill tax raised considerably.

Ordinance of Sorting requirements for Municipal Waste - January 2007

Following waste streams are subject to separate collection:

- 1) **paper and cardboard** (20 01 01);
- 2) **packages** (15 01);
- 3) **Hazardous waste** (in the Waste List 20 01 «*» marked waste types);
- 4) **Bio-degradable garden- and park waste** (20 02 01);
- 5) Bio-degradable kitchen- and food waste (20 01 08);
- 6) Wastes, covered with the Producer responsibility principle - ELV and parts (16 01), incl tyres (16 01 03), WEEE and parts thereof (16 02), batteries and accumulators (16 06);
- etc.

The Municipalities are obliged to regulate and ensure the collection of waste types 1-4 , whereas the collection of packages and packaging waste is responsibility of Packaging organisations

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For the separate collection the collection at source is necessary, but for several waste items also Waste stations are crucial!

Ordinance on Sorting Requirements for Municipal Waste, January 2007

The sorting Obligations came to force on 1.01.2008, although the general Requirement was in in Waste Act since 2004, stipulating that 'the municipal waste must at least be sorted prior to landfilling, there was High level uncertainty, what it all means?

- **Although all problems, the separate collection is raised rapidly,**

Results: on 2008 landfillin MSW decreased by 20 %; on Q1 2009, still -20% from previous Year is reported

- Kitchen- and food waste is not obligatory to separate, but is on 'whish list', up to decide by municipalities

Tallinn City Waste management ordinance makes kitchen and food waste separate collection compulsory in livinghouses with over 10 flats and in non-livingroom properties, where such a waste is, generated over **25 kg** per week since 1.05.2007

On 2008 ca **7500 t** of kitchen Waste was separately collected – it makes ca 15 % from total Generation, ca **18,7 kg/in/y**

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It means, that there is reserve – but quality of material is also important



National Waste management plan : Prognoses 2008-2013

- The share of the bio-degradable waste in municipal waste is estimated on 2005 still as **65%**,
- On 2005 there was generated ca 320 000 tons Bio-degradable municipal waste, from that 260000 tons (81 %) was landfilled
- Aims of reduction of landfilling, i.e 'diverting away from landfills' of BD Municipal waste
- 2010 20 000 t (8 % from landfilled 2005)
- 2013 100 000 t (38 % from landfilled 2005)
- 2020 158 000 t (61 % from landfilled 2005)

Discussion – what is possible to achieve only with source separation and composting? KESKKONNAMINISTERIUM




Landfill tax 2002-2009

Yearly ca **7 M€** of landfill tax revenues are turned back to Waste sector Projects through Environmental Investment Fund – main National support for Waste management projects

Landfill tax on Landfilling, €/t

Saastetaine	Pollution Charges Act 2002				Environmental Charges Act 2005			
	2002	2003	2004	2005	2006	2007	2008	2009
Non-hazardous waste basic, incl. 'Residual Household waste'	0,2	0,2	0,3	1,9	7,8	7,8	8,5	10,0
Factor for Non-compliance Landfills	6	6	6	4	2	2	2	3
Landfill Tax on 'Old Non-Compliance' landfills	1,1	1,3	1,5	7,7	15,6	15,6	17,0	30,1
Oil-shale gangue and enrichment residuous	0,1	0,1	0,1	0,2	0,4	0,5	0,6	0,8
Oil-shale ash	0,3	0,3	0,3	0,3	0,4	0,5	0,6	1,0
Oil-shale semi-coke	0,3	0,3	0,4	0,4	0,4	0,4	1,0	1,0
Factor for Non-compliance Landfills	3	4	2,5	2,5	2,5	2,5	5	8
Landfill Tax on Non-Compliance landfills	0,9	1,3	0,9	1,0	0,9	0,9	5,0	8,0





Influence of the Landfill tax

The Landfill Tax have been essential Part of the Financial Support scheme for Environmental investments – incl. Support to build new landfills and close 'old-ones'.

This is ensuring 'softer landing with the landfills' – from ca 200 landfills to 5 non-hazardous landfills on 2009, where 'gate fees have changed from 0-10 to 40 €/t with less then 10 y

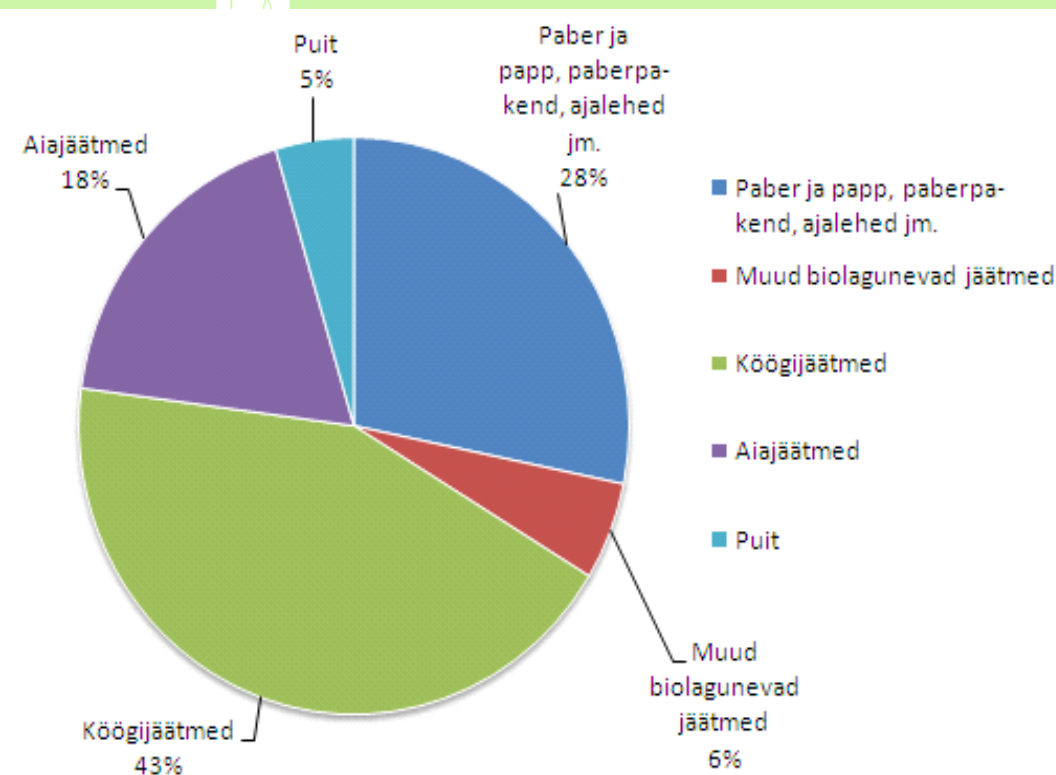
Clear influence to promote recovery of waste stream, which was on end of 1990-s yet landfilled (as was so cheap...) :

- Construction-Demolition waste,
- sludge,
- garden waste,
- wood waste etc.

Now it is clearly more 'waste management driving tool' – to motivate recovery

Waste management plan : Bio-degradable waste in Municipal Waste (2005)

MoE have ordered new comprehensive Waste sorting research (2007-2008), with the aim to have better data, but also to work out guidelines for such sorting test



The Content of BD waste in Municipal waste 2005

Kitchen waste 43 %

Paper, cardboard (incl. Packages) – 28 %

Garden waste 18 %

Wood – 5 %

Others – 6 %



Landfill gate fees - I

The landfill 'gate-fes' have been in fact subsidized so far (via investmenst supports)

- main argument: to smoothen the transition from ca 250 → 5 landfills, and avoid 'negative social-economic impacts'
- it is been practical approach so far (1999-2009), but not further
- current landfill gate-fees do not cover all landfilling related direct cost (not to mention undirect)

The closer up of old landfills wil be subsidized during coming years with ca **38 M€** (600 MEEK)

As during 2001-2008 there was landfilled on old landfills ca 1,5 Mt mixed municipal waste, then additional 'closure fund' part ca 6,4 € (100 kr/t), were given as **9,6 M€** (150 Mkr) – actually only small part from that is accumulated...

Conclusion: landfilling is in fact so far subsidized as well trough large-scale support to closure of old landfills.



Landfill gate fees - II

Landfill gate fee is (until incineration or other large-capacity treatment) first economical benchmark, with which always all recovery operations are compared

Subsidizing landfilling, means as well contra-subsidizing recovery

As Funds have been delivered to landfilling, there is just not enough money for recovery operations

→ **Landfilling subsidising should be ended ASAP, all financial support measures according to Waste management hierarchy (prevention/reuse/recycling etc.)**

Landfill tax should be raised on 'first possibility' (2012?), when Estonia has joined Euro-zone – new tax level at least from 10 €/t to 30 €/t



EU Support 1999-2009

- The EU Support to develop Waste management have been substantial
- On the period of 2007-2013 will be **180 M€** allocated for Waste management
- From that majority goes to closure of different (incl. Industrial) landfills, ca **40 M€** for recovery projects
-
- As a conclusion – EU accesssion have motivated/forced to deal actively with Waste management, but there have been as well strong financial Support



Lessons learned Major Challenges ahead

- It's not at all only about landfills, as it seemed on 1999.
- There will be 5 municipal landfills in Estonia on 2009, in long term even less
- The EU Waste Hierarchie should taken as basis: seriously, as it comes from New Waste Directive
- Financial support as much as possible for prevention, reuse, separate collection, aftersorting, recovery in any form etc.
- Clear norms for pre-treatment needed- as in many EU Countries- basically **municipal Waste could only by landfilled after incineration or MBT process (TOC limit etc.)**
→ 2013-2015 ?

Problems: Applications of the Landfilling Criteria (Decision 2003/33)

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- **Aftercare of the landfills**

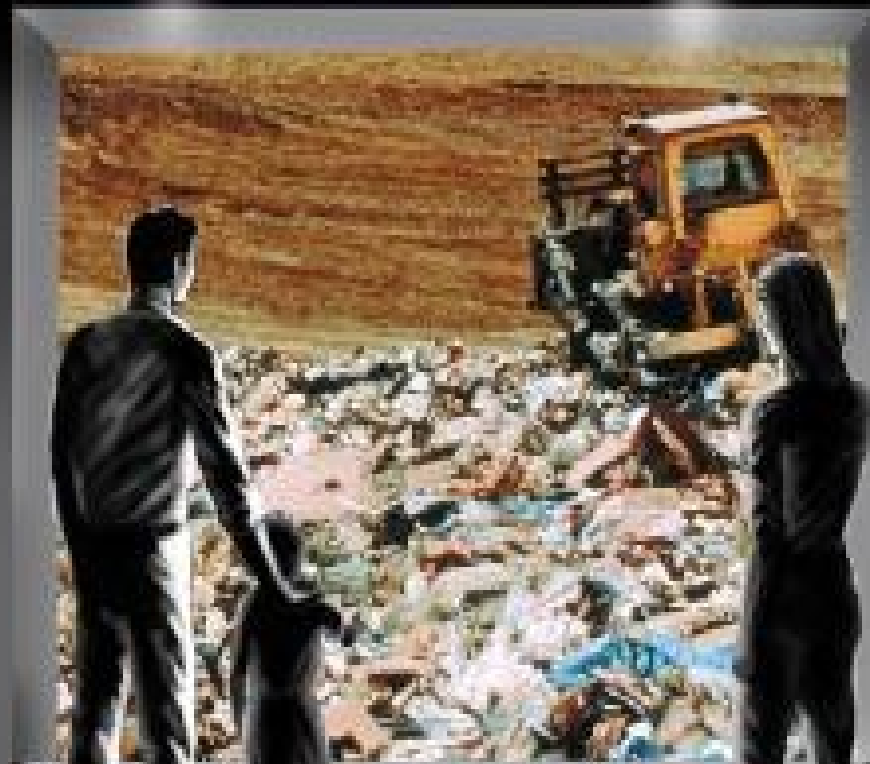
The World of Yesterday

LANDFILL

CIRCA 1999

A hole in the ground where valuable resources were needlessly buried.

This practice was ended in the early 2000's



LANDFILL
CIRCA 1999

A stylized white line-art tree is positioned on the left side of the slide. Its trunk is tall and slender, extending from the bottom to the top. The canopy at the top is filled with intricate leaf patterns. The roots at the bottom are spread out and also feature leaf-like details. The background is split horizontally: the top half is a bright blue sky with scattered white clouds, and the bottom half is a solid green field.

Thank You for Your attention!

Peeter Eek
peeter.eek@envir.ee

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