

Evaluation of waste policies related to the Landfill Directive

Estonia

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Context

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1. Country introduction

Estonia is a small Baltic country with a population of around 1.4 million. Approximately 67% of the inhabitants live in towns and cities. The population of the capital city Tallinn is around 400 000. The territory of Estonia is 45 000 sq. km.

Estonia gained independence from the Soviet Union in August 1991. The Association Agreement with the European Union was signed in 1995 and since then Estonia has focused on the transposition of the EU environmental acquis including waste. At the same time, and closely linked to the development of the environmental approximation strategy, Estonia reformed and implemented its national environmental policy, in particular through the preparation of a National Environmental Strategy (NES) approved in 1997. A detailed National Environmental Action Plan (NEAP) was developed and approved in 1998. NEAP II, harmonised with the EU environmental approximation process, was approved in 2001.

Estonia closed provisionally the Environmental Chapter 22 on June 1, 2001. In the regular report of 2003, the European Commission noted that the waste management acquis had not been completely transposed and there was a need of new waste and packaging acts and new implementing regulations. There was also a need to transpose acquis on end-of-life vehicles by accession. Consequently, a new Waste Act was adopted in 2004 and a Packaging Act in 2005 together with implementing regulations.

Estonia has a transitional arrangement with intermediate targets for the implementation of the Landfill Directive until July 16, 2009. The derogation concerns the landfilling of ash from oil-shale power plants. At present, oil-shale ash is landfilled in the form of liquid slurry, which is considered as the disposal of liquid waste. This practice must be changed by July 16, 2009.

The Estonian economy has been growing at a very fast pace since 2000, with GDP growth peaking at 11.7% in 2006.

Table 1.1. Rates of GDP and consumption growth

	2000	2001	2002	2003	2004	2005	2006
GDP growth (%)	7.9	7.7	8.0	7.1	8.1	10.5	11.7
Real private consumption growth (%)	N/A	N/A	9.3	6.8	7.0	7.9	15.4

Source: Enterprise Estonia; National Statistics; Eesti Pank (consumption)

Private consumption has been growing at a pace similar to, or even faster than GDP (9.3% in 2002 and 15.4% in 2006) and this has put big pressure on waste generation. Consequently, the targets in the National Environmental Strategy to stabilise municipal waste generation at 250–300 kg per capita by 2010 have become unachievable.

Estonia is attractive to foreign investment and capital flows (USD 12.7 billion in foreign direct investments in 2005), especially originating from the Scandinavian countries. Growth comes mainly from services and partly from manufacturing. The country was ranked seventh in the world in the index of economic freedom in 2006 and 25th in the index of global competitiveness. Therefore, it can be expected that the Estonian economy will keep growing at a fast pace in the next several years. According to Eesti Pank forecasts, growth will be between 8.4% and 5.6% between 2007 and 2009.

Estonia is divided into 15 counties. Counties have supervisory functions. The county governor has the right to supervise all acts of municipalities but not permits issued by ministries.

The Ministry of Environment has 15 structural units at county level — County Environmental Authorities (CEAs) — which are responsible for permitting and, until recently, for county-level waste management planning. The CEAs play a key role in implementing waste legislation, mainly through permitting policies and relevant action programmes at county level. The counties are responsible for issuing waste permits.

The number of municipalities is relatively high for a country of this size — 33 urban and 194 rural municipalities. It is higher than in countries of similar size, and the number of inhabitants per municipality (5 670) is relatively low. Municipalities are in charge of organising the collection, transport and disposal of municipal waste. Often, municipalities lack sufficient human and financial capacities to deal with their waste management responsibilities. The special pollution charge for municipal waste disposal (sometimes referred to as landfill tax) was designed at the beginning of 1990 and was collected by the state. After 2004, it was decided to pay 75% of the pollution charge back to municipalities where the waste was collected, partially to secure a steady source of funding for the waste management activities of local authorities. However, this acts as a disincentive for diverting municipal waste from landfills as in this way small municipalities lose revenues. The revenue from landfill tax differs significantly between municipalities and depends on several factors such as waste generation per capita, the share of organised waste transport among the population as a whole, the general income of the municipality etc.

From early 2007 there have been amendments to the Waste Act (2004) suspending county-level waste management planning. This move was aimed at giving more responsibilities to the municipalities as well as at stimulating municipalities to pool their resources and strengthen their human and financial capacities for better waste management activities. For example, it is compulsory for municipalities to elaborate waste management plans, but the expectation is that municipalities will cooperate and there will be regional waste management plans based on cooperation.

The Environmental Inspectorate (EI) is an institution for environmental supervision, coordinating and managing the enforcement of waste legislation. The Inspectorate is subordinated to the Ministry of Environment. Inspectorates are not a part of the hierarchy, but independent supervisory bodies.

Because of the relatively cold climate, Estonian authorities look favourably at the production of heat from waste incineration.¹ Additionally, the incineration of waste could replace heat produced from oil shale, which would also have a positive environmental effect. This is because part of waste-generated fuel can be considered as renewable fuel (unlike oil shale). It would also decrease dependency on Russian gas imports. The chances are that one or more of the incineration projects that are currently under consideration will be implemented.

¹ This information is based on the recognised LCA methodology assessment carried out in 2007 as part of the preparation for the National Waste Management Plan.

2. Lessons learnt

The closing of old landfills has been quick and efficient, especially after the transposition of the Landfill Directive. The understanding on the part of authorities at municipal and county level of the importance of the problem and the ensuing benefits gave additional impetus to the process. County-level environmental authorities were responsible for issuing the environmental permits for the closure of waste sites. There was also significant financial support from the Environmental Investment Centre, which channelled missing funds.

The processes of closing old landfills and increasing gate fees for new landfills and for remaining old landfills should go hand in hand with providing collection and transportation services to all households in rural areas. If the latter process lags behind, households might resort to home incineration, with the accompanying negative environmental impacts, and to the illegal dumping of waste.

Local authorities need to be provided with a guaranteed source of regular funding for separate collection and recovery operations. At the same time, this source of funding should not serve as a disincentive for the municipalities to divert waste from landfills, as is sometimes the case in Estonia.

It is much faster and easier to ensure the uptake of schemes for reuse and recycling that have a tradition in society. This has been the case with the deposit scheme in Estonia. The return rate of bottles with a deposit has risen significantly because of old habits and the financial incentive built into the scheme. On the other hand, it is very hard quickly and efficiently to introduce separate collection of kitchen waste because the population is not used to it. It would take the investment of time and money in public awareness campaigns to develop and reach optimal levels of kitchen waste collection in households.

3. Understanding the overall strategy for the diversion of waste from landfills

3.1. Objectives set for municipal waste, BMW, tyres and construction and demolition waste

The overall priorities for the improvement of waste management in Estonia were laid down in the **National Environmental Strategy (NES)**, adopted in 1995:

- prevention of waste generation;
- reduction of generated waste volumes and reduction of their hazardousness;
- increase in quantities of recycled waste.

It set two benchmarks regarding municipal waste:

- 1) to increase the share of waste recycling to 50% of all municipal waste;
- 2) to stabilise municipal waste generation at 250–300 kg per person between 2000 and 2010, which was a very ambitious goal.²

The Estonian National Waste Management Plan (NWMP) 2003–2007 was adopted in 2002 when the process of Estonian approximation to the EU was at an advanced stage. Therefore, the main role of the NWMP was to work in the direction of full transposition of EU waste legislation. It sets goals and targets for different waste streams; reviews possibilities for waste handling and measures to achieve the goals; defines the organisation and institutions of waste management; and details the costs of waste handling and the necessary investments.

The Ministry of Environment is responsible for the development and implementation of the NWMP as well as of all other waste management policies.

The NWMP established priorities in line with the NES: the prevention of generation; and the extension of waste recovery, direct reuse, material recycling, composting, and energy recovery. The NWMP highlighted several issues in Estonian waste management that require more attention:

- the implementation of source separation of municipal waste;
- the organisation of collection and recovery of types of industrial and municipal waste, the further handling of which is not profitable.

As of the end of April 2007, the new National Waste Management Plan for 2008–2013 is being drafted. It will substantially amend the existing NWMP and will also contain information about fulfilling the targets in the current plan.

A 2003 European Commission report on Chapter 22 of the accession negotiations between Estonia and the European Commission emphasised that full implementation of the End-of-Life Vehicles Directive (2000/53) and the Packaging Directive (94/62) was still not achieved and should be achieved at the latest by the time of accession in May 2004. The renewed Waste Act (2004), the Packaging Act (2004) and three new regulations were adopted in order to respond to this and reach full implementation of these two directives.³ It can also be said that the adoption of the majority of waste policies in Estonia has been driven mainly by the process of harmonisation of Estonian legislation with the EU.

² National Environmental Strategy, 1995

³ National Waste Management Plan 2003–2008

The Estonian Waste Act entered into force on May 1, 2004. It states that ‘in any activity all appropriate measures should be applied to avoid waste generation’.

The Waste Act shifts responsibility for the prevention of waste generation and for the collection of generated waste to the producers (as defined in EU legislation). They are obliged to do so by:

- promoting the integration of secondary raw materials in products;
- incorporating waste recovery in planning for and designing new products;
- providing information to waste handlers concerning the materials and components used.⁴

Motor vehicles and parts thereof are singled out as one of the several ‘products of concern’.

The Waste Act stipulates that waste reuse is preferable to waste recovery.

The Waste Act also introduces several measures significantly influencing the diversion of waste from landfills:

- a ban on the landfilling of untreated waste (including mixed municipal waste);
- a ban on the landfilling of whole used tyres.

Important amendments to the Waste Act were made in March 2007. The position of tyres as ‘products of concern’ was made stronger and more concrete. Consequently, obligations arise for tyre dealers to ensure their collection and recovery. The landfilling of shredded tyres has been prohibited. The new amendment also regulates the establishment of a state register of ‘products of concern’ including ELVs and tyres. This register — the PROTO⁵ — has been founded by the Estonian Environment Information Centre⁶.

3.1.1. Municipal waste

The proportion of municipal waste out of the overall waste generated in Estonia is approximately 4% (2.8% in 2006)⁷. In the period between 2002 and 2005, around 400–420 kg of municipal waste was generated per capita⁸, which was significantly higher than the set targets.

⁴ Waste Act (2004)

⁵ PROTO: the National Register of Products of Concern maintains records on the recovery and disposal of products of concern and waste arising from products of concern produced in, imported to and exported from Estonia, placed on the Estonian market. All producers who manufacture, import or resell products of concern must be included on the PROTO. The register contains information on products of concern as well as on waste that has been recovered and disposed of in Estonia and exported from Estonia.

The purpose of the PROTO is to record information relating to the reaching of targets for waste recovery provided in Estonian legislation and to submit waste-related information (the data in the PROTO) to the European Commission. Only Estonian companies can register in the PROTO and submit data directly. Foreign companies join one of the producer responsibility organisations or find another solution.

⁶ (<http://proto.envir.ee>)

⁷ Because of the huge amount of oil-shale ash produced.

⁸ Estonian Environmental Review 2005

The NWMP for 2003–2007 sets objectives and targets for municipal waste. The main objectives in managing municipal waste are:

- the stabilisation of municipal waste generation per person by 2005–2006;
- an increase in the recovery of municipal waste with the aim of recovering 30–40% of waste;
- stronger stimulation of waste separation in industry, the services sector and enterprises in order to reduce the amount of municipal waste deposited in landfills;
- wider promotion and provision of guidance in sorting municipal waste in households;
- the provision of all generators of municipal waste with municipal waste handling services, except in places where the establishment of the relevant network is not cost-efficient.

3.1.2. Biodegradable municipal waste (BMW)

The NWMP sets out the percentage of BMW out of the total amount by weight of municipal waste deposited in landfills. These benchmarks were also included in the Waste Act (2004). This approach is different from that of the Landfill Directive, where targets are set in relation to the waste produced in 1995. The national targets are designed to guarantee the implementation of the Directive, establishing, via the Waste Act, that the proportion of biodegradable waste out of the total amount by weight of municipal waste deposited in landfills must be reduced to:

- 45% by July 16, 2010
- 30% by July 16, 2013
- 20% by July 16, 2020.

Estonia has set the target dates four years later than those prescribed in the Waste Landfill Directive, taking advantage of the provision granted to countries that disposed of more than 80% of their municipal solid waste in landfills in 1995. However, the targets are stricter than those in the Landfill Directive and would remain realistic only if the incineration of municipal waste is implemented in the coming years. As they concern principally municipal waste, industry had no serious concerns. Consultations have taken place, during which the projects of the National Waste Management Plan and the Waste Act were discussed in public.

Table 3.1. Targets for the generation and disposal of municipal waste and BMW

Year	Municipal waste generation 1 000 tonnes	Landfilled municipal waste 1 000 tonnes	Landfilled biodegradable waste 1 000 tonnes	Amount of recovered BMW 1 000 tonnes
2010	500	250	110	225–250
2013	500	225	65	270–290
2020	500	200	40	290–320

Source: NWMP, with later amendments.

The NWMP stipulates that an increase in the recovery of packaging plays an important role in reducing the amount of BMW deposited in landfills.

3.1.3. Tyres

The National Waste Management Plan planned to ban the landfilling of used tyres from July 2006. It also acknowledged the need to create conditions, non-existent in 2002, for the handling of used tyres. The plan provided for incineration, or for recovery through material recycling or oil production as methods for the handling of used tyres.

The landfilling of whole tyres was banned by the Waste Act in 2004. The amendments to the Waste Act in March 2007 also banned the landfilling of shredded tyres. The objective is the full recovery of waste from collected tyres. The types of recovery operation are

guided by the common waste hierarchy rules but there are no legal preferences for a particular recovery operation. The amendments also included tyres in the list of 'products of concern' and established producer responsibility.

3.1.4. Construction and demolition waste

For the time being there are no special targets for construction and demolition (C&D) waste. In 2006, the recovery rate for C&D waste was reported to be around 70%, which is already very high due mainly to an increase in gate fees at municipal landfills. The setting of goals for this waste flow was discussed during the preparation of the new NWMP. It was concluded that a special study is needed to evaluate in greater detail all the possible applications reported as recovery and, based on these conclusions, possible targets could be set later. The main principles and policy for dealing with C&D waste will also be established with the NWMP 2008–2013.

The aim is to reduce the generation of construction waste, increase the recovery of waste generated, avoid the mixing of hazardous waste with inert waste, and increase the use of recoverable materials. Preconditions for reduction and recovery lie in the planning and designing of new buildings. Waste generation can be prevented and reduced in construction and demolition works by rational work organisation. New planning rules and construction practices are being developed.

The NWMP sets out the following aims (partly already achieved) concerning the recovery of waste by demolition enterprises:

- materials with a substantial market value should be separated from other waste, where practicable;
- materials that would result in demolition waste belonging to the category of hazardous waste should be separated;
- materials that cause problems and deterioration of quality in the further processing and use of demolition waste should be separated.

Economic aspects play the most important role in achieving these aims, that is, the cost of recovered materials etc.

3.2. The package of measures for diverting the waste streams presented above

3.2.1. Municipal waste

Table 3.2. Instruments for diverting municipal waste from landfills

Instrument	Legal Act	Description	Purpose	Introduced
User charge for municipal waste	Law on Obligations	The amount charged is established by the municipality. It is paid by the waste generator to the collection and transportation company. The charge includes all waste management costs, disposal costs (paid by the companies to waste landfill operators) and waste pollution charges (including the pollution charge for municipal waste disposal below). The charge increases with inflation. The municipalities can adjust for inflation when establishing the amounts charged or making corrections. In practice, it was mostly about paying service invoices to service providers.	To cover costs and profits of collection and transportation companies.	1991
Pollution charge for municipal waste disposal (sometimes referred to as landfill tax)	Environment Protection Act (1990); Pollution Damage Compensation Act (1994); Pollution Charge Act (1999); Environmental Charge Act (2006)	The charge is paid by landfill operators: 75% goes to the local budget of the waste generating municipality and 25% to the state budget. The rate (in EUR) is fixed in advance: 1999 – 0.10 2000 – 0.12 2001 – 0.15 2002 – 0.18 2003 – 0.21 2004 – 0.26 2005 – 1.92 2006 – 7.8 The rate is double for landfills not in compliance with the Waste Landfill Directive.	Promote waste recovery and other treatment options. Provide funds to municipalities and funds for financing waste management projects via Environmental Investment Centre.	1990
Ban on the landfilling of unsorted municipal waste*	Waste Act (2004)	Mixed municipal waste should be sorted before being landfilled; if necessary, waste collected separately should be sorted afterwards; recoverable waste should be separated if technically possible.	Allow recovery of municipal waste to the highest possible extent. Achieve proper composition of waste in landfills.	2004**

Note*: According to Estonian regulation, sorted waste is waste from areas where municipalities have implemented the separate collection of concrete fractions — paper and cardboard, garden waste, packaging as well as municipal waste after special sorting factories or lines where these fractions are removed from mixed waste.

Note **: Until January 1, 2008 this only applies to landfills located in a county with an established facility for treating municipal waste: these are landfills in Harju county (Tallinn area), home to about one-third of the Estonian population, where there is a sorting facility in operation.

The current NWMP provided for important accompanying measures:

- the involvement of all waste generators in servicing networks;
- the expansion and development of systems for receiving waste for reuse and recovery;
- the development of a network of waste collection points; the installation of containers for recoverable waste and hazardous waste at collection points.

In larger cities the NWMP envisaged the following measures:

- the establishment of collection points for recoverable materials — paper, cardboard, plastics, glass, etc.;
- the collection of garden waste (also by greenery management companies) and its composting, together with the organisation of compost use;
- stage I — source separation of waste into biodegradable waste and other waste;
- stage II — further development of waste handling in waste transfer centres and/or landfills.

Waste management in rural areas:

- the maximisation of source separation of biodegradable waste and composting in gardens;
- the setting up of containers in suitable places in areas of low population density.

Box 3.1. Measures for source separation of BMW

Through local government waste management rules, some municipalities (i.e. Tallinn) have made the source separation of BMW obligatory for bigger apartment blocks (with 10 apartments or more) and companies generating BMW over given limits (25 kg/week for non-residential houses or sites). However, implementation is not very rapid at present because the scheme has been launched only recently and there is no tradition of separating BMW at source. Some towns have 'waste stations' where people can deliver their garden waste. In rural areas, home composting is developed, but unfortunately systems for the separate collection of garden waste are not. In Tallinn, the measure was introduced in 2007.

3.2.2. Action Plan for the management of BMW until 2013

The Action Plan concentrates on actions and recommendations for counties and local municipalities for the treatment of BMW. The Action Plan proposes several flexible solutions for the treatment of biodegradable waste, from which each county and municipality has to select the appropriate and optimal options.

The Action Plan proposes the following steps for the implementation of the biodegradable waste management system. They include promotion and support to:

- inhabitants to treat BMW by themselves if possible (i.e. home composting);
- wastewater treatment companies to treat BMW by themselves if possible;
- companies to separate BMW streams from other municipal and industrial wastes;
- companies to treat BMW by themselves if possible;
- inhabitants to collect BMW separately from other municipal and industrial wastes.

The BMW Action Plan focuses mostly on biological treatment. As incineration is becoming more and more important there might be a need for a revision of the Action Plan in the near future. When the new NWMP (containing incineration options) is approved and concrete projects (with EIA and relevant permits) for incineration facilities are available, there will be a basis for revision. This will probably happen in the period 2008 to 2009. Incineration is not widely discussed in public (apart from the public hearing procedures within the EIA studies) as the real incineration projects are quite new and there has not been a concrete reason for wide discussion. However, since one of the main outcomes of incineration would be energy production from waste and the replacement of electricity production from oil shale or imported gas, public opinion is expected to be quite positive⁹.

3.2.3. Tyres

Table 3.3. Instruments for the diversion of tyres from landfills and for the management of waste from tyres

Instrument	Legal Act	Description	Purpose	Introduced
Ban on the landfilling of whole tyres	Waste Act (2004)	No used tyres can be landfilled, except bicycle tyres.	Achieve full recovery of used tyres.	May 1, 2004
Ban of the landfilling of shredded tyres	Waste Act (2004)	No shredded tyres can be landfilled.	Achieve full recovery of used tyres.	July 16, 2006
Adding tyres to the list of 'products of concern'	Amendments to the Waste Act (2007)	This list exists in the Waste Act and allows a stricter approach to the products on the list.	Draw attention to this type of waste. Introduce producer responsibility obligation.	March 11, 2007
Producer responsibility*	Amendments to the Waste Act (2007)	Establish the obligation on persons putting motor vehicles and trailers on the market to keep records of the number and weight of tyres and to ensure their collection and recovery. The collection points established by producers (importers) of ELV and tyres must be situated max. 50 km from the place of residence.	Create a system for the collection and recovery of tyres as an alternative to landfilling.	March 2007
Tyres are added to the register of products of concern.	Amendments to the Waste Act (2007)	Data is gathered for products manufactured in, imported into and exported from Estonia. Producers must themselves manage the treatment of tyres and report to the register of 'products of concern' (PROTO). ¹⁰	Keep better track of the treatment of tyres.	2007

* See below for a more detailed description of the Estonian Tyre Association.

In 2000, a total of 680 tonnes of used tyres were collected in enterprises based in Estonia. According to a study ordered by the Ministry of Environment, the actual amount of used tyres generated annually was approximately 15 000 tonnes. Used tyres accumulated or deposited on company premises or elsewhere during the last 16 years should be added to this amount. There is no precise data for the total number of these tyres.

⁹ Interview with Harri Moora, Stockholm Environmental Institute.

¹⁰ <http://proto.envir.ee/>

The incineration of used tyres has been tested in the kilns of Kunda Nordic Cement AS and in the oil shale pyrolysis facilities in Kohtla-Järve and Narva. Before the ban on the landfilling of tyres, the majority of tyres were landfilled and very small quantities were incinerated in local boiler houses or incineration facilities. Companies have shown interest in making fuel oil from tyres together with oil shale. The economic aspects must be estimated together with the reconstruction of existing facilities in the form of co-incineration facilities that fulfil environmental norms.

Estonian Tyre Association ¹¹

The Estonian Tyre Association (ETA) is a non-profit organisation and the oldest manufacturers' liability watchdog in the country. It organises the collection and recycling of old tyres. Its members are Estonia's largest producers and importers of tyres. The existence of the ETA is made possible by the producer responsibility clause in the Waste Act obliging manufacturers to ensure the collection and recycling of the waste produced by products it has manufactured, sold or imported.

In reality, implementing this principle has generally meant that producers or importers add a recycling fee to the price of a new tyre, with the money collected in this way forwarded to the manufacturer's liability organisation. This organisation then arranges for the collection and recycling of the tyres, outsourcing services from the waste management sector. Tyre recycling has been obligatory since January 1, 2006 and a recycling fee has been paid to ETA since then.

The Estonian Tyre Association issues invoices to importers based on the declared number of tyres multiplied by the recycling fee.¹²

3.2.4. Construction and demolition waste

The NWMP states that 'emphasis must be placed on the aim of gaining control over the generation of construction waste, especially in small building and renovation companies, because part of their waste often ends up in ordinary trash containers.' The general arrangement for the handling of construction waste is established by the waste handling rules of local municipalities.

¹¹ Rehviliiit in Estonian (<http://rehviliiit.ee/web/eng/>)

¹² Fees: 1st and 2nd class: 800 EEK/tonne or 51.3 EUR/tonne.

3.3. Stages of implementation

Table 3.4.

1989/1990	Basic act on the protection of the environment. Introduction of environmental pollution charges on waste.
1992	First Estonian Waste Act introducing, inter alia, the principles of waste management planning.
1995	Adoption of the Estonian National Environmental Strategy, setting the priorities for improvements in waste management: - prevention of waste generation; - reduction of waste generation; - increase in quantities of recycled waste. It sets the following benchmarks regarding municipal waste: to increase the share of waste recycling to 50%; to stabilise municipal waste generation at 250–300 kg per person.
1998	Second Estonian Waste Act, considering and transposing EU legislation introducing waste management planning on three levels (municipal, county and national). Renewal of lower-level waste legislation (regulations of the government and the minister of environment).
2002	National Waste Management Plan 2003–2007: - strategic document to achieve systematic strategy for WM at national level; - aims to harmonise national WMP with EU strategy and transpose and implement EU waste handling principles.
2004	Waste Act entered into force on May 1, 2004: - prohibits landfilling of untreated waste; - sets targets for the percentage of BMW in the total amount by weight of municipal waste deposited in landfills: 45% by July 16, 2010; 30% by July 16, 2013; 20% by July 16, 2020.
2005	National Action Plan for the treatment of biodegradable municipal waste until 2013
2007	Amendment to the Waste Act, February 2007: - ban on landfilling of tyres; - tyres classed as a 'product of concern'; - obligation on persons putting motor vehicles and trailers on the market to keep records of the number and weight of tyres and to ensure the collection and recovery of tyres.
2007	Regulation of the minister of environment on procedures for the sorting of municipal waste and bases of classification of sorted waste.
2007	New National Waste Management Plan is being prepared for 2008–2013. The main goals of the NWMP include: - closing or conditioning of landfills for waste from oil-shale industry and energy sectors, reducing of hazardousness of oil-shale waste; - closing or conditioning of all landfills for non-hazardous waste not corresponding to the requirements of Directive 1999/31/EC, completing the network of waste disposal facilities; - measures for the implementation of waste management hierarchy principles established by EU strategic documents, primarily promoting waste prevention and recycling; - establishing and developing a network for the collection and treatment of packaging waste, hazardous waste and waste from 'products of concern'.

4. Understanding the associated package of measures

4.1. Relationships with a package of other policy interventions

4.1.1. Packaging

In 2003, the report from the European Commission on the harmonisation of Estonian legislation with the EU stated that the Packaging Directive is not fully transposed and implemented. A Packaging Act was adopted in 2004 establishing several policy instruments:

- **Guarantee of collection and recovery.** Packaging companies, except persons who sell packaged goods, should guarantee the collection and recovery of the packaging of goods packaged or imported by them, as well as the packaging waste resulting from them, to the extent given by the target recovery indicators. Those obligations are transferred to the recovery organisation. The instrument has been in place since 2004.
- **Obligation to accept packaging material (take-back system).** Packaging companies are required to accept, from the final user or consumer, sales packaging and packaging waste, or to arrange for such service based on a contract at another place of sale in the close proximity of the undertakings. The purpose of the measure is to minimise the landfilling of packaging waste and to optimise reuse. The instrument has been in place since 2004.
- **Implementation of deposit system.** Deposits are established for glass, plastic and metal packaging (of beer and some other alcoholic and soft drinks). The costs related to taking back packaging and the arrangements made for such purposes are not to be included in the deposit.
- **Excise duty on packaging.** This was introduced with the renewed Packaging Excise Duty Act (2005) (the first Packaging Excise Duty Act for some packaging categories was adopted in 1997). Excise duty on packaging is imposed on packaging filled in Estonia or acquired in another member state of the EU or imported into Estonia. In the case of imports it is paid by the importer, and in the case of domestic production it is paid by the end user. The purpose is to stimulate a reduction in packaging. The extended instrument has been in force since May 1, 2004.
- **Exemption from excise duty.** This was also introduced with the Packaging Excise Duty Act. Since January 1, 2007, excise duty has not been imposed on deposit packaging of which not less than 65% is recovered (70% from January 1, 2008; and 75% from January 1, 2009 respectively). An exemption is also in force for metallic packaging for drinks of which not less than 40% is recovered and for other sales packaging of which not less than 15% is recovered. The purpose is to stimulate the recovery of packaging waste.

There are three **producer responsibility organisations** in Estonia:

- The first is the **Estonian Recovery Organisation (ETO)**, a member of ProEurope and the only organisation which has the right to use the Green Dot sign in Estonia.¹³
- **Eesti Pandipakend LLC (EPP)** is a recovery organisation established for the purposes of organising the recovery of packaging subject to the payment of a deposit.¹⁴

13 <http://www.eto.ee/?setlang=eng>

14 <http://www.eestipandipakend.ee/eng/epp>

- **Estonian PackCycling (EPC)**¹⁵ is responsible for collecting and recovering its clients' packaging waste and to guarantee reporting for the Packaging Register.

These producer responsibility organisations finance their activities by charging a recovery fee. Fees are calculated on the basis of the material used by the weight of items sold. The fees also take into account the different costs incurred in collecting and sorting the packaging materials and, in the case of plastics, in recycling. The companies pay only for those items of packaging they put onto the Estonian market. The purpose is to help packaging operators to fulfil the Packaging Act in an economically reasonable, socially acceptable and environmentally effective way by taking over their obligations.

4.1.2. Incineration Directive

The Incineration Directive is transposed into Estonian legislation through the Waste Act (2004) and through the Regulation of the Minister of Environment of June 4, 2004, No 66. The text of the regulation is similar to the text of the directive. The Waste Act makes a distinction between an incineration plant and a co-incineration plant similar to Art.3(4) and Art.3(5) of the Incineration Directive. Co-incineration plants are usually technological facilities (such as cement plants etc.)

4.1.3. End-of-Life Vehicles

The End-of-Life Vehicles Directive (2000/53) has been transposed into Estonian legislation by the Waste Act (2004), Regulation No. 352 'Requirements, Procedure and Targets and Implementation Deadlines for Collection, Return to Producer, Recovery or Disposal of Motor Vehicles and Parts Thereof' (2004) and Regulation No. 89 'Requirements for Treatment of End-of-Life Vehicles' (2004).

A producer responsibility system has been introduced: producers are obliged to organise the collection and return of ELVs. This should take place not more than 50 km from the place of residence. Producer responsibility entered into force on January 1, 2006.

As of 2007, there were 27 authorised companies dealing with ELV treatment (possessing the relevant hazardous waste handling licence), with a treatment capacity of about 15 000 tonnes per year, and two companies dealing mainly with metals from ELV dismantling. The companies are members of the Estonian Association of Automotive Recycling Companies.¹⁶

At present there are no producer responsibility organisations of ELV importers, which is a problem. A common system for the financing of ELV treatment is being developed. It is actually an obligation on producers and the development of the system depends on organisation and cooperation among producers.

4.2. Objectives

¹⁵ <http://www.pakendiringlus.ee/eng/>

¹⁶ <http://www.elv.ee/next.php?lang=3>

4.2.1. Packaging

The Packaging Act (2004) sets targets for the recovery and recycling of packaging waste in accordance with the Packaging Directive.

Since May 1, 2004, companies involved in packaging must guarantee the recovery of packaging waste to the following extent:

- at least 50 % annually of the total mass of packaging waste;
- by way of recycling, at least 25 % annually of the total mass of packaging waste and at least 15 % annually of the total mass of each type of packaging material.

From December 31, 2010, companies involved in packaging must guarantee the recovery of packaging waste to the following extent:

- at least 60 % annually of the total mass of packaging waste;
- by way of recycling, at least 45 % annually of the total mass of packaging waste and at least 15 % annually of the total mass of each type of packaging material.

4.2.2. Incineration objectives

There are no specific objectives for incineration. For some categories of waste, such as packaging, WEEE and ELV, the limits for recovery by means of incineration can be derived from respective legislation taking into account the differences between targets for total recovery and recycling. Some 1 090 tonnes of packaging were incinerated in 2005 and practically no WEEE and ELV.

4.2.3. End-of-Life Vehicles

The targets in Estonian legislation are the same as the targets set in the EU ELV Directive:

- by no later than January 1, 2006, for all end-of-life vehicles, reuse and recovery shall be increased to a minimum of 85%. By the same deadline, reuse and recycling shall be increased to a minimum of 80%;
- by no later than January 1, 2015, for all end-of-life vehicles, reuse and recovery shall be increased to a minimum of 95%.. By the same deadline, reuse and recycling shall be increased to a minimum of 85%.

4.3. Stages of implementation

2000	Management Plan for Packaging and Packaging Waste
2000	Establishment of packaging waste collection
2001	Adoption of Regulation No. 34 on 'Requirements for the establishment, operation and closure of landfills', transposing the main part of EC Directive 1999/31
2002	Launching of a separated waste collection system in Tallinn (through local waste management rules). The organisation of separated waste collection is the obligation of local authorities and the launching of the system differs from municipality to municipality.
2003	The report of the European Commission on Chapter 22 pointed at the incomplete transposition of the End-of-Life Vehicles Directive (2000/53) and the Packaging Directive (1994/62).
2004	Adoption of the new version of the Waste Act: <ul style="list-style-type: none"> - defines landfills as in the Waste Landfill Directive; - prohibits landfilling of untreated waste; - distinguishes between incineration and co-incineration plants;
2004	Adoption of the new version of the Packaging Act: (<i>first version 1994</i>) <ul style="list-style-type: none"> - encourages prevention, reduction and recovery; - obligation to accept back packaging; - implementation of deposit system; - sets targets: 50% annually of total weight of packaging waste must be recovered and 25% of all packaging waste must be recycled, with a minimum of 15% for each packaging material.
2004	Regulation No. 352 'Requirements, Procedure and Targets and Implementation Deadlines for Collection, Return to Producer, Recovery or Disposal of Motor Vehicles and Parts Thereof'
2004	Regulation No. 89 'Requirements for Treatment of End-of-Life Vehicles'
2004	Regulation of MoE No.38 on Landfill (new version) Transposes, together with the Waste Act, the main substantial provisions of the Landfill Directive.
2004	Regulation of MoE No.66 on Incineration Transposes, together with the Waste Act, the main substantial provisions of the Waste Incineration Directive.
2005	Amended Packaging Excise Duty Act (1997): <ul style="list-style-type: none"> - imposes excise duty on imported packaging; - provides exemptions from the payment of excise duty to stimulate the recovery of packaging waste.

5. Factors influencing the effectiveness of a policy of waste diversion from landfill

In this section we present a reference indicator related to the Landfill Directive target on BMW, and a number of factors related to landfills and the incineration and recycling of waste. This information serves as input to the proposed methodology presented in Mazzanti and Zoboli (2007), which will also be used in the comparative analysis of the five countries and one region in the study. The information is summarised in tables 5.2 to 5.4.

The key idea of the proposed procedure is that the *causal relationship* between *specific* landfill policy *changes* and the *changes* of an indicator representing waste diversion from landfills is ‘*controlled*’ by other hindering/favouring factors *at the time of policy implementation*. This reflects a system-wide approach, and it should help us to identify the *specific role of policy change* in the framework of *co-causation* arising from the many factors at work in the waste system. The proposed methodology is a mixed quantitative/qualitative one, and it should be able to exploit the information on policy changes and other ‘explaining factors’ in a coherent model-like approach.

The time of policy implementation is the year in which the Landfill Directive was transposed and in the study it is used to assess the trends before and after policy implementation. In Estonia, the Landfill Directive was transposed in 2001 and 2004.

5.1. Development in reference indicator

Table 5.1. Diversion indicator change: landfilled BMW in year X/BMW generated in 1995

Years	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Diversion Indicator	100	108	115	110	114	123	83*	86	76	79	77

Note*: In 2001 there is a drop in generation, which is probably due to an improvement in reporting methods and the elimination of overlapping

Estonia fits into configuration 3 from table 1 of the methodological paper: “there was no diversion before the implementation of one part of the Landfill Directive (2001) and diversion started immediately after that”.¹⁷ This configuration will later interact with the combination of favouring and hindering factors in order to help formulate a judgement about the effectiveness of the policies related to the Landfill Directive. An ‘*effectiveness judgment prevails for most combinations*’. The reason is that, despite the past trend of diversion not being positive, after policy change it became positive, and the probability that policy change itself had a role is relatively high even with different combinations of hindering/favouring factors.¹⁸

¹⁷ M. Mazzanti and R. Zoboli, ‘Landfill Policy Effectiveness: How to Apply the Methodology in Country Studies.’

¹⁸ Ibid.

5.2. Factors influencing the effectiveness of a policy for municipal BMW diversion from landfill

Table 5.2. Factors influencing effectiveness of a policy for municipal BMW diversion from landfill

Favouring/hindering factors	Influence on diversion	Justification of the +/- sign	Indicator	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Factors related to BMW landfill policy															
Landfill Directive 1999/31/EC transposed	+	Legal framework in place: became a favouring factor in 2001 and even more so in 2004 after full transposition	Dummy (1/0)	0	0	0	0	0	0	1	1	1	1	1	1
Landfill tariffs/gate fees for BMW or MSW (excl. VAT and landfill tax)	+	Relatively high cost of landfill especially after 2003. Planned increase. Even higher in 2007.	Average for country, or the highest gate fee and the lowest gate fee for new landfills, EUR/tonne							11 (old landfill)			27.5 (new landfill)	32 EUR/t - highest 19 EUR/t - lowest	46.7 EUR/t - highest; 30.4 EUR/t - lowest
Landfill tax on BMW (or MSW)	+	Relatively high cost of landfill. Allows for the introduction of some alternative treatment options.	Average for country, or the highest and the lowest tax, EUR/tonne					0.10 EUR/t	0.12 EUR/t	0.15 EUR/t	0.18 EUR/t	0.21 EUR/t	0.26 EUR/t	1.92 EUR/t	7.8
Prohibition on untreated waste in landfills	+	Discourages landfill	Dummy (1/0)	0	0	0	0	0	0	0	0	0	1	1	1
Selective ban on BMW	+	Quantity limitation by law	Dummy (1/0)	0	0	0	0	0	0	0	0	0	1	1	1
Factors related to waste production and collection															
BMW generation per capita	-	High production requires many management options	BMW generation per capita in tonnes	320 0.222	344 0.243	367 0.262	350 0.252	364 0.264	411 0.300	330 0.242	359 0.264	369 0.273	374 0.277	361 0.268	

Favouring/hindering factors	Influence on diversion	Justification of the +/- sign	Indicator	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Separate collection for BMW: split into the following fractions (if possible): · paper and cardboard (incl. newspapers etc.) · kitchen, garden and wood waste · BMW in residual waste	+	Basic requirement for recycling	Share of generated BMW collected separately (%)	0	0	0	0	0	0	0	0	0	0	0	0
									19	19	19	19	19	19	19
									43	43	43	43	43	43	43
									3	3	3	3	3	3	3
'Full cost' collection tariffs/charges (excl. VAT and taxes)	+	Higher capacity to invest in separated collection and recovery/recycling	Share of municipal waste management cost covered by tariffs (%)	100% - Almost all municipal waste is collected and transported by private waste management companies acting on behalf of municipalities. Landfills are owned by the municipalities or public-private companies and usually operated by private firms (85% of municipal waste is disposed of in such landfills). Payments between waste generators or their associations (e.g. in apartment blocks) are regulated on a contractual basis with waste collectors and depend mostly on the amount of waste collected, including landfill disposal costs. There are no common municipal waste taxes for municipal waste management in Estonia. In principle, local authorities do not collect money and do not have regular financial sources to cover municipal waste management costs. Exemptions are the financing of the collection of hazardous municipal waste fraction, the partial financing of some separated collection systems etc.											
Factors related to landfill sector															
Share of landfilled MSW (Eurostat Structural Indicator)	+	Pressure on capacity	Landfilled MSW over MSW generation (%)	100	100	100	100	100	95	84	80	69	67	66	
Landfill residual capacity (non-hazardous waste)	-	Discourages diversion	Landfill residual capacity (non-hazardous waste) (% of MSW generated)	It is very difficult to define and estimate 'landfill residual capacity' in Estonia due to the very dynamic situation concerning the closing of old landfills and the building of new ones. Some landfills had relatively large residual capacities in 2001, but have been closed with most of the non-hazardous waste landfills in Estonia. At the beginning of 2006 there were only 22 landfills for non-hazardous waste in use, four of them according to the requirements of the Landfill Directive (at present there are five 'new' landfills). In 2009 there will be only five or six regional landfills for municipal waste and in 2013 a maximum of seven. It is possible to come up with a figure for the residual capacity of new landfills in 2009.											
Land per capita	-	Land available makes it a non-scarce resource	Land per capita in sq.m.	31000											

Favouring/hindering factors	Influence on diversion	Justification of the +/- sign	Indicator	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Factors related to incineration sector															
Share of MSW incinerated (Eurostat Structural Indicator)	-	Low incineration rate: makes diversion more difficult	Incinerated MSW over MSW generation (%)	0	0	0	0	0	0	0	0	0	0	0	0
Dedicated incineration capacity for MSW (available)	+	Makes diversion easier	Incineration capacity available (as % of MSW generated)	0	0	0	0	0	0	0	0	0	0	0	0
Incineration gate fees for MSW (excl. VAT and incineration tax)	-	High fee, low incentive to divert	Average for country, or the highest gate fee and the lowest gate fee (EUR/tonne)	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
National policies on RES	+	Targets for RES policies stimulate energy from MSW	Distance-to-target for E-RES on domestic electricity consumption (%)										4.1%	3.9%	
Factors related to material recycling and recovery sector															
Packaging and packaging waste policy	+	Stimulates diversion	Recycling rate (recycling over paper packaging placed on the market) (%)						11				33.6	45.1 (41.7% reported to EU)	
MBT capacity	+	Favours diversion	MBT capacity (tonnes/year)	0	0	0	0	0	0	0	0	0	0	0	0
Compost capacity (i.e. input of bio-waste)	+	Favours diversion	Compost capacity (tonnes/year)	In 2001 there were no special capacities for composting BMW. Some amounts of biodegradable fractions (e.g. garden waste) were composted together with other waste, e.g. sewage sludge: 11 100 tonnes. In the following years this amount decreased (1 700 tonnes in 2002; and 900 tonnes in 2003). At present, Tallinn Landfill has special capacities for composting BMW. According to its IPPC permit, it is allowed to treat 29 000 tonnes of biodegradable waste, including 20 000 tonnes of BMW. In the absence of a general collection system only 1 900 tonnes of BMW were composted in 2006. This figure is expected to increase rapidly in the coming years together with the development of the collection system.											

As explained earlier in the text, the legal framework in Estonia related to the Landfill Directive was set up in 2001 and 2004 and has been a favouring factor for the last six years. Landfill gate fees have increased significantly during the last three years and are also perceived as a strong favouring factor. The landfill tax was quite low until 2005 and almost quadrupled in 2006. It is higher than the landfill tax in neighbouring Baltic states Latvia and Lithuania but lower than the landfill tax in most old EU member states. The prohibition on landfilling untreated waste also discourages the use of landfills. However, until January 1, 2008, this applied only to the Tallinn area (home to one-third of the Estonian population), which has the only sorting facility in the country. The separate collection of kitchen waste in Tallinn is not yet a strong favouring factor as the scheme was launched only in the spring of 2007. However, it has the potential to become an important favouring factor in Tallinn and in other regions.

The rate of packaging recycling is increasing due to the availability of packaging policies and it is perceived as one of the strongest favouring factors for the diversion of municipal solid waste from landfills. The availability of free compost capacity would also make it easier in the future to divert BMW from landfills. In the case of several regional composting facilities (supported financially by the state), municipalities have not been very active in introducing separated collection schemes, so those facilities still have unused capacity.

The strongest pressure in the system comes from increasing BMW generation per capita, which requires many management options. At the same time, incineration — one of the important options — is not available, and this represents a hindering factor.

5.3. Policy change, and favouring/hindering factors as of 2004

Table 5.3. How to weigh/measure policy change, and favouring/hindering factors as of 2004 (The values of the indicator and the critical values are those in the year of directive implementation in the country)

Landfill policy	Indicator	Strong	Weak
Landfill Directive 1999/31/EC transposed *	Dummy (1/0)	1 – part in 2001, part in 2004	
Landfill tariffs/gate fees for BMW Tax is included in gate fee (+VAT).	Average for country, or the highest gate fee and the lowest gate fee, EUR/tonne	27.5 EUR/tonne and increased > 20% 3 years after implementation. In 2007 – 39.5 EUR/tonne	
Landfill tax	Average for country, or the highest and the lowest tax, EUR/tonne		0.26 EUR/tonne in 2004, however 7.5 EUR/tonne in 2007 and can already be qualified as strong
Pre-treatment requirements *	Dummy (1/0)	1 – since 2004	
Selective ban on BMW implemented **	Dummy (1/0)	1 – since 2004	
Summary evaluation		Globally strong: 4 strong out of 5	

Note *: It is assumed that all countries (new and old member states) were to transpose the Landfill Directive two years after its adoption (i.e. in 2001). If this is not the case, then the critical value is two years after the directive was supposed to be implemented.

Note **: It is assumed that all countries (new and old member states) were to transpose the Landfill Directive two years after its adoption (i.e. in 2001). If this is not the case, then the critical value is four years after the directive was supposed to be implemented.

Favouring factors (+ sign)				Hindering factors (- sign)				
	Indicator	Strong if	Weak if		Indicator	Strong if	Weak if	
Related to waste production and collection								
1	Separate collection for BMW	Share of BMW collected separately of generated MSW (%)	>30%	0 (< 30%)	1	BMW generation per capita	BMW generation, per capita tonnes	> EU25 average 0.258 tonnes < EU25 average
2	'Full cost' collection tariffs/ Charges	Share of waste management cost covered by tariffs/charges (%)	100% (> 90%)	<90%				
Related to landfill sector								
3	Landfilled MSW out of MSW generation	Landfill share in MSW waste generation (%)	66 (>EU25 average)	< EU25 average See table below	2	Landfill residual capacity (non-hazardous waste)	Landfill capacity (non-hazardous), as % of MSW generated	NA (Higher than 5 years of generation (in implementation year)) Lower than 5 years of generation (in implementation year)
					3	Land availability	Land per capita in m ²	31 000 m² >5000 <5000

Favouring factors (+ sign)				Hindering factors (- sign)					
	Indicator	Strong if	Weak if		Indicator	Strong if	Weak if		
Related to incineration sector									
4	Dedicated incineration capacity for MSW (available)	<i>Incineration capacity, as % of MSW generated</i>	If capacity > 20% of generated MSW	0 (capacity < 20% of generated MSW)	4	Incineration gate fees for MSW (NR)	<i>Average for country, or the highest gate fee and the lowest gate fee, EUR/tonne</i>	> 30% increase in gate fees after implementation	< 30% increase in gate fees after implementation
5	National policies on RES	<i>Distance-to-target for E-RES on domestic electricity consumption, %</i>	24% (2005) < 50% of the 2010 target has been met	> 50% of the 2010 target has been met	5	Share of MSW incinerated	<i>Incinerated MSW over MSW generation, %</i>	> EU25 average See table below	0 (< EU25 average)
Related to material recycling and recovery sector									
6	Packaging and packaging waste policy	<i>Recycling rate paper and paperboard, %</i>	Either : > 50% Or : > 5 % p.a.	Either : 45.1 (2005) < 50% Or : < 5 % p.a.					
7	MBT capacity	<i>MBT capacity per capita</i>	Either: 20% of BMW generation Or: > 5 % p.a.	Either : 0 (< 20% of BMW generation Or: > 5 % p.a.)					
8	Compost capacity	<i>Compost production capacity, tonnes/year</i>	Either: 20% of BMW generation Or: > 5 % p.a.	Either : NA (< 20% of BMW generation Or: > 5 % p.a.)					
	Summary evaluation	Globally weak: 5 out of 8 are weak!!!	Globally strong: If at least 5 strong out of 8	Globally weak: If at least 5 weak out of 8	Summary evaluation	Globally weak/strong: 2 out of 4 are weak!!!	Globally strong: If at least 3 strong out of 5	Globally weak: If at least 3 weak out of 5	

It turns out that the favouring factors are generally weak, as in general five out of eight favouring factors are weak. This could potentially change in the near future with the uptake of the separate collection of BMW and the construction of dedicated incineration capacity. The share of recycled paper and paperboard as well as MBT capacity are also changing in the direction of becoming strong favouring factors.

It is difficult to judge if the hindering factors are globally weak or strong as two out of four factors are weak and two are strong. The fifth factor — incineration gate fee — is not relevant as there are no incineration facilities in Estonia. The BMW generation per capita remains below the EU average but the trend is on the increase.

Table 5.4. Policy evaluation for configuration 3 of diversion indicator: ‘There was not a diversion trend before the directive implementation and a diversion trend started after the implementation’

Combination	Landfill policy change	Favouring factors +	Hindering factors -	Summary judgement
6	Strong: The existing policy was far from the directive or was already in line but its change went beyond the directive.	Weak	Weak	Effective: Policy has been active and it was able to exploit a ‘neutral’ combination of favourable and hindering factors.
6	Strong: The existing policy was far from the directive or was already in line but its change went beyond the directive.	Weak	Strong	Effective: An active policy has been able to create a positive trend by contrasting strong hindering factors in presence of weak favouring factors

Note: The policy evaluation methodology is developed by M. Mazzanti and R. Zoboli in ‘Landfill Policy Effectiveness: How to Apply the Methodology in Country Studies’.

Two policy judgements are included as the hindering factors are on the border between being globally weak and globally strong. However, both judgements refer to an active policy.

5.4. Landfill Directive transposed

Estonia has transitional arrangements on the Landfill Directive. Requirements for liquid and corrosive waste will not apply to oil-shale ash until 2009. The Landfill Directive is transposed in Estonian legislation through several laws and regulations: Regulation No.34 ‘On requirements for the establishment, operation and closure of landfills’ (2001) and the Waste Act (2004). Therefore, it can be said that the Landfill Directive has been transposed in two major parts: 2001 and 2004.

In Estonia, new landfills get IPPC permits and they are issued on county level by county environmental authorities who also issue waste permits. Inspection and control powers are exercised at national level. Municipalities also have ‘inspection and control powers’ regarding environmental rules established by local councils. Unless otherwise decided by a local government, environmental supervision is exercised in the same manner as the supervision exercised by state agencies. On their corresponding administrative territories, the bodies exercising supervision have equal rights with state environmental supervision agencies and environmental protection inspectorates. Regional and local authorities have received additional jurisdiction in relation to the implementation of the Landfill Directive allowing for a more multi-stakeholder approach to waste management.

Estonia has adopted measures to meet the technical requirements of the directive, including provisions concerning the design, operation, closure and aftercare of landfills. Estonia has also incorporated in its legislation the obligation on the landfill operator to include all the costs of construction, operation, closure and aftercare in the price charged for accepting waste.¹⁹

In 2004, Estonia reported to the European Commission that it ‘encounters problems with sorting the BMW in households’.²⁰

¹⁹ Report from the Council and the European Parliament on the Implementation of the Community Waste Legislation for the Period 2001–2003, European Commission, July 2006

²⁰ Developing Capacity in Implementation and Enforcement through the AC IMPEL Network. Annex B2: Enforcement Note on the Landfill Directive, European Commission, July 2004

5.5. Factors related to waste generation and collection

5.5.1. Waste Generation

In the period 1995–1999, almost all of municipal waste was landfilled. In 2000 there was a peak in municipal waste generation, which is probably due to the improvement in reporting and calculation methods (eliminating the double counting of waste amounts). The elimination of double counting was one of the reasons for the drop in waste generation figures in 2001 (apart from double counting in generation reports, the old landfills dominant during those years did not have weighing equipment, so waste was calculated/estimated by volume and later, for reporting, recalculated based on assumed density. This led to overestimations, but these are no longer significant as over 90% of landfilled waste is weighed). The old reporting system was last used in 2000, when most of the waste collectors and generators were registered, but double counting still existed. This was also the last year of the transition from the old waste classification to the new. In the following years the weighing of waste in landfills became the usual practice, thus the reliability of figures for the amounts of waste being landfilled is far greater than previously.

In Estonia, there is no separate data for generated biowaste and landfilled biowaste. It is calculated (as in the table below) as a percentage (65%) of municipal waste. The figure is based on an analysis of waste composition from different areas, for example from Tallinn, as the bigger municipal waste producer.

From 2000 onwards there is a tendency to decouple generated municipal waste and landfilled municipal waste. Logically, the same could be said of BMW. There is a steady tendency to reduce the quantities of landfilled municipal waste, which have fallen from 95% in 2000 to around 66% in 2003, 2004 and 2005. This decoupling can be qualified as ‘relative decoupling’ in the sense of the landfill policy effectiveness methodology.²¹

One of the options for treating municipal waste that is not landfilled is the recycling of separately collected fractions. Another option is the recycling of fractions sorted from mixed municipal waste in sorting facilities. The Ministry of Environment and bigger municipalities (such as Tallinn city) very clearly prefer the first option. The second option is supported by some business companies with commercial interest.

Table 5.5. Waste generation and treatment in 1 000 tonnes

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Total waste generation	14 196	14 687	14 398	12 984	10 848	11 616	12 839	14 397	18 397	17 471
Municipal waste generation	533	565	593	557	569	633	509	553	567	575
Landfilled municipal waste	529	564	592	556	569	601 (95%)	403 (79%)	419 (76%)	371 (65%)	383 (67%)
BMW generated**	487* 320	344 (61% of MW)	367 (62% of MW)	350 (63% of MW)	364 (64% of MW)	411 (65% of MW)	330 (65% of MW)	359 (65% of MW)	369 (65% of MW)	374 (65% of MW)
Landfilled BMW**	317	343	366	349	364	391 (95%)	262 (79%)	272 (76%)	241 (65%)	249 (67%)
Used tyres generated								2	2	

Source: Fact sheet for Estonia, ETC website

Note*: The figure is disputed by Estonian experts. According to them, BMW is calculated as 65% of municipal waste (MW). If the calculation is done in this way the figure would be 346 000 tonnes of BMW generated in 1995.

Note**: Data on landfilled BMW and generated BMW have been calculated by the authors.

²¹ M. Mazzanti and R. Zoboli, ‘Landfill Policy Effectiveness: How to Apply the Methodology in Country Studies.’

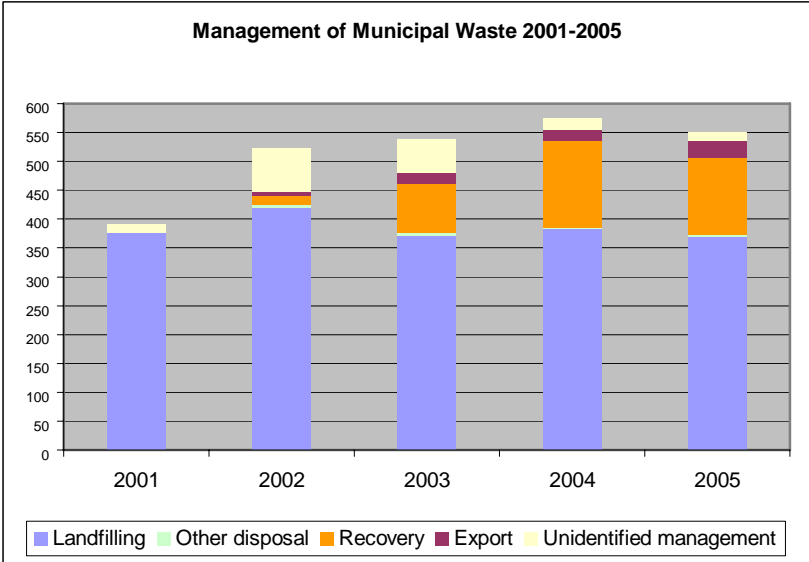
The reduction in the amount of landfilled municipal waste is mainly due to the implementation of the Packaging Act and the Packaging Excise Duty Act promoting the recovery of packaging and packaging waste from alcoholic and non-alcoholic beverages; the extension of the separate collection of waste; and the sorting of municipal waste by fractions in the new Tallinn Waste Sorting Plant²².

Box 5.1. Sorting of municipal waste

According to the waste report of 2003, the Tallinn Waste Sorting Plant sorted 20% of usable waste, including 11% of packaging waste, out of 60% of mixed municipal refuse. In 2003, AS Vaania also dealt with the sorting of municipal waste and, according to their report, 40% out of 1 707 tonnes of mixed municipal waste was sorted as usable materials, including 34% paper, cardboard and glass in total.

Separately collected and recovered paper, cardboard and packaging waste formed 19% of municipal waste in 2005. Better management of municipal waste by households is another reason for this positive trend.²³ The trend towards the increased recovery of municipal waste can clearly be seen in the next figure.

Figure 5.1. Management of municipal waste 2001–2005



Based on GDP growth and purchasing power, and their links with waste generation, the following forecast has been made regarding the growth of municipal waste. There is a steady increase of 4 to 5% per year. It remains an open question whether the quantity of landfilled municipal waste would stabilise at about 66% of the whole amount of municipal waste and therefore keep growing at the same rate, or whether the adopted policies will have a bigger impact on the decoupling of the total amount of municipal waste from landfilled municipal waste.

²² Environmental Review: 2005

²³ Based on data from the waste register and the packaging register as well as data from the Statistical Board.

Table 5.6. Forecast for the generation of municipal waste

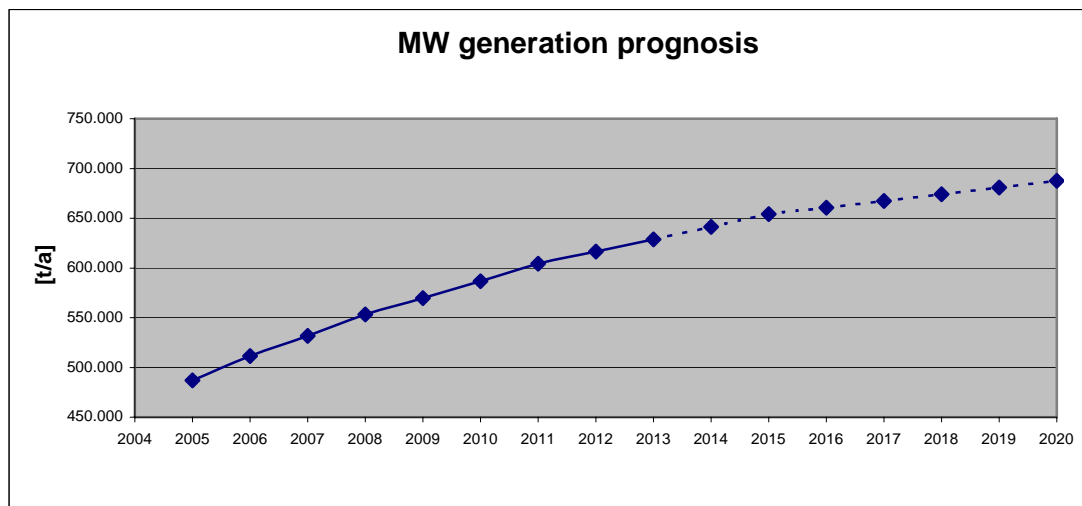
Year	2005	2006	2007	2008	2009	2010	2011	2012
Amount*	487 000 (real amount)	516 220	547 193	574 553	603 281	627 412	652 508	678 609
Amount**		624 000	640 000	657 000	676 000	696 000	714 000	732 000
% Growth		6 (1)	5 (1)	5 (1)	4 (1)	4 (1)	4 (1)	4 (1)

*Source: Stockholm Environmental Institute, SEI Tallinn

**Source: European Topic Centre on Waste

Note: The SEI prognosis is still under discussion.

Figure 5.2. Prognosis for municipal waste generation 2005–2020



Source: Stockholm Environmental Institute, SEI Tallinn

5.5.2. Waste Collection

The Waste Act defines the obligations on producers for the prevention of waste generation and the collection of generated waste. Producers should ‘facilitate recycling’ and ‘promote the integration of secondary raw materials in products’. Producers should also provide handlers with complete information on waste. These provisions of the law are clear favouring factors for the improvement of waste collection. ‘Producer responsibility’ is the main option for the implementation of these requirements.

The collection requirement for producers is even stronger in regard to ‘products of concern’ (ELVs and tyres in this study). In the case of Estonia, producers participate in schemes for financing the management of waste resulting from their activities.

Chapter 4 of the Waste Act defines the obligations on local authorities in connection with the collection and transportation of municipal waste. The rural municipality or city council issues a regulation establishing the wastes subject to transportation, the areas, the frequency and time of transportation and the extent of transportation fees which should be sufficient to cover the cost of the establishment, operation, closure and aftercare of waste treatment facilities. The local authority is also in charge of selecting waste collection and transport operators. All the above-mentioned waste management functions are critical to the quality of municipal waste handling.

Until the last amendments in the Waste Act in early 2007, municipal waste management had also been dependent on the availability of municipal waste management plans in compliance with the national and county waste management plans and drafted in accordance with the public participation rules incorporated in chapter 2, division 3 of the Waste Act.

A favouring factor for the improvement of waste collection is the growing network of waste collection centres throughout the country. In 2005/2006 there were 29 such centres, while the optimal number for the country is estimated to be around 100.²⁴

The collection of the kitchen fraction of BMW started in the spring of 2007 in Tallinn but the uptake of the scheme is slow due to lack of tradition.

5.6. Factors related to the landfill sector

Until 1991 there were more than 300 landfill sites for municipal waste in Estonia. Almost every rural state-owned or collective farm had its own landfill where waste was simply dumped in an uncontrolled manner. About 40 larger landfills, located near the major cities and bigger settlements, were operated by municipal service enterprises and maintained by the municipalities. The number of landfills fell continuously in the first years of independence, but in 1996 there were still 282 landfills for municipal waste in operation, and 221 in 1999. In 2007, 16 landfills for municipal waste were in use.

The Estonian National Environmental Strategy established as its first tasks by the year 2000 to appoint owners/operators for every landfill; to close landfills without active operators; and to optimise the number of municipal landfill sites by the year 2010 (up to 150). The last task was fulfilled in 2000 when 148 landfills for municipal and other non-hazardous waste were in operation, but the situation changed drastically during the years 2001 to 2003 as a result of the transposition of the rules of the EU Landfill Directive 1999/31 into Estonian legislation in 2001. At the beginning of 2004, only 37 municipal landfills were in use. According to the NWMP (2002), up to nine regional landfills for non-hazardous waste are foreseen to operate in the future.

Previous landfills were in operation, but generally had very small capacities. With a population of 1.4 million, Estonia is comparable to a large city and theoretically only one large landfill for municipal waste is sufficient. Transport distances and convenience are the main factors influencing the final number of landfills in the country.

Between 2000 and 2005, special attention was paid to the construction of modern landfills and the closure and reconditioning of old ones. There are four big or medium-sized landfills for municipal waste in Estonia, which are in full compliance with EU provisions. The biggest — the Jõelähtme landfill near Tallinn — serves Tallinn and the neighbouring local municipalities (up to 500 000 inhabitants). About 165 000 tonnes of mixed municipal waste were deposited in the Jõelähtme landfill in 2005. The owner of this landfill is the public-private company Tallinn Landfill Ltd, 35% owned by the city of Tallinn and 65% by a private company. The volume of investments for the first phase of landfill construction by the owner was EEK 150 million (approx EUR 9.6 million). The city of Tallinn and the EU ISPA programme supported the project with an additional EEK 95 million, used for the construction of an access road to the landfill site and a sewerage system. The total cost of the project to its completion is approximately EEK 900 million.

Investments in the construction of the newest landfill near the city of Pärnu (with a disposal capacity of around 30 000 tonnes/year), which is owned by the local municipalities and which opened in June 2006, were EEK 136 million (EUR 8.7 million) (first phase). A substantial part of these investments was covered by EU funds. However, the expectation is that the recovery of waste, rather than landfills, will be the priority for funding from local and EU sources in the future.

The high investment costs for the landfill are reflected in relatively high disposal fees, which have to cover, according to law, all costs related to the operation of the new landfills including closure and aftercare costs.

24 Information from the Stockholm Environmental Institute.

Box 5.2. Landfill charges

In 2006, the Jõelähtme landfill charged EEK 616 per tonne for the disposal of waste. The average disposal fee in Estonia is about EEK 500 /tonne. This fee includes the landfill running costs and also the landfill charge (tax) — EEK 122 per tonne for new landfills and EEK 244 /tonne for older landfills which are not in compliance with EU requirements.

The difference in taxes allows new landfills to compete with old ones in economic terms, as old landfills do not have the burden of investments and modern running costs. By comparison, at the beginning of the 1990s the average disposal fee in Estonian landfills was about EEK 40 per tonne, including EEK 0.7 landfill charge.

5.7. Factors related to the incineration sector

According to the Estonian NWMP, the ‘energy recovery of waste’ comes only third among the preferred methods of waste recovery after waste prevention and the extension of waste recovery (direct reuse, material recycling, composting).

There are at present no incinerators for municipal waste in Estonia. There is a smaller incinerator (capacity 2 000 tonnes/year) for hazardous waste in Tartu (recently renovated according to the new Incineration Directive 2000/76/EU) and two facilities for co-incineration (cement and ceramics factories), which mainly incinerate liquid hazardous waste. The cement factory Kunda Nordic Tsement is making preparations for the incineration (from 2008/2009) of combustible fractions from municipal waste.

The Incineration Directive has been transposed into Estonian legislation through the Waste Act (2004) and Regulation of MoE No.66 on Incineration.

There are plans to build specialist facilities for municipal waste incineration — two near Tallinn (state-owned AS Eesti Energia and a private company) and one in Tartu (a local authority initiative). In Tallinn, two environmental impact assessments (EIAs) have been started for these facilities. However, at the moment it is not clear what will happen in the future or how the new NWMP will affect this process. The planned incineration capacities will allow the incineration of all combustible fractions of municipal waste in Estonia. The planned facilities combine the production of heat and electrical energy. Waste will substitute a part of the natural fuels, primarily natural gas imported from Russia.

Energy prices have a very direct impact on the incineration sector (in development). Companies planning municipal waste incineration are not directly asking for money from different funds for the construction of the facilities: instead, the facilities would be economically viable, taking into consideration energy prices (especially renewable energy prices) on the one hand, and disposal fees on the other.

5.8. Factors related to MBT

There is no mechanical-biological waste treatment plant at present, although one is being constructed in northeastern Estonia with a capacity of 35 000 tonnes/year. Some fractions from treated waste will be prepared for incineration as RDF.

The drivers of this development are the legislation concerning the limitation of BMW disposal; the big reduction in the amount of residual waste going into landfills and savings from avoided disposal; and the possibility to prepare RDF for incineration and sell it for energy production depending on energy prices. Technical skills and know-how are available through cooperation with partners from old EU member states such as Germany.

5.9. Factors related to the material recycling and recovery sector

According to the Waste Act, waste reuse is preferred to waste recovery.

Until 1999 there was almost no recovery of municipal waste in Estonia. Due to policy interventions and the setting up of systems of separate waste collection at source, the rate of recovery has steadily grown since 2002: the rates were 3% in 2002, 15% in 2003, 26% in 2004 and around 24% in 2005²⁵.

The highest rates of recovery can be observed for paper and cardboard (70%), glass packaging (65%), and steel and metal mix (54%). Glass mix (34%), paper and cardboard packaging (35%) and metal packaging (28%) are also recovered to a significant degree.

Table 5.7. Recovery of municipal waste (estimation on the basis of data from waste and packaging registers)

Waste category	Generation 2005	Recovery 2005	% of total
Plastics (mix)	14 610	796	5
Plastic packaging	29 707	3 502	12
Total:	44 317	4 298	10
Glass (mix)	2 435	864	34
Glass packaging	28 733	18 676	65
Total:	31 168	19 540	62
Steel and metal (mix)	9 740	5 558	54
Metal packaging (Al + Fe)	11 688	3 222	28
Total:	21 785	8 780	40
Paper and cardboard (mixed, newspapers etc)	36 525	25 084	70
Paper and cardboard packaging	53 570	18 805	35
Total:	90 095	43 889	49
Biodegradable (mix)	12 662		
Kitchen waste	148 048		
Garden waste	48 700		
Total:	209 410	8 089*	4
Wood	14 610	1 011	7
Hazardous waste	3 896	642	16
WEEE	9 740	181	2
Other combustible (mix)	28 246	-	-
Other non-combustible	34 090	6 570	14
Total:	487 000	93 000*	18 (24)

Source: Stockholm Environmental Institute, SEI Tallinn

Note: * It is possible to add recovery in households to this number, primarily home composting — estimated amount ca 24 000 tonnes (this results in a recovery of 24%).

²⁵ If primary home composting in households, estimated at around 24 000 tonnes, is included in the calculation.

If Estonia gets closer to implementing its targets with regard to the reduction of landfilled BMW (45% in 2010 and 30% in 2013), we will probably observe a further increase in the rate of municipal waste recovery. This is because BMW forms about 65% of municipal waste.²⁶

Table 5.8. Share of BMW in municipal waste

Type of waste	Weight	%
Biodegradable waste	318 985	65.5%
Other municipal waste	168 015	34.5%
Total	487 000	100%

Source: Stockholm Environmental Institute, SEI Tallinn

From the composition of BMW (table below) we can also see that the recovery of BMW will be higher if the management of kitchen and garden waste, as well as the recovery of paper and cardboard, is improved. This is because they form the biggest fraction in BMW.

Table 5.9. Composition of BMW in 2005

Biodegradable waste	Amount	% from total BMW
Kitchen waste	138 308	43%
Garden waste	58 440	18%
Paper and cardboard	90 095	28%
Wood	14 610	5%
Other BMW	17 532	6%
Total:	318 985	100%

Source: Stockholm Environmental Institute, SEI Tallinn

Recovery of packaging waste

Box 5.3. Amount of recycled and recovered packaging waste in 1999

According to the data of the packaging register, approximately 103 000 tonnes of packaging and packaging waste was recovered in 1999 (approximately 15%) (reuse, material recovery and incineration). Of that amount, 89 000 tonnes were reused (mainly glass bottles). A total of 13 425 tonnes of packaging waste was recycled as material and 875 tonnes were incinerated. Thus, the total amount of recovered packaging waste as defined in the EU Directive on Packaging and Packaging Waste 94/62/EEC was approximately 14 300 tonnes.

The quantities of packaging waste have increased over the years, growing significantly in 2002. Subsequent annual increase has been about 3%. Despite a conspicuous increase in the quantities of packaging waste, recovery remained at a relatively low level in 2001 and 2002. In 2003, the recovery of waste increased by approximately 50% and the export for recovery increased by 80% in comparison with 2002. However, the results prescribed by target figures were not achieved. In 2005, the recovery of packaging waste reached 34% (41.1%)²⁷.

Table 5.10. Recovery and disposal of packaging waste in 2005

Recovery	56 407 tonnes (41.1%)
Disposal	80 782 tonnes (58.9%)
Total	137 189 tonnes

Source: Last official data sent to the Commission by MoE on 5 June 2007.

²⁶ The number has been defined based on several surveys in different places in Estonia.

²⁷ The figure 34% is calculated based on the data in table 5.6. The last figure reported to the European Commission is 41.1% and is probably more reliable.

By comparison, in 2004 the total generated packaging waste was 131 371 tonnes and the total recovered was 44 574 tonnes (33.9%).

Collection and recovery system for packaging waste

As of 2002, Estonia lacked a national collection and recovery system covering all types of packaging waste and all places of packaging waste generation. Collection systems vary across different regions, as earlier they were developed only in bigger cities. Only the collection, separation and recovery of the packaging of alcoholic and non-alcoholic beverages was organised pursuant to the *Packaging Excise Duty Act*. In addition, some types of packaging were collected and recovered thanks to the relatively high value of the material (certain types of cardboard, metal and packaging from timber transportation, polyethylene waste, etc.).

6. Assessment of the status of municipal waste, tyres and C&D waste

Stabilisation of municipal waste generation

Because of the rapid economic growth since 2000, Estonia will most probably not manage to stabilise municipal waste generation at 300 kg per person by 2010 as set in the National Environmental Strategy (1995). Estonia has not managed to stabilise waste generation, even at a higher level, by 2005–2006 as set out in the NWMP. These goals were too ambitious and did not take into consideration the fast development of the economy. It is expected that municipal waste will be stabilised at around 622 kg per capita only by 2013.²⁸ Municipal waste generation per capita was 406 kg in 2002; 420 kg in 2003; and 427 kg in 2004.²⁹

Source separation of municipal waste

The priorities from the Estonian National Waste Collection Plan have only partially been achieved. Source separation of municipal waste is already in place for some waste streams, mainly paper and cardboard and packaging (different materials) from households. The source separation of organic kitchen waste started in April 2007 only in Tallinn. The system is not yet fully functional and the collected quantities are insignificant. The municipality intends to rectify the situation with active public awareness campaigns.

Collection and recovery of unprofitable municipal waste

The NWMP set as a target the organisation of the collection and recovery of those types of industrial as well as municipal waste, the further handling of which is not profitable. However, waste handling companies have been organising the sorting and recovery of waste within the limits of their possibilities. This concerns especially the types of waste for which the collection and sorting costs are lower than revenues from the sales of secondary raw material or energy. It is also true that the amount of profit depends largely on world market prices: for example, sorted waste metal and some plastic waste is exported. It can be concluded that the system for the recovery of these types of ‘unprofitable’ waste is not yet in place.

The Waste Act shifted responsibility for the prevention of waste generation and the collection of generated waste to the producers. They are obliged to do so through:

- promoting the integration of secondary raw materials in products;
- incorporating waste recovery in planning for and designing new products;
- providing information to waste handlers concerning the materials and components used.

Ban on depositing untreated waste and whole and shredded tyres

The ban on landfilling untreated waste (including mixed municipal waste) is being implemented. The same is valid for the ban on landfilling whole used tyres and shredded tyres.

²⁸ Interview with Harri Moora, Stockholm Environment Institute.

²⁹ Calculated based on the figures in table 5.1. The figure includes commercial generated similar waste.

Quantity of recovered municipal waste

The quantity of recovered municipal waste increased to around 18% in 2005 (93 000 tonnes out of 487 000 have been recovered)³⁰. Most probably (concrete numbers can be presented the aim of recovering 30 to 40% of the waste (NWMP) by the end of 2007 has not been met.

Better waste separation in industry

The National Waste Management Plan called for the stronger stimulation of waste separation in industry, the services sector and enterprises in order to reduce the amount of municipal waste being landfilled. Industry is making efforts in this direction. For example, the waste management rules of the city of Tallinn prescribe the sorting of municipal waste not only in households but also in industry etc. Different prices for the collection of separated municipal waste fractions, established by waste transportation companies, are stimulating industry to sort waste.

Covering all waste generators with waste handling services

The NWMP set the aim of providing all generators of municipal waste with a municipal waste management service (with the exception of places where the establishment of the relevant network is not cost-efficient). The second Waste Act from 1998 obliged municipalities to organise waste collection systems but it was not very efficient. As concrete rules and time schedules were not available, most of the municipalities did not organise them. The 2004 Waste Act was much more explicit in this respect, having a special chapter about procedures. There is a problem with the summer houses and small enterprises around Tallinn as they are not covered by a collection system and the waste often ends in the forest. The State Forest Management Centre (RMK) collected 588 tonnes of tipped waste from its forests in 2006. Around 60 to 80% of households do not have access to a separate collection scheme for garden waste, which is too high a proportion. This is also a question of justice as these waste generators are expected to pay for waste collection.³¹

The draft NWMP estimates that, as of 2006, 20% of all households (10% in towns and up to 80% in some rural areas) do not have regular waste collection. These households dealt with waste in one of the following ways: waste was brought to other containers in dwellings; waste was brought to public containers; all burnable waste was incinerated at home; waste was illegally dumped in forests.

The obligation to join a collection scheme has attracted much criticism from people and municipalities, but the Ministry of Environment maintains a firm stand on this part of the new legislation.

Better promotion of municipal waste sorting in households

The NWMP called for the wider promotion of municipal waste sorting in households, and the provision of guidance in this area. It is difficult to say whether or not this aim has been implemented. Raising public awareness is a constant effort, without an end date. According to Jana Kivimagi from the Tallinn City Environmental Department, the main effort, and therefore a major part of the city budget, should focus on public awareness campaigns. There is a learning curve that every society (city) has to go through and campaigns are needed to bring about a change in mentality.³²

³⁰ Recovery was 29% in 2005, including some recovery operations that are not real 'final' recovery but some kind of pre-treatments as R13 on the list of recovery operations (WFD, Annex IIB).

³¹ Interview with Peeter Eek, Ministry of Environment.

³² Interview with Jana Kivimagi, Tallinn City Environmental Department.

BMW landfill targets

According to the NWMP, and as later spelled out in the Waste Act (2004), by July 16, 2010 there must be no more than 45% of BMW in the total amount by weight of municipal waste deposited in landfills. Thus Estonia must reduce the percentage of landfilled BMW from 65.5% to 45% in 2010. This is very significant task, and a stricter target than that set by the EU.

According to the Landfill Directive, Estonia has to reduce the total amount of landfilled BMW to 75% of the BMW produced in 1995. The data in table 5.4 show that 317 000 tonnes of BMW were landfilled in 1995. Accordingly, in 2010 Estonia can landfill no more than 238 000 tonnes of biowaste, which is a little less than what was landfilled in 2005. The conclusion is that Estonia is complying with the Landfill Directive but not yet with the targets from the Waste Act, which are stricter than those in the Landfill Directive.

The determination of the percentage of BMW out of landfilled municipal waste and out of recovered municipal waste needs special study, but at present it is nearly the same, at around 65%. This means that the Waste Act targets (45%) are still to be achieved.

Table 6.1. Targets for the generation and landfilling of municipal waste and BMW and implementation

Year	Municipal waste generation 1 000 tonnes	Landfilled municipal waste 1 000 tonnes	Landfilled biodegradable waste 1 000 tonnes	Amount of recovered BMW 1 000 tonnes
2000	633	601	390–450	20
2005*	487	370	242 (65.5% of 370)	76 (65.5% of 117)
2010	500	250	110	225–250

* Source: Study by the Stockholm Environment Institute based on data from the waste register and packaging register.

Ban on landfilling of tyres and creating conditions for handling them

The NWMP planned for the banning of used-tyre landfilling from July 2006. The ban is being implemented and 100% of tyres are being recovered. Conditions for handling used tyres have been created and this waste stream is dealt with through the producer responsibility principle. The main producer responsibility organisation is the Estonian Tyre Association (see more details in 3.2.3.1). There are four tyre collection points in Tallinn and 45 in Estonia.

Tyres are mostly shredded and used for the construction of new landfills. In 2005, 12 500 tonnes of tyres were used for landfill construction; 240 tonnes were landfilled and about 775 tonnes were used for other recovery operations. There are at present no other recovery technologies implemented on a large scale.

Construction and Demolition Waste

No quantitative targets have been set in connection with C&D waste. The goals set in the NWMP were to reduce waste generation, increase waste recovery, increase the use of recoverable materials, and to separate valuable waste and hazardous waste.

Due to the fast economic growth in Estonia, C&D waste generation has almost tripled since 2001. In 2005, more than 2 million tonnes were generated, including metals. Until 2001, around 70% of C&D waste, including metals, were landfilled. Later on, the prices of materials went up and businesses appeared on the market dealing with different materials from C&D waste. The rise in the prices of raw materials was also a favouring factor for the increase in recovery rates.³³ Another factor was the level of landfill tax, which diverted C&D from landfills.

33 Interview with Peeter Eek, Ministry of Environment.

Most construction takes place in Tallinn. The city of Tallinn issued a regulation requiring companies to collect C&D waste separately. This contributed significantly to the solution of the C&D waste problem in the city.³⁴

However, while big constructions have already been dealt with there are still problems with small-scale renovation projects.³⁵

Lower prices and a deficit of virgin mineral materials are at present serious incentives to prefer recycled materials. However, a deficiency in recycling capacities does not allow for the organisation of government procurements of recycled materials for the building of new roads. This is true mainly for large amounts of oil shale-related mineral waste in northeast Estonia. This could replace large quantities of virgin construction materials, although this has not so far been the case and the system is under development.

Table 6.2. Generation and recovery of C&D waste (Group 17 of EU LoW, including excavated soil 17 05)

Year	Generation	Recovery	% Recovered
2001	878 000 tonnes	462 000 tonnes	52.6
2005	2 161 000 tonnes	1 698 000 tonnes	78.6

Table 6.3. Generation and recovery of C&D waste without excavated soil

Year	Generation	Recovery	% Recovered
2001	581 000 tonnes	193 000 tonnes	33.3
2005	983 000 tonnes	577 000 tonnes	58.7

³⁴ Interview with Jana Kivimagi, Tallinn City Environmental Department.

³⁵ Interview with Toomas Ideon, Maaves and Harri Moora, Stockholm Environmental Institute.

7. Analysis of the effectiveness of the policies implemented

7.1. Other important factors

Table 7.1. Distribution of responsibilities for policy measures

Policy measure	Responsibility	Comments
User charge for municipal waste	In the case of 'organised waste transport' by the municipality the user charges (fees) are established via a tender procedure and naturally the local authority must control whether a company keeps to the agreement. The collection and transportation company is responsible for collecting the charge.	This charge is one of the price factors in setting the gate fee. Its increase is politically sensitive as it is paid by households.
Pollution charge for municipal waste disposal (sometimes referred to as landfill tax)	Fixed by the law (prepared by the Ministry of Environment). Serves as an economic instrument for waste diversion. Paid by collection companies to landfill operators as a part of the gate fee. They consequently disburse it to the waste generating municipalities (75%) and the Environmental Investment Centre (25%). The charge is doubled for non-compliant landfills. This charge is controlled by the County Environmental Departments.	In reality it is also a revenue generator for municipalities, especially small ones. It can therefore serve as a counterincentive for the diversion of waste from landfills. There is a desire on the part of policy makers to replace it with a local municipal waste management tax but introducing new taxes is contrary to the government's economic policy.
Ban on landfilling municipal waste	Collection and transportation companies are obliged not to take unsorted municipal waste to the landfill. Landfill operators are obliged not to accept such waste. The Environmental Inspectorate is in charge of monitoring. The County Environmental Departments also monitor data sent by landfills on waste deposited in landfills and data sent by companies on generated waste.	
Ban on landfilling whole and shredded tyres	The Estonian Tyre Association (ETA) is in charge of collecting and recycling old tyres (producer responsibility principle in the Waste Act, 2004). It is obliged not to landfill them, whether whole or shredded. Landfill operators are obliged not to accept whole or shredded tyres for disposal.	The recycling fee is paid by the importers of tyres but is finally added to the price of tyres and therefore borne by consumers.
Producer responsibility for tyres and adding tyres to the list of 'products of concern'	Producers and importers are in charge of keeping records and reporting data on quantities to the PROTO register. Producers and importers manage the treatment of tyres through the ETA. The ETA is in charge of organising collection points for tyres. The monitoring is carried out by PROTO and the control by the Environmental Inspectorate.	There are 45 points around Estonia but people are still not well informed about them. ³⁶
Source separation of	Municipalities are in charge of setting	Implementation is in an initial phase.

³⁶ Interview with Toomas Ideon, Maaves and Harri Moora, Stockholm Environmental Institute.

Policy measure	Responsibility	Comments
kitchen waste	up the system. Collection and transportation companies are in charge of providing containers and arranging the further treatment of collected waste.	People need time to get used to the system. Collected quantities are insignificant.
Guarantee collection and recovery of packaging	Companies involved in packaging are in charge. They transfer the obligations to producer responsibility organisations. Local governments are in charge of determining 'methods for the collection of packaging and packaging waste and provide such methods in the waste management rules'. Monitoring is carried out by the Packaging Register and the Waste Register and control by the Environmental Inspectorate.	In reality, municipalities are only in charge of indicating the locations of the collection containers to the producer responsibility companies.
Take-back system	Packaging companies are obliged to take back sales packaging and packaging waste or to arrange for such a service through the producer responsibility organisations. Monitoring is carried out by the Packaging Register and control by the Environmental Inspectorate.	
Deposit system	The size of the deposit is established by the Ministry of Environment. Producers of glass and plastic packaging are in charge of implementing the scheme. Monitoring is carried out by the Packaging Register and the control by the Environmental Inspectorate.	Sometimes this is a burden for small shops, which have to accept more plastic and glass packaging than they can handle. ³⁷ The Ministry of Environment intends to increase the size of the deposit.
Excise duty on packaging.	The amount is fixed by the government. The importer is obliged to pay it. In the case of domestic production it is paid by the user of the packaging. Monitoring is carried out by the Packaging Register and control by the Environmental Inspectorate and the Estonian Tax and Customs Board.	An exemption has been in force from 1 May 2004 on metallic packaging for alcohol of which not less than 40% is recovered. The purpose is to stimulate the recovery of packaging waste. This will be revised and extended to all packaging.

Stakeholder involvement in the legislative process

In general, all stakeholders were satisfied with their involvement in the legislative process. The Ministry of Environment involves all relevant stakeholders as early in the process as possible. Sometimes there is a problem with finding experts on very specific issues. All policy documents go through public hearing and are announced on the Internet.³⁸ The Estonian Waste Management Association provides input to new policy drafts. The Association is involved in discussions with the Ministry of Environment and the Parliament and its proposals are usually taken into consideration. This provides the proper representation of 42 major waste management stakeholders (members of the association) in the legislative process. The Environmental Inspectorate is also actively involved in policy drafting.

³⁷ Interview with Pavel Ojava and Rene Rajasalu, Environmental Inspectorate.

³⁸ Interview with Peeter Eek, Ministry of Environment.

Cooperation among stakeholders

The eight interviewed stakeholders gave the impression that cooperation among stakeholders at all levels is rather good. People know each other and the competence, and therefore the initiatives, of the Waste Management Department of the Ministry of Environment are respected. There is good cooperation between the Ministry of Environment and the Environmental Investment Centre through representation in the governing bodies. Tallinn City Environmental Department, as a major urban agglomeration and pioneer in different waste management practices, also has good cooperation with the Ministry, the Estonian Waste Management Association and the Environmental Commission of the City Council.

Cooperation between municipalities has not been sufficient in recent years. They have been free to cooperate and group themselves since 1998 but they have not used this possibility. Since the latest changes to the Waste Act municipalities have more incentives to cooperate and pool resources for better waste management. A good example of this is the Central Estonia Waste Management Centre.³⁹

Municipal waste generation in Estonia has been growing steadily since 2001 due to the fast economic expansion. Nevertheless, the proportion of landfilled municipal waste decreased from 95% in 2000 to 66% in 2004. This is due to the effectiveness of the above-mentioned policy instruments (table 7.1.) linked to the Landfill Directive and the Packaging Directive. It is also due to the growing system of separate waste collection. Although the generation of municipal waste is expected to grow by between 1% and 4% annually in the next five to six years⁴⁰, this would not impact the further decoupling of landfill disposal from generation.

7.2. Important policy instruments related to the Landfill Directive

The ***separate collection system*** in Estonia is constantly expanding, which improves the diversion of municipal waste from landfills. Of nine types of BMW, six go through the municipal collection stations and, in addition, paper is collected separately. Nevertheless, the process could be speeded up should the municipalities — which are legally in charge of organising the collection and transport of waste — increase their waste management capacity in human and financial terms. After county-level waste planning was suspended in early 2007, municipalities acquired more responsibilities in planning and managing municipal waste treatment. They are also encouraged to cooperate and group themselves in order to increase resources.⁴¹ In Estonia, there is a problem with the coverage of the separate collection system. The exemption rate in rural areas in Estonia is often 60 to 80%. There is pressure on the municipalities to solve the problem and improve the rates.⁴² Firstly, this will improve the situation with respect to the illegal disposal and dumping of waste, but of course organised waste transport includes separate collection and thus improves diversion from landfills.

In April 2007, the city of Tallinn started the separate collection of biodegradable kitchen waste. Buildings with more than five apartments must have a separate container, as must offices producing more than 25 kg of BMW per week. The city regulation was adopted because of the Estonian targets regarding BMW. In the first few months implementation was rather poor but it will improve over time. There has not been any tradition in this type of separate collection therefore the uptake will be slow: there is a learning curve and public awareness campaigns are needed to bring about a change in mentality.⁴³ The

³⁹ Interview with Peeter Eek, Ministry of Environment.

⁴⁰ Interview with Harri Moora, Stockholm Environmental Institute.

⁴¹ Interview with Peeter Eek, Ministry of Environment.

⁴² Interview with Peeter Eek, Ministry of Environment.

⁴³ Interview with Jana Kivimagi, Tallinn City Environmental Department.

experience with the paper waste stream, which has been collected separately in Tallinn since 2003, is quite positive.

In the future, the collected kitchen waste will be directed to the Tallinn landfill. At the moment the Tallinn landfill has a composting capacity of 7 000 tonnes per year but it can easily go up to 22 000 tonnes per year. Although the city of Tallinn expects to generate 15 000 tonnes of kitchen waste per year, the estimates of landfill experts do not exceed 3 to 4 000 tonnes per year.⁴⁴ In either case there would be sufficient composting capacity for the kitchen waste generated in Tallinn.

Until recently (changes in the Waste Law in early 2007) there was an obstacle within the waste collection and transportation system — namely, the requirement to organise tenders for areas of no more than 10 000 inhabitants. This was a political decision at the time the 2004 Waste Act was adopted and was not a very practical one since it drove the prices of the service up because there were no economies of scale. The ceiling has been increased to 30 000 inhabitants: this is expected to make tendering and subsequent collection easier and cheaper.

The *closing of old landfills* has been qualified as one of the most successful issues during recent years. Details are given in section 5.6. The understanding on the part of authorities at municipal and county level of the importance of the problem and the ensuing benefits gave additional impetus to the process. The closing of old landfills was supported financially by the Environment Investment Centre, which directed significant funds to this activity. The County Environmental Departments also played a role in the process through approving EIAs for closure, issuing environmental permits for closure, and monitoring the projects themselves.⁴⁵

Pollution charge for municipal waste disposal (landfill tax) (Environmental Charge Act, 2006)

The pollution charge for municipal waste disposal is one of the most important, and at the same time controversial, waste policy instruments in Estonia. Until 2004 the charge was not significant but subsequently there has been a steep growth in the charge. Policy makers at the Ministry of Environment and the Estonian Waste Management Association were not in favour of this instrument and rather supported the introduction of a local waste management tax in 2003. However, introducing a new tax was, and still is, contrary to the government's economic programme. The positive side of the charge is that it gives revenues to municipalities to cover the costs of separate waste collection and recovery. This was the case in 2004 when 75% of the charge was redirected from the EIC to the waste generating municipalities. However, at the same time municipalities are reluctant to start large-scale recovery operations as they would lose income. Another drawback of the charge is that it is relatively rigid and cannot be adjusted by municipalities.⁴⁶ On the positive side is the fact that significant amounts of money are channelled to the Environmental Investment Centre, which funds environmental projects, including waste projects.

⁴⁴ Interview with Allan Pohlak, Tallinn landfill.

⁴⁵ Interview with Heikko Antsmae, Harju County Environmental Department

⁴⁶ Presentation by Peeter Eek on landfill tax in Leiden (May 10, 2007)

Table 7.2. Payments through the state budget to the Environmental Investment Centre

	2002	2003	2004	2005	2006
Total, MEUR	23.5	32.2	33.8	40.1	55.9
Landfill tax, MEUR	7.0	9.2	9.0	10.8	14.9
Landfill tax share, %	29.8	28.5	26.7	26.9	26.7

Table 7.3. Financing of Environmental Programmes by the EIC

	2000	2001	2002	2003	2004	2005
Total, MEUR	13.0	17.5	20.9	25.2	26.9	28.4
Waste Programme, MEUR	2.8	3.6	4.2	3.1	5.3	7.3
Waste Programme share, %	21.6	20.4	20	12.3	19.7	25.7

The closing of old landfills, which was quite successful, was also funded partially through the EIC and the pollution charge. Another positive aspect is the trend towards an increase in the charge in the next few years until 2010–2011, when Estonia is expected to join the euro zone. The date of joining the euro zone may be postponed until 2015 because of high inflation. The increase in the charge would make recycling and recovery operations more attractive. The increase is supported by the stakeholders as it will make it easier to reach Estonian recycling targets.⁴⁷ The fact that the charge is double for old, non-compliant landfills is an additional pressure to close them. Fly-tipping was perceived as a side effect but the reason is mostly that the legal obligation to join the systems of organised waste collection and transport is not fully implemented by many municipalities. In fact, the old, small, uncontrolled landfills were also fly-tipping and dumping sites from an environmental point of view.

Producer responsibility

The producer responsibility principle has been introduced in Estonia both for packaging waste (2005) and for tyres (2004).

Since the adoption of the new Packaging Act (2005) the rates of recovery of *packaging waste* have been growing constantly. While only 15% of packaging waste was recovered in 1999, the figure was 34% in 2004 and 42% in 2005, and is expected to be around 50% in 2006.⁴⁸ Most of the interviewed stakeholders in Estonia singled out the diversion of the packaging waste stream from landfills as one of the successes in the management of municipal waste in Estonia. It was probably the most important factor for the diversion of BMW from landfills. A major factor in the success is the establishment of producer responsibility organisations. There are three producer responsibility organisations, one of which has been responsible for the deposit scheme since 2005.

Producer responsibility organisations focus on collecting packaging waste from industry, offices and shops, as it requires less effort. There is a problem with collecting packaging from households.⁴⁹ In order to change this, municipalities should require producer responsibility organisations and companies to collect packaging waste from households. Municipalities have this power based on local waste rules but the problem is that sometimes such rules for packaging are missing.⁵⁰ There is also a problem with implementing the obligation to take back packaging that is of no financial value, as the financial incentive remains the strongest.

⁴⁷ Interview with Margit Ruutelmann, Estonian Waste Management Association.

⁴⁸ Interview with Peeter Eek, Ministry of Environment.

⁴⁹ Interview with Margit Ruutelmann, Estonian Waste Management Association.

⁵⁰ Interview with Harri Moora, Stockholm Environmental Institute.

The Environmental Inspectorate is in charge of controlling the producer responsibility organisations. The Inspectorate is now drafting a system to control them effectively and to get a full picture of the situation through the seven regional units of the Inspectorate.

The producer responsibility principle and the ban on the landfilling of whole and shredded tyres are the reason for the almost full recovery of old **tyres**. Tyres are dealt with by producer responsibility organisations.

The *deposit scheme* for glass and plastic packaging has been one of the successful waste diversion instruments. Around EEK 250 million is being circulated in the deposit scheme. It is cost neutral for the producers of glass, metal and PET packaging and for retailers. Retailers collect both types of packaging and give them to the collection systems. It is important that no one in the system loses money. Producers pay a producers' fee per unit. For producers it is cheaper to be a client of the deposit system. The deposit system is very successful and the collection rate is over 80% for PET bottles and over 90% for reusable glass, but only 40% for metal cans. The two main drivers of the success of the system are the financial incentives built into it and the tradition of many years. In 2005–2006, the Environmental Inspectorate focused its efforts on checking more than 900 sales points and in this way contributing to the uptake of the scheme.

8. Main findings

- Municipal waste generation in Estonia is growing because of the rapid economic growth and the accompanying growth in private consumption.
- The forecasts show that a stabilisation of municipal waste generation is expected by 2012–2013.
- There is a trend towards the decoupling of municipal waste generation and municipal waste landfilling because of the policies in place, as discussed above.
- The system of source separation is growing slowly and there is already separate collection of biodegradable kitchen waste in Tallinn.
- The uptake of the separate collection of kitchen waste is expected to be slow because of lack of tradition.
- Traditional schemes like the deposit scheme for glass and plastic and the separate collection of paper are successful because of the habits of the population.
- The closing of old landfills is almost over and has been a successful process because of good legislation, stakeholder involvement and available funding.
- New compliant landfills have been built and there is enough available landfill capacity despite the availability of many recovery options.
- The pollution charge for waste disposal is relatively high for the region and will keep growing. It is a driver for the diversion of municipal waste from landfilling. Higher levels will allow the bigger uptake of alternative treatment options.
- Despite its advantages the pollution charge for waste disposal has a controversial nature as it generates revenues for municipalities and therefore could serve as a disincentive for launching recovery operations. There are ideas for replacing it with a local waste management tax.
- There is a favourable attitude towards building municipal waste incinerators as they will generate heat, substitute oil shale-generated electricity and further divert additional quantities of municipal waste from landfilling. There is an opinion that building an incinerator is the only way to reach the targets in the Landfill Directive and in the respective Estonian legislation.
- There are a relatively high number of municipalities in Estonia and their waste management capacities are rather weak in general. Their waste management budgets are not high either. Therefore there is a policy effort to create incentives for pooling resources and for increasing municipal waste budgets.
- The producer responsibility principle — introduced for packaging waste, old tyres and end-of-life vehicles — has been very successful and is functioning well. It is the major cause for the growing proportion of packaging waste recovery as well as the almost full recovery of old tyres and end-of-life vehicles.
- Industries and offices are better covered by producer responsibility organisations while the coverage of households is lagging behind as it is less efficient and more expensive.
- The generation of construction and demolition waste has been growing significantly because of the fast economic growth. Nevertheless, recovery has been fully decoupled from generation for the last several years. The reasons for this are the higher prices of raw materials as well as the growing capacities of private companies to process metal, aggregates etc. The city of Tallinn's regulation to collect C&D waste separately has contributed significantly to the high rate of recovery.
- There is a problem with recovering C&D waste from small renovation projects as they are very difficult to monitor.
- The existence of the Environmental Investment Centre has played a beneficial role in providing funding for waste management projects in Estonia. Generating significant revenue from the landfill tax, the EIC has filled in funding gaps in connection to the implementation of policies related to the Landfill Directive such as the closing of old landfills.

- The producer responsibility principle is also in force with end-of-life vehicles. Recovery is easier, as the metal has a positive value and it is based on the principle of dismantling.
- The quantities of municipal waste going to the landfill will keep going down especially if one or two incinerators are built in Estonia. Consequently, the business of the landfills will have to change somewhat and they will have to focus more on composting and on the treatment of ashes from the incinerator and sludge from wastewater cleaning, etc.

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I. Annex: List of interviewed stakeholders

May 15, 2007	May 16, 2007	May 17, 2007
9.00–10.30. Peeter Eek, Director-General, Waste Department, Ministry of Environment Narva mnt. 7 A, 15 172 Tallinn, tel. + 372 6262884 fax: +372 6262869 GSM +372 5165291 peeter.eek@envir.ee	9.30–11.00. Jana Kivimägi , Deputy Head, waste management board of Tallinn City Environment Department Harju 13 10130 Tallinn Jana.Kivimagi@tallinnlv.ee tel. +372 6404609	8.30–9.30. Pavel Ojava Senior Inspector Pavel.Ojava@kki.ee tel. +372 696 2229 Rene Rajasalu Rene.Rajasalu tel. +372 696 2228 Inspector Environmental Inspectorate Kopli 76, 10416 Tallinn Fax: +372 696 2237
11.30–13.00. Margit Rütelmann Managing Director Estonian Waste Management Association tel/fax: +372 666 3063 mob: +372 5130 698 margit@ejkl.ee Maleva 4, 11711 Tallinn	11.30–13.00. Heikko Antsmäe , Expert on waste, Harju County Environmental Board, MoE, tel. +372 672 2127, heikko.antsmae@harju.envir.ee Viljandi mnt. 16, 11216 Tallinn	10.30–11.30. Allan Pohlak Address: Loovälja, Rebala küla, Jõelähtme vald tel: 609 6530, 5067769 fax: +372 609 6014 allan.pohlak@cleanaway.ee http://www.landfill.ee/
16.00. – 17.30. Heiko PÕDERSALU Head of Division, Programme Leader tel. 627 4174 Environmental Investment Centre Rävåla pst 8, 10143 Tallinn Heiko.podersalu@kik.ee	14.30. – 16.00. Toomas Ideon, expert on waste, AS MAVES, main consultant of MoE concerning preparation of new WMPlan tel. +372 656 5428; Marja 4 ^D , 10617 Tallinn Toomas@maves.ee Harri Moora Stockholm Environmental Institute, Tallinn harri.moora@seit.ee	