

Evaluation of waste policies related to the Landfill Directive Flanders

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Note from the author

This paper aims at improving the understanding and evaluating the effectiveness of policy measures implemented in the Flemish region in order to divert municipal waste from landfills, with special attention to the management of biodegradable municipal waste (BMW), waste tyres and construction and demolition waste.

In section 2 we present the lessons learnt from the study. In sections 3 to 5 we present the general policy and targets, measures and figures for BMW, waste tyres and construction and demolition waste. Then, we present the assessment in section 6 and 7, and the conclusions in section 8. This paper focuses particularly on the environmental agreement between the Flemish government and municipalities.

In some cases, data for Belgium is used instead of data for the Flemish region.

Context

The Topic Centre has prepared this working paper for the European Environment Agency (EEA) under its work programme as a contribution to the EEA's work on policy analysis and assessment.

Disclaimer

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1. Introduction to Flanders

Belgium has three regions: Flemish Region, Walloon Region and Brussels Capital Region. Flanders is situated in the Northern part of Belgium and has five provinces (Antwerpen, Vlaams-Brabant, West-Vlaanderen, Oost-Vlaanderen and Limburg) and 308 municipalities.

The population of Belgium is approx. 10.5 million inhabitants, with 6 million in the Flemish region, 3.4 million in the Walloon region, and 1 million in the Brussels region. For Flanders, this results in a very high population density of 447 inhabitants per km². There are 2.5 million households, corresponding to 2.39 persons per household (in 2005, Statistics Flemish Region).

In 2004, the GDP per capita for Belgium¹ was EUR 25 400 compared to EUR 18 600 for the EU-25 (in 1995 prices, Eurostat). Measured in Purchasing Power Standards (PPS) where EU-25 = 100, the Belgian GDP per capita was 117.3 in 2004, i.e. 17% higher than the EU average. Still, the growth in GDP per capita has been similar to the EU-25 over the period 1995-2004 (around 1.8% p.a.).

A number of policy areas have been transferred from federal level to regional level in Belgium:

- 1980: policy areas related to territory, such as housing, country planning, land division, nature conservation and certain aspects of the environmental and water policy (e.g. air pollution, soil pollution, waste collection and treatment, water pollution, ground water, drinking water, environmental enforcement, environmental and safety reporting)
- 1988: education, public transport, public works and certain aspects of the environmental and water policy (e.g. environmental licensing, waste policy (except waste transit/import/export and nuclear waste), waste water licensing).
- 1993: waste import and export (except nuclear waste, product standard setting, waste transit).

As a result, the three regions have wide political autonomy and each region is responsible for implementing waste management legislation and policy. In the Flemish region the Public Waste Agency of Flanders (OVAM) is responsible for preparing and implementing waste management legislation, and for supervising the achievement of waste management objectives. The duty to set up waste management plans covering all waste generated (household, commercial and hazardous waste) lies at the regional level, not the national level.

The responsibilities of the federal government are limited to product standards, nuclear waste, and negotiation and implementation of international engagements of the country. Moreover, there is no hierarchy of the legal system in Belgium, which means that the federal government cannot impose regulation on regional governments in environmental matters (Bracke and De Clercq 2005, 4).

The Flemish provinces have the responsibility to issue operating permits for complicated and environmentally hazardous plants (WasteBase).

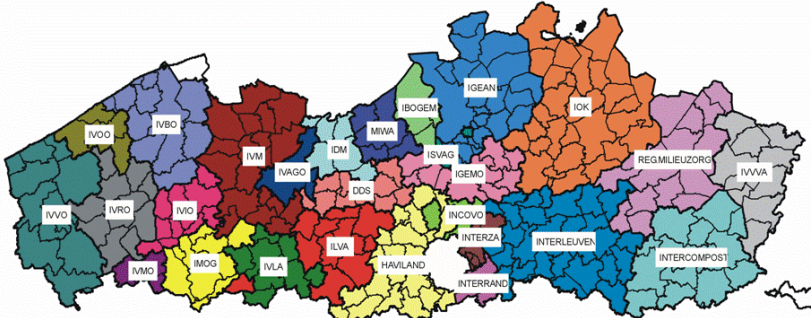
Flemish municipalities are responsible for collection and treatment of all household waste generated within their territory. This responsibility covers the obligation to give instruc-

¹ Even though figures for GDP are available for the Flemish Region from Statistics Flemish Region, figures for Belgium have been used here for the sake of comparison with the five countries in the study, see papers for Estonia, Finland, Germany, Hungary and Italy.

tions to citizens. They set up regulations within the framework at the regional level. Since 1980 almost all municipalities cooperate in intermunicipal associations to establish the infrastructure for waste collection and treatment capacity (Delatter 2006). There are 27 intermunicipal associations regarding waste, as shown in Figure 1.1. On average, an intermunicipal association has 220 000 inhabitants (Parent et al. 2004).

The Association of Flemish Cities and Municipalities, VVSG, represents the municipalities and the intermunicipal associations. VVSG has a separate coordination unit for the intermunicipal associations (Interafval) in order to ease communication with municipalities, OVAM and other relevant political bodies. The five Flemish provinces cooperate in the Association of Flemish Provinces.

Figure 1.1 Intermunicipal associations in the Flemish region



Source: Wille (2004)

2. Lessons learnt

Lessons learnt in the Flemish region that may be useful for other regions and countries are:

Cooperation between municipalities in intermunicipal associations has promoted the establishment of sufficient treatment capacity and the implementation of different schemes for separate collection and charging. As in many other countries, the Flemish municipalities are responsible for collection and treatment of the generated household waste. However, with 19 000 inhabitants the average municipality is relatively large and is therefore in a relatively good position to organise an advanced waste management system and to employ staff with specific competences in the field. This relative advantage is further enhanced by the cooperation among municipalities in intermunicipal associations. The municipalities have collaborated in these associations since the 1980s, and today there are 27 of these associations and they have an average size of 220 000 inhabitants.

The division of responsibility between relevant stakeholders is clear. For example, the provisions of the waste management plan apply to the administrative governments of the Flemish region, the provinces, municipalities among others.

There is also a tradition for engaging relevant stakeholders through regular meetings with OVAM and involving these stakeholders in the preparation of waste plans, as negotiation partners, etc.

Taxes and other market-based instruments have been introduced and are sufficiently high for providing a strong incentive for municipalities to divert waste from landfills in order to save money. The landfill disposal levy was relatively low when first introduced in 1990, but in 2007 it was EUR 75 per tonne of waste landfilled. Part of the revenue from the levy is returned to municipalities in the form of subsidies if they manage to meet certain requirements.

The charge paid for waste management services is visible to householders and commerce. Moreover, the charge is often split into variable elements for bio-waste (kitchen and garden waste) and for residual waste (pay-as-you-throw). Some waste fractions such as paper and glass are collected free of charge.

Communication seems very important for the waste management system to work as intended. Information alone is not enough, the municipality needs to focus on action, i.e. *how* to make people act. Some experiences on communication are:

- For a policy to be successful it needs to be targeted at specific groups. It is also important to have personal contacts and the administration should look for partners to cooperate with.
- It is important to actively keep the awareness levels high through regular campaigns. If activities are brought down the awareness drops and separation quality decreases.
- Since 1997, the strategy has been to focus on the amount of residual waste collected per inhabitant. This target has been fairly easy to communicate to the public.

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

In the 1970s and 1980s almost every municipality had its own landfill site and when it was full, the waste was typically incinerated in the open thus creating smoke, dioxin and other adverse effects. In a densely populated region this was considered a major problem and it is one of the main reasons for waste management being very high on the political agenda in Flanders.

The first Flemish Waste Decree was issued on 2 July 1981 on the Management of Waste². The decree forms the regulation for the establishment of the Public Waste Agency of Flanders, OVAM, and waste plans. The provisions of the waste plans apply to the administrative governments of the Flemish region, the provinces, municipalities and public or private institutions who carry out tasks on environmental policy (OVAM web site). In the development of a waste plan, OVAM involves all relevant stakeholders.

Waste plans have been made since 1986. The first waste plan (1986-1990) aimed at closing and improving landfills, making maximum use of existing incineration capacity and starting the first separate collection of municipal waste (Parent et al 2004). The second plan (1991-1995) focused on improving separate collection further and on preventing waste generation.

The Waste Decree was revised in 1994 to include, among other things, international obligations and a new instrument: the duty of acceptance (Bracke and De Clercq 2005, 4). The duty of acceptance was included in the Waste Decree in order to implement (extended) producer responsibility.

3.1. Objectives

The general objectives for waste management are (Parent et al. 2004):

- to protect public health and the environment from the harmful influence of waste and to prevent raw materials and energy becoming waste materials.
- to regulate waste management policy in accordance with the waste hierarchy (prevent and reduce the generation of waste; reuse and recover waste; incinerate waste; and where the previous options are not practicable: landfill waste).

3.1.1. *Municipal waste*

The objective in the waste plan (1997-2001) was to increase separate collection (for recycling) from 34% in 1995 to 55% in 2006. In the waste plan (2003-2007) the objective was to increase separate collection further to 69% in 2007 (to be recycled or composted).

By 2007, the collected amount of residual municipal waste should be reduced by 13% compared to 2000, taking into account an annual increase of 2% as a result of the growth in population and economy if no further measures are taken, (Parent et al. 2004, 6).

² The title of the 1981 Waste Decree was "on the Management of Waste", later (in 1994) it was adapted and its title changed to "on the Prevention and Management of Waste". Given the evolution in policy by that time the focus on prevention was more outspoken and this led to a more visible prevention goal by putting it next to "management" even in the title of the Waste Decree.

The municipal waste management plan (1997-2001) set the following targets for the generation of residual waste per municipality, (Parent et al. 2004):

- 1998: 255 kg/capita
- 2001: 220 kg/capita; (240 kg/capita for coastal municipalities, Ghent and Antwerp)
- 2006: 200 kg/capita; (230 kg/capita for coastal municipalities, Ghent and Antwerp)
- Proposed long-term target: 150 kg/capita as an average for the Flemish Region

These targets were revised in the municipal waste management plan (2003-2007) to (as an average for the Flemish Region):

- 2003: 180 kg/capita
- 2005: 165 kg/capita
- 2007: 150 kg/capita

But the following targets for residual waste were set for every municipality:

- 2003 : 220 kg/capita
- 2005 : 200 kg/capita.

Moreover, processing capacity must be increased: MBT treatment capacity of 600 000 tonne per year and fluidised bed incineration plants.

3.1.2. *Waste paper*

The objectives for waste paper (as subject to the duty of acceptance) are:

Environmental targets	The duty of acceptance
Recycling rate of: <ul style="list-style-type: none"> • 60% in 1998 • 80% in 1999-2000 • 85% from 2001 	1 June 1998

Source: Bracke and De Clercq (2005)

The duty of acceptance is used for waste products, other than packaging waste, that are subject to producer responsibility. The bodies obliged with this responsibility are the producer who puts those products on the market, the wholesalers and the retailer.

3.1.3. *Used tyres*

The targets for used tyres (as subject to the duty of acceptance) are:

- 100% collection of used tyres
- 25% retreading
- 20% recycling
- 55% recovery (cement kilns)

The take back system was implemented as:

- Take back when new product is purchased (replacement market only): 1 July 1999
- Take back for all waste (incl. new cars): 1 July 2004

3.1.4. *Construction & demolition waste (C&D waste)*

The Implementation Plan for Construction and Demolition Waste was approved on 5 April 1995 (OVAM 2001). According to the plan, C&D waste generation should be reduced by 25% in the medium to long term, and 85% of the C&D waste must be separated before delivery to treatment companies in 2000. The target for treatment is that at least 75% (of the waste available for treatment, roughly 85% of total waste), should be applied 'usefully'. The plan also aims to expand the markets for secondary materials processed from C&D waste (Suikerbuijk et al 1999, 34).

3.2. The package of measures to meet objectives

Several instruments have been introduced to divert waste from landfills. For municipal waste, the environmental agreement (or covenant) was first introduced in 1992 and since then it has been re-negotiated four times. Other instruments for municipal and biodegradable waste are: the waste management tariff (since 1980s), the waste disposal levy (since 1990), the Compost Master programme (since 1997, as part of a general promotion of home composting), the ban on incineration and landfilling of certain waste streams (since 1998), the duty of acceptance for paper (since 1998) and the total ban on landfill of household waste (since 2005).

For tyres, the duty of acceptance was introduced in 1997, and the ban on landfilling of tyres came in 1999.

3.2.1. *Municipal environmental agreements*

In the late 1980s Flanders had good experience with subsidy policy for investments in recycling centres, composting plants and incinerators, and the subsidies helped stimulate these major investments in particular for (small) municipalities. As a result the Ministry of the Environment decided to continue with the subsidy policy and develop the environmental agreement.

In 1991 the Flemish Minister for the Environment proposed to the municipalities to enter a voluntary agreement ('municipal environmental agreements') on the management of municipal waste. In the agreement, municipalities receive a subsidy which is partly linked to the meeting of certain targets within a time period³ (Parent et al. 2004).

Since 1992, there have been three generations⁴ of municipal environmental agreements based on five separate agreements:

- First generation: 1992-1996
- Second generation: 1997-1999, and 2000-2001
- Third generation: 2002-2004, and 2005-2007.

There is a parallel development between waste plans and environmental agreements so that the objectives of the waste plan are reflected in the requirements of the agreement. The agreement in a 'generation' has the same structure and more or less the same the topics, but the focus differs from that of the waste plans.

The Ministry of the Environment coordinates negotiations on the environmental agreement. OVAM invites municipalities and provinces to suggest items to be included in the new agreement. OVAM sends the waste plan to consultation and draws up a list of proposals for initiatives that they would like to include. The environmental agreements are negotiated with Flemish Cities and Municipalities (VVSG) and the Association of Flemish Provinces (VVP) as the latter is the back-up of implementation of the environmental agreements in the municipalities (Parent et al. 2004, 12).

While the first generation agreement could only be signed in full (i.e. all articles had to be accepted), the second and third generations include a basic element and a number of options. Moreover, in the third generation a minimum level for participation has been defined.

³ The provinces also take part in the negotiations and can sign the agreement. Separate requirements for the provinces are negotiated. For convenience, the provinces are not further discussed in the paper.

⁴ In this evaluation we have had access to an English translation of the first (1992-1996) and third agreement (fourth contract of 2002-04).

First generation of agreement

The first generation agreement focused on making inventories of available data on environment and nature, producing an annual report on the municipality's environmental and nature policy, and employing staff and organising a municipal advisory council with expertise in environmental and nature protection. The agreement specifies the subsidy provided by the Flemish Government for these activities.

For municipalities the agreement included an obligation to:

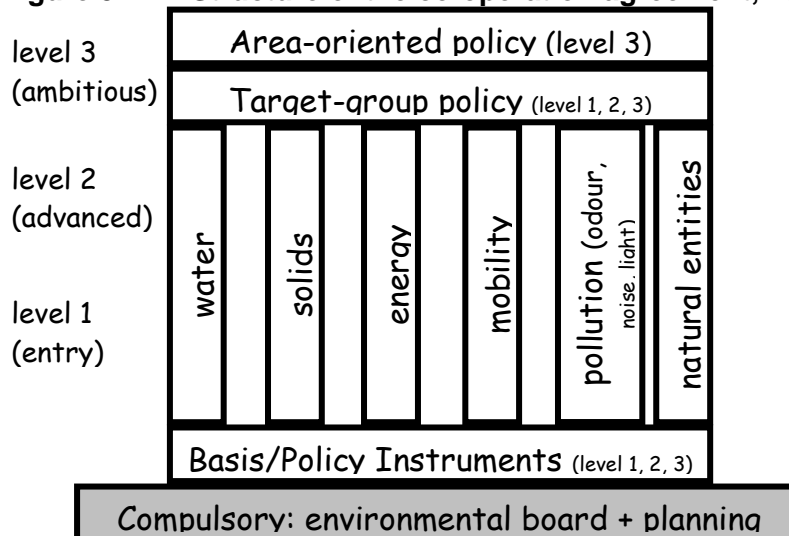
1. establish and operate (or operate by a third party) recycling centres, alone or in co-operation with other municipalities
2. establish selective collection of small hazardous domestic waste⁵
3. establish selective collection of compostable wastes (e.g. vegetable, fruit and garden waste), or dry recyclable materials
4. raise awareness about selective collection and a consumption behaviour that prevents the generation of domestic waste.

The Public Waste Agency of Flanders, OVAM, on the other hand, was to raise the general awareness as regards prevention, separation at source, and selective collection. Moreover, OVAM was to make all the necessary initiatives to facilitate the processing of selectively collected waste, its disposal and actual recycling.

Third generation of agreements

The third generation of agreements consists of a basis (Policy Instruments) and eight clusters (six 'technical' themes and two with an integration theme, area-oriented operation and target group policy). The "solids" cluster includes waste and environmentally justified product consumption. The Policy Instruments include many of the elements from the first generation of agreements. The structure of the third generation agreement is shown in Figure 3.1.

Figure 3.1 Structure of the co-operation agreement, 2002-2004



Source: Ministry of the Flemish Community (2002)

⁵ Household hazardous waste

The cluster “Basis/Policy Instruments” and the eight theme clusters are divided in three ambition levels and the financial support to a municipality depends on which ambition level it chooses, i.e. the higher the ambition level, the higher the subsidy. Level 1 is the minimum level a municipality can sign up for. The three ambition levels for the solids cluster as they are defined in the agreement are presented in Annex I.

Subsidies

The subsidies paid for the solids cluster are shown in Table 3.2. For the first five-year period the subsidies amounted to EUR 37 million, and this had decreased to EUR 28 million in the last five-year period. The revenue from the waste disposal levy finances the subsidies in the environmental agreement, (Parent et al. 2004, 12)⁶.

The table shows that the number of municipalities at levels 1 and 2 fluctuate over a contract period. The reason is that the requirements become more difficult to reach over time. This is particularly the case for the targets for residual waste at level 2. In the beginning of a contract period, many municipalities perform well, but as it becomes more difficult to meet the requirements more municipalities opt for level 1. It takes time to implement most policy changes and even more time before the effect on the performance is visible.

The subsidies do not cover the legislative requirements that municipalities have to fulfil according to the Flemish legislation (Putseys 2007). Part of the solids cluster at level 1 consists of legislative requirements, but the subsidies are not given for those requirements. They are given for the activities under level 1 that are not legally required but which are important to carry out because they are necessary for a good waste management performance at the municipal level. Some legal requirements are very important for this good municipal waste management performance, and if those requirements are not met, they will affect all non-legal requirements under level 1 and there will be no effect at all. Thus, some legal requirements are put under level 1 as conditions which have to be met before all other non-legal requirements of level 1 are considered.

From 2002 to 2004, OVAM financed 70% of all Flemish local authorities’ investments in waste prevention stimulating items such as compost bins, breadbox, reusable shopping bags, reusable beverage beaker, wormery, drinking fountain, reusable nappy, investments in prevention projects and educational material. Between 2005 and 2007 the financing is reduced to 50% (ETC/RWM (2006)).

Table 3.2 Number of municipalities who have signed the agreement and amount of subsidies paid in the solids cluster

Year	Municipalities signed	Million EUR	Municipalities at level
1992-1996	294	37	-
1997-2001	284	33	N/A
2002	185	5.5	Level 1: 142; Level 2: 43
2003	195	5.1	Level 1: 162; Level 2: 33
2004	222	4.4	Level 1: 166; Level 2: 56
2005	249	6.5	Level 1: 174; Level 2: 74
2006	251	6.5	Level 1: 162; Level 2: 59
2002-2006	-	28	-

Source: Parent et al. (2004) and OVAM (2006, 188)

On average, the subsidy amounts to EUR 22 000 per municipality per year. With an average waste management charge of EUR 190 per household per year, the waste management costs in a municipality with 19 000 inhabitants (and 8 000 households) amounts to EUR 1.5 million. In this rough calculation, the subsidy is around 1.5% of waste management costs.

⁶ The subsidies cover "services for the general public interest" not "services for the general economic interest".

Administration and monitoring of the agreement

OVAM monitors whether all requirements regarding waste and environmentally justified products in the agreements are fulfilled every year. Only when the yearly monitoring has a positive outcome, the subsidies are paid to the municipalities.

In order to monitor developments, OVAM has established a database on household waste collection (collection data). The database is very important in order to be able to check whether the reported data are correct, because it is used as the basis for assessing whether municipalities have reached the defined target for residual waste and thus are liable to receive their subsidy or not. The evaluation of the municipality's performance regarding the solids cluster is based partially on the database and partially on the yearly environmental report all municipalities have to provide to the Flemish administration (it contains all activities and performance during the previous calendar year regarding all requirements set in the environmental agreement that the municipality has signed).

OVAM needs around six months from the moment the data are reported to the moment all data are validated and put in the database. Hence, the data are reliable for calculation of the targets reached on residual waste. In addition to the database, also the environmental reports of the municipalities are checked by OVAM.

A first evaluation of reports and data from municipalities is done from April to July, and around mid-June reasonably good data are available for residual waste. The second evaluation with extra information provided by the municipalities and with a completely validated database is done from September to November. Then the final decision is made on whether or not the municipality will receive its subsidies.

It is important that the data quality is good in order for the agreements to come across as a legitimate basis for refusing a subsidy to those municipalities that did not meet their target. This is also a reason for using residual waste for reporting as one of the criteria. Separately collected waste streams are often pre-treated and/or sent abroad for treatment and therefore the data quality is difficult to manage. By focusing on the residual waste target, this is in fact also an indirect focus on all initiatives of separate collection and waste prevention (Putseys 2007).

3.2.2. Kitchen and garden waste

To manage kitchen and garden waste the policy focuses on: encouraging home composting, establishing 'waste free gardens' and separately collecting and composting garden waste and bio-waste⁷ (Parent et al. 2004, 15).

The Flemish Compost Organisation, VLACO, was established in 1992 as a separate, independent organisation in co-operation between OVAM, the intermunicipal waste associations, private compost producers and some cities. From December 1998, VLACO also covers prevention and home composting (European Compost Network). VLACO is responsible for coordinating the implementation of systems to collect and manage kitchen and garden waste, for monitoring the quality of compost and to promote sales (Parent et al. 2004, 15).

Green waste and bio-waste

Municipalities can decide whether they will collect only garden waste or bio-waste (garden, vegetable and fruit waste). If municipalities choose the separate collection of bio-waste, they have to collect it door-to-door at least once every two weeks (collection of bio-waste at recycling centres is prohibited). If they chose to collect garden waste only, it has to be collected at the recycling centre and door-to-door at least four times a year. The

⁷ Here bio-waste is vegetable, fruit and garden waste (VFG).

choice of separate collection of garden waste (instead of bio-waste) also implies an intensive scheme to promote home composting of bio-waste.

Compost Masters programme

To encourage home composting VLACO has initiated the Compost Masters programme that has been in place for ten years. It is an important communication link between municipalities and citizens. The Compost Masters provide information to their neighbours and other citizens about how to compost bio-waste at home. There are 3000 active, voluntary Compost Masters in Flanders (Vandenbroek 2007).

Box 3.1 Compost Masters in the municipality of Aalst

- The municipality of Aalst has around 77 000 inhabitants, and 40 voluntary Compost Masters.
- To become a Compost Master one needs to participate in a training course: theory, practise and presentations, coordinated by the intermunicipal association, ILVA, and Aalst provide staff. VLACO organises teachers and training material.
- There are five working groups in Aalst:
 - Young people, schools and children (e.g. compost at the school area)
 - Demonstration: site for all to see and ask questions
 - Neighbourhood composting: only for households without their own garden, to make it possible to compost organic waste
 - General communication: publication of articles, open garden day
 - Presentations for associations etc.
- It is important to keep the Compost Masters motivated, they often participate for social reasons, they meet regularly, hence it is important to pamper the volunteers.
- Recruiting is made through newspaper and courses.
- From the municipality's point of view the Compost Masters Programme is not expensive but time consuming.

Source: Singelyn (2007).

3.2.3. Financing of waste management services

The polluter pays principle was established by cost covering waste treatment tariffs. The local authorities finance waste management services from three sources (Parent et al. 2004, 13):

- a cash charge, e.g. the price of a household refuse bag, sticker for the bio-waste container, price per kg residual and bio-waste, etc. This cash charge is the “variable cost” which depends on the amount of waste generated.
- waste and/or environmental tax per household supplemented in part by the general income tax in the municipality. This tax per household represents the fixed costs regarding household waste management generated per household. It is based on the fixed costs of waste collection, infrastructure and treatment regardless of the amount of waste generated.
- organisations established by industry in order to organise the take-back obligation for certain waste streams (producer responsibility). Citizens also pay a contribution when purchasing a product or packaging to cover the waste management costs.

In most municipalities a combination of cash charge and waste/environmental tax is used to implement the polluter pays principle. The next step is to evolve the system to a pay-as-you-throw system where only a charge per amount of waste is implemented. This charge covers the variable and the fixed cost relating to waste management. Some municipalities have implemented this system already.

Almost all municipalities have introduced pay-as-you-throw schemes in combination with a lower flat rate tax, using a specific obligatory household refuse bag or more complex collection systems with chipped bins that are weighed during collection. For example, in the intermunicipal association, IOK with 29 municipalities this system of chipped bins is

being introduced. At the moment 70-80% of the municipalities in IOK have introduced it, the aim being extension to all municipalities (Macken 2007).

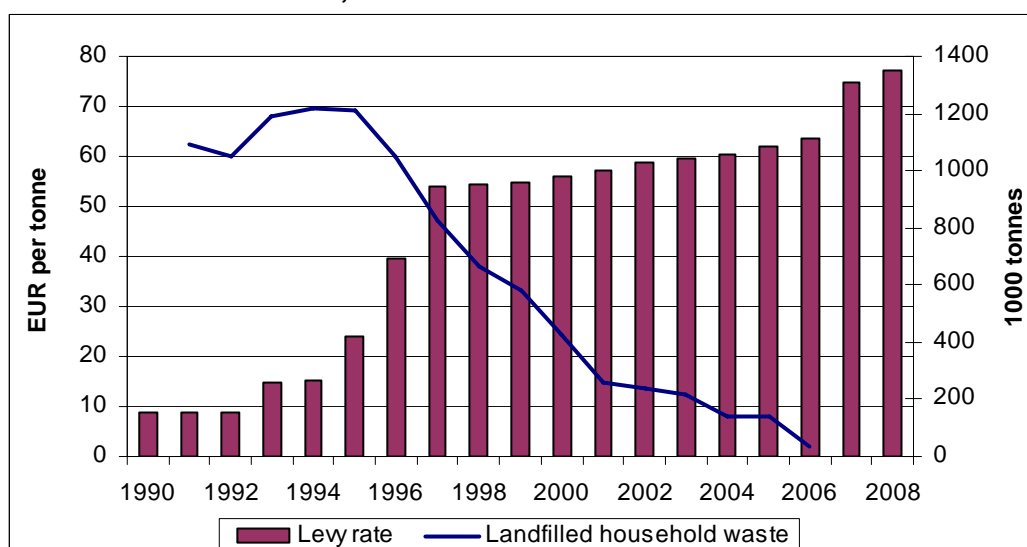
In Aalst, part of waste management costs is financed via income taxes (Singelyn 2007). A general principle in defining the waste management charge in the municipality is that prevention should be free, while management of residual waste should be at a higher cost than separate collection of recyclable materials.

Around 2004, the average cost of the ‘extended system of separate collection’ was below EUR 190 per year per average family (2.5 persons). The taxes and cash taxes imposed by the municipality were EUR 155, management of packaging waste by the ‘green dot’ was EUR 25, and waste subject to an acceptance obligation was EUR 10 (Parent et al. 2004, 14).

3.2.4. Waste disposal levy

The waste disposal levy was introduced in 1990 at almost EUR 10 per tonne. Between 1993 and 1997 the levy rose from EUR 15 to EUR 54 per tonne. The next nine years the levy increased only moderately until it was raised from EUR 64 to EUR 75 in 2007. Figure 3.2 shows the development in the waste disposal levy and the amount of landfilled household waste. From the graph it seems that the diversion of waste from landfill started when the levy reached EUR 40 per tonne.

Figure 3.2 Waste disposal levy rates and landfilled quantities of household waste, 1990-2008



Source: OVAM, personal communication, May 2008, and Statistics Flemish Region

The levy is differentiated for household and industrial waste, and for the management of waste. In 2002, the levy was EUR 60 per tonne of landfilled household waste. Far lower rates apply for waste that is recovered with energy generation (EUR 7 per tonne in 2007). Separately collected recyclable waste streams are exempted from the tax.

The revenue from the waste disposal levy goes to the general budget of the Flemish Region. However, part of the revenue finances the environmental agreements (Parent et al. 2004, 12). The revenue decreased between 1996 and 2002, but since 2003 it has been increasing slowly. However, as the revenue accrues from both household and industrial waste it is difficult to assess whether the changes in revenue are due to changes in the management of one or the other waste stream.

Table 3.3 Waste disposal levy, 2002. EUR/tonne

Household waste	

- landfill	60
- incineration without energy recovery	14
- incineration with energy recovery	6.5
Industrial waste	
- landfill	59
- incineration without recovery	24
- incineration with recovery	8.5

Source: ETC/RWM (2006)

3.2.5. *Ban on landfilling and incineration of certain waste streams*

Due to the scarcity of land in Flanders and the policy to divert waste from landfill, the Minister for the Environment decided in 1993 not to establish new landfill sites. A few years later, the Minister decided to extend this decision and not establish more capacity for incineration except for the three plants that were planned already (Putseys 2007).

Since 1998, only waste which cannot be prevented, recycled or incinerated may be landfilled. The following wastes are banned from landfills, (EC 2005):

- unseparated household and commercial waste
- waste materials that are collected separately with a view to be recovered
- waste materials that can be recovered because of their nature, quantity and homogeneity
- the combustible residual fraction of separated household waste or comparable commercial waste
- old and expired medicines.

Until 2005, landfills were allocated an annual quota of waste that could be landfilled if the capacity for thermal treatment was not sufficient. From 2005 extra capacity must be created to reduce landfilling of household waste and commercial category 2 waste to zero. Landfilling is only allowed in emergency cases or if the required treatment capacities are not realised in time. The criterion to distinguish between combustible and non-combustible waste is a TOC content of 6% (EC 2005).

In addition to the landfill ban, a ban on incineration of the following waste streams was introduced in 1998 (Wrante 2007):

- Selectively collected wastes that can be recycled, except for some high calorific wastes for renewable energy purposes
- Unseparated industrial and household wastes.

3.2.6. *Duty of acceptance: waste paper*

Waste paper was chosen to be subject to producer responsibility (duty of acceptance) due to its large volume and the resulting impact on the municipal waste budgets, (Bracke and De Clercq 2005, 5).

Two agreements have been made: one with the printed advertisement sector and one with the informative press, (Bracke and De Clercq 2005, 7). Both agreements are of financial nature only. The printed advertisement sector deposit 0.37 eurocents per kg of paper they place on the market in a fund, which is then transferred to the local authorities depending on how much paper has been collected separately. The informative press, on the other hand, has granted advertising space to the Flemish region worth EUR 3.22 million. Both compensations never covered the full cost of collection and recycling at the local level (Delatter 2007).

3.2.7. *Tyres*

Duty of acceptance (producer responsibility)

A producer responsibility system was introduced in 1997. As of 1 July 1999 producers became responsible for taking back end-of-life products only when consumers bought a

new product of a similar kind, (Bracke and De Clercq 2005, 5). Five years later (1 July 2004), the responsibility was extended to include tyres of first assembly (i.e. new cars), but not to historical stocks of tyres (e.g. from agriculture). The last environmental agreement for tyres was signed in 2003.

Recytyre is a non-profit organisation responsible for collecting and recovering tyres in Belgium. The main members are the six main tyre manufactures. The system is organised on a national scale and each of the three regions in Belgium is represented on the board as observers (Lorquet 2007).

The Recytyre system was started in 1999, but stopped between 2004 and 2005 because of legal problems. Recytyre had divided Belgium into a number of geographical entities and negotiated a contract with a collector in each one, but this was not in line with legislation. Hence, Recytyre had to make a market for Belgium and set up a structure for a new system. Currently, a legal case is ongoing with the collectors that lost their contract as a result of the restructuring (Lorquet 2007).

Recytyre is only responsible for the replacement market, i.e. tyres on new cars and end-of-life vehicles are not covered by Recytyre. The system covers 98% of this replacement market or around 6.2 million tyres of which 5.1 million is from passenger cars. Importers of new cars have resisted signing an agreement with Recytyre as it may open the door for more fees such as for used oil, batteries, etc.

The activities are financed by customer charges. Before the start in 2005, a study of costs was made. The Netherlands and France had started their systems and their cost was EUR 1.90/tyre which seemed to equal the Belgian costs, hence the charge was set at the same level. Since then the charge has risen to EUR 2.40/tyre incl. VAT from cars and light lorries.

The Association of Flemish Cities and Municipalities, VVSG, has estimated the actual cost of managing used tyres at recycling centres (municipal civic amenity sites) to be EUR 1.75/tyre. This covers only management and it does not include transport and recycling/disposal (Delatter 2007). In comparison, Recytyre pays EUR 0.25/tyre to the municipalities.

Waste tyres are collected through the municipal collection sites and end-sellers such as tyre dealers, garages, etc.. Approx. 95% of the used tyres are collected in garages etc. and 5% in recycling centres (Delatter 2007). Not all municipalities collect used tyres at recycling centres and in 2006, 253 Flemish municipalities collected tyres, (Putseys 2007).

Landfill ban

A landfill ban on the landfill of whole tyres and shredded tyres has been in effect from 1999 (Golder Associates 2005, 123).

3.2.8. Construction & demolition waste

The actions taken to prevent the generation of C&D waste have been involvement of all parties; life-span extension of the products, promotion of environmentally-friendly materials and products and development of prevention manuals through the 'Presti'-programme (Suikerbuijk et al 1999, 34).

In order to reach a high level of separation of waste, the Waste Decree was revised in 1994 and defined conditions for the use of waste in or as construction material. A ban on the landfill of unseparated industrial waste was introduced from 1 July 1998 (VLAREA regulation). A waste disposal levy was also introduced. Moreover, an Implementation Plan for C&D waste was developed in 1995 (Symonds 1999, 145).

In 1997, contractors and separation companies entered a voluntary agreement where companies who separated their waste would get a better price for the waste (Symonds 1999, 146). The Flemish recycling association and the regional governments entered a voluntary certification scheme for recycled aggregates which is managed by the organisation, COPRO. The COPRO certification also includes quality assurance systems of recycling plants (Symonds 1999, 147).

3.3. Stages of implementation

The table below focuses on the general waste regulation, the developments in waste management plans (targets) and environmental agreements.

Table 3.4 Waste regulation in Flanders

Regulation	Contents
Waste Decree of 2 July 1981	Establishment of OVAM; provides legal framework for waste plans
Waste Plan 1986-1990 (Parent et al. 2004)	Close down and sanitation of dumping grounds, optimal use of incineration capacity, 'green light' for separate collection of household waste. Primary focus on waste disposal.
Waste Plan 1991-1995 (Parent et al. 2004)	Separate collection of household waste was further promoted (including measures and infrastructure to support this). Clear focus on waste prevention and recycling.
Environmental agreement with municipalities, 1992 – 1996 (Wille 2004)	Focus: stimulating selective collection <ul style="list-style-type: none"> • prevention: one action/year • container park • selective door-to-door collection
Decree of 15 June 1994 concerning environmental policy agreements (duty of acceptance) (Bracke and De Clercq 2005, 4)	Revised to include, among other things, international obligations and a new instrument: the duty of acceptance
Implementation Plan for Household Waste, 1997-2001	Sets specific targets for household waste prevention (esp. residual waste); separate collection of packaging waste ; backyard composting; network of reuse centres; awareness raising. Focus on prevention.
Waste Decision of 17 December 1997	The duty of acceptance was further elaborated (VLAREA)
Environmental agreement with municipalities, 1997 – 2001 (Wille 2004)	Introducing prevention and reuse, reduction of residual waste <ul style="list-style-type: none"> • 1997-1999 (basic element; and the municipalities/provinces could choose from a number of options) • 2000-2001 (adjustment: more consideration of and incentives for a sustainable environment policy) <p>Contents: prevention, communication actions, projects, civil servants responsible for durability, cooperate with recycling centres, optimal selective collection and reduction of residual waste to 220 kg/inhabitant/year</p>
The Strategic Waste Plan of Flanders, approved in May 2001, outlines the scope of the waste policy for 2002 – 2006, with a view to 2010, MIRA-T, 2001 (ETC/RWM 2006)	The starting point for the development of the plan is a set of four planning objectives: <ul style="list-style-type: none"> • the production of waste and the effects thereof on the environment can no longer increase, • raw materials and energy are replaced by waste products, • the overall volume of waste to be dumped or incinerated is limited in an ecologically sound manner, effectiveness of the waste policy is increased.
Environmental agreement with municipalities, 2002 - 2004 (2007) (Wille 2004)	Contents: <ul style="list-style-type: none"> • prevention, example function, target groups, stimulating eco-consumption (catering, construction materials, maintenance of gardens, office equipment, cleaning products)
Decision of the Flemish Government of	Enacting the Flemish regulations concerning the preven-

Regulation	Contents
5 December 2003	tion and management of waste (renewed VLAREA)
Implementation Plan for Household Waste, 2003-2007 (Parent et al. 2004, ETC/RWM 2006)	<p>Targets of this plan are:</p> <ul style="list-style-type: none"> • 13% prevention of household waste in 2007 as compared to 2000 • 69% of household waste is selectively collected and recycled or composted • residual household waste should not be more than 180 kg/cap in 2003, 165 kg/cap in 2005 and 150 kg/cap per year in 2007. • From 2005 only waste which cannot be incinerated may be landfilled. Processing capacity must be increased: (MBT) treatment capacity of 600 000 tonne per year and fluidised bed incineration plants.
Ministerial Decision of 18 July 2005	Criteria for calculation of the costs that municipalities have to cover in order to collect waste streams that are covered by a duty of acceptance. Hence the producers who have the duty of acceptance can pay all municipalities which provide a service correctly, and by which the producers can (in part) fulfil their duty of acceptance and the targets set by it.

4. Understanding the associated package of measures

Most of the associated policies were introduced after the implementation of the environmental agreement and the waste tax.

4.1. Relationships with a package of other policy interventions (e.g. implementation of the Incineration Directive)

Flanders transposed the Incineration Directive in December 2003, (ETC/RWM 2006).

Two of the planning objectives in the Strategic Waste Plan of Flanders (MIRA-T, 2001) are that raw materials and energy are replaced by waste products, and that the overall volume of waste to be landfilled or incinerated is limited in an ecologically sound manner. These objectives resulted in six interrelated projects, one of which is a High Calorie Waste Project (ETC/RWM 2006).

4.1.1. Packaging and packaging waste

For packaging waste, an Interregional Cooperation Agreement was signed in May 1996, in order to implement the Packaging Directive 94/62/EC. It requires every company⁸ to take back its waste packaging⁹ in order to reach individual recycling and recovery rates.

The regions have set up the Interregional Packaging Commission (IPC) where all three regions are represented. The Interregional Packaging Commission is to ensure compliance with the provisions of the Interregional Cooperation Agreement. The main responsibilities of the Packaging Commission are (WasteBase):

- To approve or reject general prevention plans.
- To control the way the authorised organisations achieve the required targets for recycling and useful application of packaging waste
- To approve or reject authorisation of organisations. Once these organisations are approved for the take-back obligation, the IPC controls their functioning and can, if required, suspend their authorisation
- To verify the compliance of several information obligations
- To supervise administratively and legally the cooperation agreement in the three regions (the Flemish, Walloon and Brussels Capital Region)
- To formulate proposals and recommendations on behalf of the regional governments.

4.2. Objectives

4.2.1. Packaging and packaging waste

The targets in the agreement were:

	1996	1997	1998	1999	Packaging Directive 2008 targets
Recycling	35%	40%	45%	50%	Min. 55%, max 80%
Total useful applied	50%	60%	70%	80%	60%

Source: Interregional Cooperation Agreement (1996) and the revised Packaging Directive 2004/12/EC

⁸ That has packed products in Belgium or has them packed.

⁹ Take-back obligation is used for all packaging waste. The producer who puts products on the market in a single-use packaging is responsible when the packaging becomes waste.

Belgium has met the targets of the 1994 Packaging Directive and the Interregional Cooperation Agreement (Fostplus 2003, 4)¹⁰. As shown in the table, the targets for 1999 were very close to the 2008-targets of the revised Packaging Directive.

In addition, any company which places more than 10 tonnes of packaging per year on the market is to draw up a waste prevention plan.

4.3. Stages of implementation

Fostplus is an organisation set up to manage packaging waste. The organisation covers Belgium.

Waste stream	Signed agreement	Name of waste management organisation	Date for set up of waste management organisation
Packaging	30 May 1996	Fostplus	

Source: Interregional Cooperation Agreement (1996).

¹⁰ Only data for Belgium are available, however it is assumed that Flanders has met the targets.

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 the landfill, 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 5.8 to 5.11 at the end of this section.

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 the state of 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 where the Landfill Directive was transposed and in the study it is used to assess the trends before and after the policy implementation. In the Flemish region the Landfill Directive was transposed in 2001.

5.1. Development in reference indicator: Landfill Directive target

The generation of BMW in 1995 and the landfill of BMW in 2001-2003 are shown in Table 5.1. The generation of biodegradable municipal waste in the *Flemish region* was 3.4 million tonnes in 1995.

Table 5.1 Generation and management of BMW in 1995, tonnes

Total generation of biodegradable municipal waste	3,397,080		
Separately collected biodegradable waste	1,974,080		
- food industry and commercial activities		1,656,080	
- households and municipalities		318,000	
- Biowaste (vegetable, fruit and garden waste)			231,000
- green waste			87,000
Landfilled or incinerated biodegradable municipal waste	1,423,000		
- household waste:		880,000	
- landfilled			484,000
- incinerated			396,000
- commercial waste:		543,000	
- landfilled			500,500
- other biodegradable			42,500

Source: OVAM, personal communication, October 2007

With a generation of 3.4 million tonnes of BMW each inhabitant generated 579 kg of BMW. In other EU-15 Member States the generation of BMW varies between 150 kg per inhabitant (Netherlands) and 350 kg per inhabitant (Germany)¹¹ so by these standards the Flemish BMW generation is extraordinarily high.

¹¹ BMW figures reported in EC (2006) divided by number of inhabitants.

Moreover, in 1995 the generation of municipal waste for *Belgium* was 4.6 million tonnes (Eurostat, Structural Indicators) and in this light the generation of BMW in the *Flemish region* is extremely high which indicates differences in the methodology for waste statistics in the Flemish region and Belgium. The Flemish BMW generation includes biodegradable waste from food industry and commercial activities. If the 1.66 million tonnes of separately collected BMW is subtracted¹², the BMW generation was 1.74 million tonnes, which corresponds to 290 kg per inhabitant.

The generation of BMW in 1995 and the landfill of BMW in 2001-2003 are shown in Table 5.2. As the table shows, the Landfill Directive target for 2016 was already met in 1995. Measured per inhabitant the landfilling of BMW fell from 168 kg in 1995 to 97 kg in 2003.

Table 5.2 Generation and landfill of BMW in Flanders, cf. Landfill Directive targets

	1995	2001	2002	2003
Generation, 1000 tonnes	3397			
Landfilling, 1000 tonnes	985	998	698	584
Cf. Landfill Directive target	29%	29%	21%	17%

Note: In EC (2006) the amount of generated BMW in the Flemish region was 4.8 million tonnes in 1995.

Source: EC (2006, 183f) and OVAM, personal communication, September 2007

5.2. Factors related to BMW and landfill policy

Landfill Directive 1999/31/EC transposed

The directive was transposed in 2001 in the *Besluit van de Vlaamse Regering houdende de algemene en sectorale bepalingen inzake milieuhygiëne, zoals herhaaldelijk gewijzigd en meer specifiek bij besluit van de Vlaamse Regering van 13.07.01 (B.S. 19.09.01)*, (ETC/RWM 2006).

Landfill tariffs or gate fees

The average tariff for landfilling has increased from EUR 40 in 1996 to EUR 65 in 2005 excl. VAT and waste disposal levy.

The increase can be attributed to indexation over the years and also to the more strict regulations put in place. Since 1996 the Flemish region anticipated on the implementation of the Landfill Directive. A direct result was more costs to operate landfill sites (including "aftercare" for 30 years after closure of the landfill site) and thus an increase in landfill tariffs. Moreover, as less waste goes to landfill, the fixed costs per tonne increase.

Table 5.3 Landfill gate fees, EUR/tonne

1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
39.6	45.3	56.6	47.5	51.1	54	57	57	59	65

Source: OVAM (2007, 164)

Landfill tax

In 2002, the waste disposal levy for household waste was EUR 60 per tonne, and the incineration tax was EUR 6.5 per tonne in case of energy generation, otherwise it was EUR 14 per tonne (see Table 3.3).

¹² To estimate the BMW generation without waste from the food industry.

Prohibition of untreated waste in landfill and selective landfill bans

A ban on the landfill of certain waste streams, including BMW (see section 3.2.4), has been in place since 2005. Similarly, a ban on incineration of selected waste streams was introduced in 1998.

5.3. Factors related to waste generation and collection

BMW generation

As mentioned earlier, 579 kg of BMW was generated per inhabitant in 1995. If the 1.66 million tonnes of biodegradable waste from food industry and commercial activities is subtracted, each inhabitant generated 290 kg.

Separate collection of BMW

Separately collected paper & cardboard, bio-waste (vegetable, fruit and garden waste) and green waste from households and municipalities is shown in Table 5.4. The amount of biodegradable waste that has been separately collected from the generated *household* waste has increased from 10% in 1991 to 38% in 2000 and this share has remained stable until 2004.

Table 5.4 Separately collected household BMW, 1000 tonnes

1000 tonnes	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Paper & board	82	112	147	181	197	260	322	386	423	438	432	418	425	449
VGF and green waste	141	185	228	281	318	428	617	722	753	844	820	870	784	852
Total separately collected BMW	224	297	375	462	515	688	939	1108	1176	1282	1252	1288	1209	1301
Total separately collected BMW, kg per capita	37	51	64	79	88	117	159	187	198	216	210	216	202	216

Source: Statistics Flemish Region

In 1995, 29% of the municipalities had kerbside collection of bio-waste and in 1998 this had risen to 57% (Suikerbuijk et al 1999, 19).

'Full cost' collection tariffs/charges

This factor shows the share of waste management costs covered by tariffs or charges (not taxes), in per cent of total costs. The purpose is to illustrate if the local authorities are in a good position to collect money to cover costs as it may ease the implementation of new policy, collection systems, etc.

As presented in section 3.2.2, municipalities are in a good position to finance waste management initiatives. Still, most municipalities do not finance costs exclusively via a waste collection tariff. Costs are also covered via income taxes in municipalities.

5.4. Factors related to landfill sector

Share of household waste landfilled

In 2001, 8% of the generated household waste was landfilled. In comparison, the landfill rate in the EU-15 was 53%.

Table 5.5 Management of household waste

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
1000 tonnes														
Recycling	402	516	614	749	859	1,120	1,496	1,778	1,945	2,111	2,201	2,243	2,176	2,407
Incineration	844	882	823	841	812	722	786	694	697	784	860	863	806	819
Landfilling	1,094	1,053	1,189	1,220	1,213	1,051	827	664	580	424	261	237	219	143
Total	2,340	2,451	2,626	2,811	2,883	2,893	3,110	3,136	3,222	3,319	3,323	3,316	3,201	3,369
In %														
Recycling	17%	21%	23%	27%	30%	39%	48%	57%	60%	64%	66%	68%	68%	71%
Incineration	36%	36%	31%	30%	28%	25%	25%	22%	22%	24%	26%	26%	25%	24%
Landfilling	47%	43%	45%	43%	42%	36%	27%	21%	18%	13%	8%	7%	7%	4%

Source: Statistics Flemish Region

Landfill residual capacity (for non-hazardous waste)

The total residual capacity in landfills was 6.2 million tonnes in 2000 and this had been reduced to 2.63 million tonnes in 2005 (Putseys 2007). In 2005, there were five landfill sites.

The waste infrastructure is subsidised through a decision of the Flemish government. This decision is dependant of the Waste Decree.

5.5. Factors related to incineration sector

Share of household waste incinerated

In 2001, 26% of the generated municipal waste was incinerated. In comparison, the incineration rate in the EU-15 was 17%.

Dedicated incineration capacity (available)

The total capacity for incineration of household and industrial waste was 1.168 million tonnes in 2000 at an average calorific value of 10 GJ/tonne (Putseys 2007). Thus, the capacity equals 50% of the generated household waste. In 2007, the capacity had increased to 1.224 million tonnes. There are 13 modern incineration plants.

Incineration gate fees

The average tariff for incineration has increased from EUR 56 in 1996 to EUR 103 in 2005 excl. VAT and waste disposal levy. The increase is caused by the environmental requirements which have become stricter over the years (investments in dioxin and NOx abatement to meet emission standards, etc.)

Table 5.6 Incineration gate fees, EUR/tonne

1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
56.5	67.9	86.2	83.0	87.5	91.7	95.7	96.2	100.1	103.0

Source: OVAM (2007, 162)

National policies on RES (Renewable Energy Sources)

The 'share of electricity from renewable energy to gross electricity consumption' measures the contribution of electricity produced from renewable energy sources to the national electricity consumption. Electricity produced from renewable energy sources comprises electricity generation from hydro plants (excluding pumping), wind, solar, geothermal and electricity from biomass/wastes (Eurostat). 41% of energy recovered during the incineration of residual household waste is considered to be renewable.

The Belgian target for RES is 6% in 2010, and 1.6% was achieved in 2001 (Eurostat). According to the International Energy Agency, Belgium produced 789 GWh electricity and 1 958 TJ heat from incineration of municipal waste in 2004. This is equal to 4 800 TJ. As the total energy production based on renewables in Belgium was 15 600 TJ, energy from incineration of waste was 30% of the renewable energy source.

5.6. Factors related to material recycling and recovery sector

Packaging and packaging waste policy (for Belgium)

Table 5.7 shows the generation and recycling of paper and cardboard packaging in Belgium. It seems reasonable to assume that the Flemish region has the same level of recycling (or possibly higher) than Belgium. The targets for paper and board recycling of the 1994 and the revised 2004 Packaging Directive have been met.

Table 5.7 Paper and board packaging generation and recycling, Belgium

	1997	1998	1999	2000	2001	2002	2003
Arisings, tonnes	529,600	539,750	591,700	516,120	520,550	568,500	592,978
Recycling, tonnes	410,620	448,580	412,450	423,970	446,734	445,430	469,430
Recycling rate	78%	83%	70%	82%	86%	78%	79%

Source: European Commission, Packaging and Packaging Waste web site

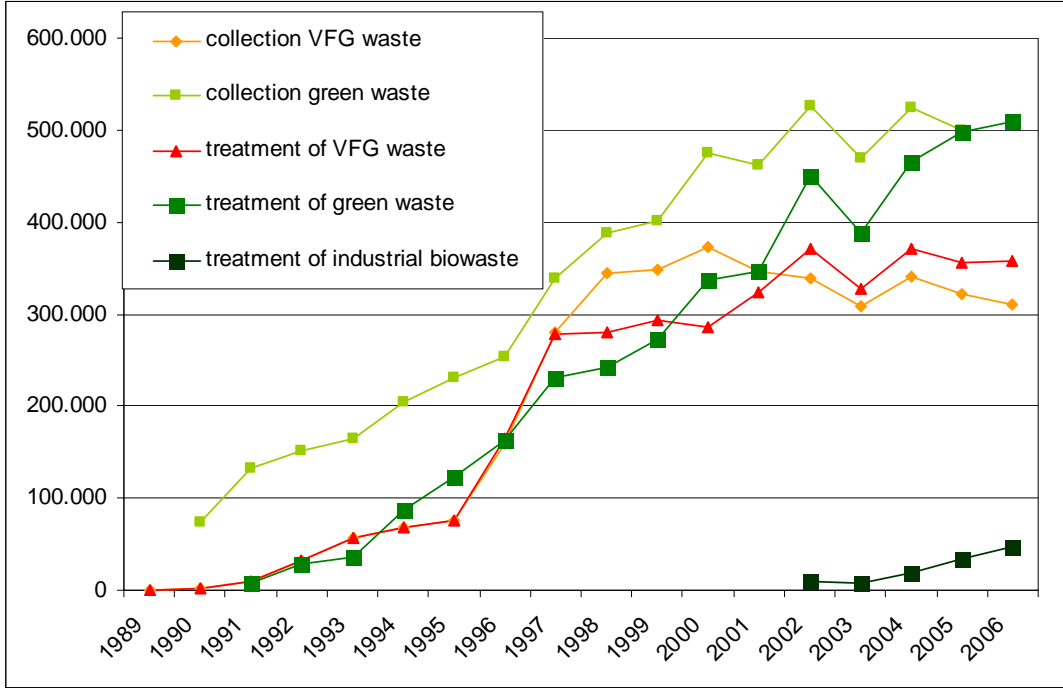
MBT capacity

According to the waste management plan 1997-2001, the aim is to establish Mechanical Biological Treatment capacity of 600 000 tonnes per year. In 2007, one MBT-installation is in operation with a capacity of 150 000 tonnes per year (Putseys 2007). The products from MBT are incinerated.

Compost capacity

In the Flemish Region, around 500 000 tonnes of green waste and 320 000 tonnes of bio-waste were collected and treated in 2006. By reading from Figure 5.1, it is estimated that 330 000 tonnes of green waste and 310 000 tonnes of bio-waste were treated in 2001 (the year of implementing the Landfill Directive). Thus, in 2001 compost capacity was around 640 000 tonnes per year, or 19% of the BMW generated in 1995 (see Table 5.8).

Figure 5.1 History of separate collection and bio-waste treatment in the Flemish Region. Tonnes.



Source: Belgian point of view regarding the end-of-waste criteria for compost

In 2006, more than 330 000 tonnes of compost were produced (Belgian point of view regarding the end-of-waste criteria for compost). 34% of the compost was sold to organisations that buy large amounts of compost, 40% was used on green areas and 9% was

used in agriculture. The remaining 9% was either exported or used for other purposes (Vandenbroek 2007).

The price of compost is approx. EUR 6-7/tonne (Vandenbroek 2007). There may be local competition among composting plants, especially in spring when the demand is high.

Box 5.1 The Flemish quality assurance system (QAS) for compost

The Flemish Compost Association, VLACO, has established a quality assurance system for compost which is obligatory for all composting and digestion plants in the Flemish Region. The QAS is based on the principles of integral chain management. The QAS takes into account all aspects of the composting chain, from the acceptance of bio-waste, the quality of the treatment process, end product quality up to customer support for a reasoned use. The outcome of the QAS on treatment plant level is one or several product certificates showing that the compost is produced according to the criteria set up in the certification scheme and the waste legislation. Without the control certificate, treated bio-waste cannot be used as a secondary material. Control of compliance with this certification scheme is carried out by means of regular audits and product sampling.

Source: Belgian point of view regarding the end-of-waste criteria for compost

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

On the following pages we present the favouring and hindering factors of the 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 reference indicator was presented in Table 5.2 and showed that the Flemish region landfilled 25% of the generated BMW in 1995. In other words, the Landfill Directive target was met already then. Using the terminology in the methodology, there *was* a trend of diversion from landfill (i.e. decreasing ratio 'BMW in landfill/BMW production') *before* the directive implementation and it *did not* change after the implementation.

Table 5.8 Factors influencing the effectiveness of a policy for diversion of BMW from landfill

Favouring/hindering factors	Influence on diversion	Justification of the +/- sign	Indicator	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Factors related to BMW landfill policy																			
Landfill Directive 1999/31/EC transposed	+	Legal framework in place	Dummy (1/0) If implemented no later than 2003 =1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	
Landfill tariffs/gate fees for BMW or MSW (excl. VAT and landfill tax)	+	High cost of landfill	Average for country, or the highest gate fee and the lowest gate fee, % increase up to 3 years after impl.						20%	13%	-5%	20%	12%	9%	14%	14%	10%		
Landfill tax on BMW (or MSW)	+	High cost of landfill	Average for country, or the highest and the lowest tax, % of gate fee											111%	105%	105%	102%		
Prohibition of untreated waste in landfill	+	Discourage landfill	Dummy (1/0) If implemented no later than 2005 =1	0	0	0	0	0	0	0	0	0	0	1 (2005)	1	1	1	1	
Selective ban on BMW	+	Quantity limitation by law	Dummy (1/0) If implemented no later than 2005 =1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Factors related to waste production and collection																			
BMW generation	-	High production requires many management options	BMW generation per capita					579 kg/290 kg											
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 biodegradable waste collected separately	10%	12%	14%	16%	18%	24%	30%	35%	36%	38%	38%	39%	38%	38%		
			% of household waste	4%	5%	6%	6%	7%	9%	10%	12%	13%	13%	13%	13%	13%	13%	13%	
				6%	8%	9%	10%	11%	15%	20%	23%	23%	25%	25%	26%	24%	25%		
'Full cost' collection tariffs/charges (excl. VAT and taxes)	+	Higher capacity to invest in separate collection and recovery/recycling	Share of waste management cost covered by tariffs, %	Less than 90% of the costs are assumed to be covered via charges: municipalities can finance waste management costs via a tariff paid by households or via income taxes. Costs are also covered via producer responsibility systems.															
Factors related to landfill sector																			
Share of MSW landfilled (Vlaamse Statistiek)	+	Pressure on capacity	Landfilled household waste over household waste generation, %	47%	43%	45%	43%	42%	36%	27%	21%	18%	13%	8%	7%	7%	4%		

Favouring/hindering factors	Influence on diversion	Justification of the +/- sign	Indicator	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Landfill residual capacity (non-hazardous waste)	-	Discourage diversion	Landfill residual capacity (non-hazardous waste), % of generated household waste										187%	187%			78%	78%
Land per capita	+	Land availability makes it a non-scarce resource	Land per capita in m2	2344	2333	2322	2313	2305	2300	2292	2287	2282	2276	2272	2262	2257	2248	2238
Factors related to incineration sector																		
Share of MSW incinerated (Vlaamse Statistiek)	-	Low incineration rate: makes diversion more difficult	Incinerated household waste over household waste generation, %	36%	36%	31%	30%	28%	25%	25%	22%	22%	24%	26%	26%	25%	24%	
Dedicated incineration capacity for MSW (available)	+	Makes diversion easier	Incineration capacity available, % of generated household waste										50%	50%			42%	
Incineration gate fees for MSW (excl. VAT and incineration tax)	-	High fee, low incentive to diversion	Average for country, or the highest gate fee and the lowest gate fee, % increase 3 years after implementation											9%	8%	7%	3%	
National policies on RES: Target for BE 6% in 2010	+	Targets for RES policies stimulate energy from MSW	Distance-to-target for E-RES on domestic electricity consumption, % points from target	4,9	4,8	4,9	4,9	4,8	4,9	5	4,9	4,6	4,5	4,4	4,2	4,2	3,9	
Factors related to material recycling and recovery sector																		
Packaging and packaging waste policy (for BE)	+	Stimulates diversion	Recycling rate (recycling over paper packaging placed on the market), %								78%	83%	70%	82%	86%	78%	79%	79%
MBT capacity	+	Favours diversion	MBT capacity, % of generated BMW (in 1995 for Flanders)											0,0%			4,4%	4,4%
Compost capacity (i.e. input of bio-waste)	+	Favours diversion	Compost capacity, % of generated BMW (in 1995 for Flanders) Note *											19%	24%	20%	24%	

Note: cells in light green: data from other years have been used. * The compost capacity is 10% when including the total BMW generation of 3.4 million tonnes in 1995 . If excluding the 1.7 million tonnes from food industry the compost capacity is 20%.

Table 5.9 Evaluation of indicator for landfill policy in 2001

Landfill policy	Indicator	Strong	Weak
Landfill Directive 1999/31/EC transposed	Dummy (1/0) If implemented no later than 2003 =1	1 Implemented in 2001	
Landfill tariffs/gate fees for BMW or MSW (excl. VAT and landfill tax)	Average for country, or the highest gate fee and the lowest gate fee, % increase up to 3 years after impl.		1 The landfill gate fee in 2004 had risen by 12% compared to 2001
Landfill tax on BMW (or MSW)	Average for country, or the highest and the lowest tax, % of gate fee	1 Assuming the landfill tax was EUR 60 per tonne in 2001, it was 111% of the gate fee of EUR 54 per tonne in 2001	
Prohibition of untreated waste in landfill	Dummy (1/0) If implemented no later than 2005 =1		1 No requirement for pre-treatment
Selective ban on BMW	Dummy (1/0) If implemented no later than 2005 =1	1 The landfill ban was implemented in 1998	
Summary evaluation		Globally strong: 3 out of 5	

Based on information in Table 5.9 the landfill policy for 2001 four of the five indicators are strong and thus the summary evaluation is 'globally strong'.

Table 5.10 Evaluation of favouring and hindering factors in 2001

		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 household waste, %	38% (>30%)	< 30%	1	BMW generation per capita	BMW generation, per capita tonnes	635 kg / 359 kg (> EU25 average)	< EU25 average
2	'Full cost' collection tariffs/charges	Share of waste management cost covered by tariffs, %	> 90%	Less < 90%					
Related to landfill sector									
3	Landfilled MSW of MSW generation	Landfill share of household waste generation, %	>EU25 average	8% < EU25	2	Landfill residual capacity (non-hazardous waste)	Landfill capacity (non-hazardous), as % of household waste generated	(> 5 years of generation)	1.9 years in 2000 < 5 years of generation)
					3	Land availability	Land per capita in m ²	(>5000)	2272 m² <5000
Related to incineration sector									
4	Dedicated incineration capacity for MSW (available)	Incineration capacity, as % of household waste generated	35% If capacity > 20% of generated MSW	(If capacity < 20% of generated MSW)	4	Incineration gate fees for MSW (3 years after implementation)	Average for country, or the highest gate fee and the lowest gate fee, EUR/tonne	(> 30% increase in gate fees)	9 % < 30% increase in gate fees
5	National policies on RES	Distance-to-target for E-RES on domestic electricity consumption, %	(> 50% of the 2010 target has been met)	27% < 50% of the 2010 target has been met	5	Share of MSW incinerated	Incinerated household waste over household waste generation, %	26 % > EU25 average	(< EU25 average)
Related to material recycling and recovery sector									

		Favouring factors (+ sign)			Hindering factors (- sign)				
		Indicator	Strong if	Weak if			Indicator	Strong if	Weak if
6	Packaging and packaging waste policy	Recycling rate paper and paper-board, %	86% > 50%	(< 50%)					
7	MBT capacity	MBT capacity per capita	(> 20% of BMW generation)	0 < 20% of BMW generation					
8	Compost capacity	Compost production capacity, tonnes/year	(> 20% of BMW generation)	19% < 20% of BMW generation					
	Summary evaluation	Can be both globally strong or weak 4 out of 8	Globally strong: If at least 5 strong out of 8	Globally weak: If at least 5 weak out of 8	Summary evaluation	Globally weak: 3 out of 5	Globally strong: If at least 3 strong out of 5	Globally weak: If at least 3 weak out of 5	

The favouring factors related to waste production and collection, landfill sector, incineration sector and material recycling and recovery sector are globally strong, while the hindering factors are globally weak. The compost capacity may be higher than indicated (20% of BMW generation in 1995), and if this is the case the evaluation of the favouring factors may be globally weak instead.

In the evaluation we have chosen configuration 1 (there was a trend of diversion from landfill *before* the directive implementation and it *did not* change after the implementation) using the landfill of household waste as reference. Based on the proposed methodology the summary evaluation shows that the policy has been 'ineffective'. This could very well be due to the fact that the majority of the policy measures in the Flemish region were implemented several years before the adoption of the Landfill Directive in 1999.

Table 5.11 Policy evaluation for Configuration 1 of diversion indicator: 'Trend of diversion from landfill existed *before* the directive implementation and it *did not* change after the implementation'

Combination	Landfill policy change	Favouring factors +	Hindering factors -	Summary evaluation
6	Strong: <i>The existing policy was far from the directive or was already in line but its change went beyond the directive</i>	Weak	Weak	Ineffective: policy has been very active but it was unable to exploit 'neutral' favourable and hindering factors
8	Strong: <i>The existing policy was far from the directive or was already in line but its change went beyond the directive</i>	Strong	Weak	Ineffective: policy has been very active but it was unable to exploit favourable factors in the presence of weak hindering factors

According to the methodology in Mazzanti and Zoboli (2007), the reference should have been the landfill of biodegradable municipal waste, but as discussed in connection with Table 5.2, there is some uncertainty about generation and thus, landfilled amount. As shown in Table 5.2 there was no diversion trend before the directive (29% BMW was landfilled in 1995 and in 2001) and a diversion trend started after the implementation. This is Configuration 3 of the methodology. With Configuration 3 the evaluation would be that the policy has been effective in diverting BMW from landfill.

Table 5.12 Policy evaluation for Configuration 3 of diversion indicator: 'Trend of diversion from landfill did not exist *before* the directive implementation and a diversion trend started after the implementation'

Combination	Landfill policy change	Favouring factors +	Hindering factors -	Summary evaluation
6	Strong: <i>The existing policy was far from the directive or was already in line but its change went beyond the directive</i>	Weak	Weak	Effective: policy has been active and it was able to exploit a 'neutral' combination of favourable and hindering factors
8	Strong: <i>The existing policy was far from the directive or was already in line but its change went beyond the directive</i>	Strong	Weak	Effective: policy has been active and it was able to exploit favourable factors in the presence of weak hindering factors

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

This section discusses the achievement of the objectives presented in sections 3 and 4 and the diversion of BMW from landfill. The evaluation of the policy measures is made in section 7.

6.1. Household waste (municipal waste)

To assess the generation and management of waste in the Flemish region data from the Statistics Flemish Region have been used. These data are for *household waste* only which means that they are not directly comparable with the data on *municipal waste* for the five countries in the study.

6.1.1. Generated waste

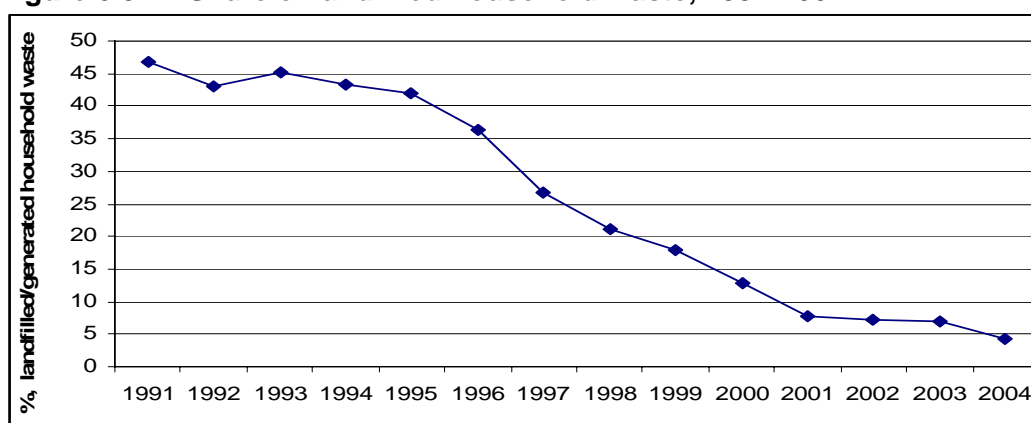
Since 1991 the total amount of generated household waste in the Flemish region has increased by almost 45%. Measured per inhabitant this corresponds to an increase from 405 kg to 560 kg.

For collected municipal waste the 2007-target is to reduce the amount by 13% compared to 2000, taking into account an annual increase of 2% as a result of the growth in population and economy if no further measures are taken. The collected amount has remained stable since 2000 so the target has likely been met¹³.

6.1.2. Landfill

There has been a marked decrease in the share of landfilled waste since 1991 as shown in Figure 6.3. Already in 1991 the landfill of household waste was low compared to many other European countries as only 47% of generated household waste was landfilled. When the Landfill Directive was adopted in 1999, 18% of household waste was landfilled.

Figure 6.3 Share of landfilled household waste, 1991-2004



Source: Statistics Flemish Region

About one third of household waste was incinerated (with energy recovery) in 1991, but this share has decreased since and was 24% in 2004.

As shown in section 5.1, the Flemish region has already reduced the landfilling of BMW and complies with the 2016 target of the Landfill Directive.

¹³ A growth of 2% p.a. in seven years equals a total growth of 15% from 2000 to 2007.

6.1.3. Home composting

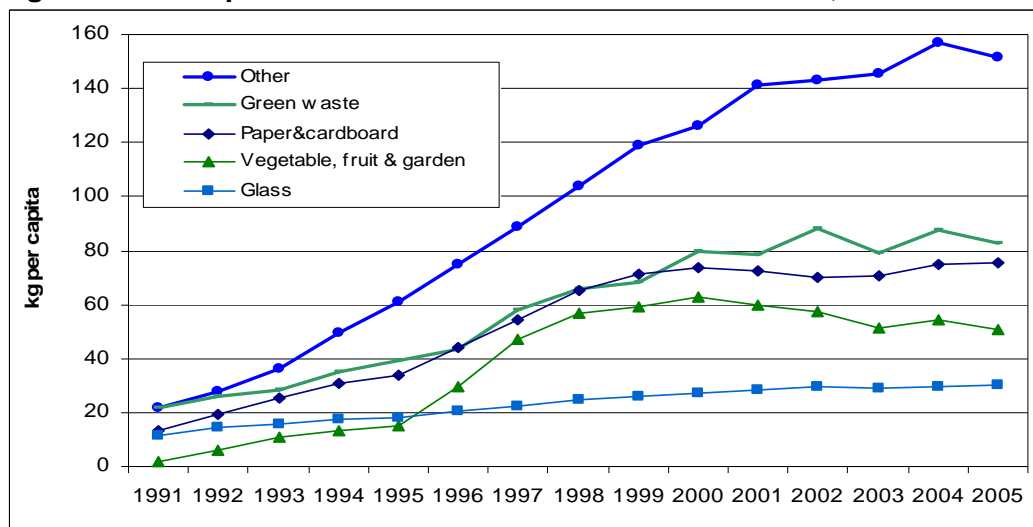
The participation in home composting has increased from 19% in 1995 to 35% in 2002, so that on average 50 kg of organic waste is composted at home which corresponds to a waste prevention of 100 000 tonnes (Buysse et al, unknown, 6). A study from 2006 shows that 40% of the families in the Flemish Region compost at home and that the amount of compost varies from 25 to 80 kg per inhabitant (Vandenbroek 2007). On average, a region with separate collection of bio-waste composts 25 kg and a region with no separate collection of bio-waste composts 80 kg. A similar study from 2001-2002 shows that 34% of households compost their organic waste at home, (Parent et al. 2004, 8). Thus, the participation in home composting has increased by 6% points in about four years.

6.1.4. Separate collection and management

The target for reducing the collection of residual waste by 2007 was a maximum 150 kg per inhabitant. The 150 kg residual waste target was almost met in 2004, as 159 kg was collected per capita in 2004. Thereby the amount of residual waste has been reduced by 172 kg per capita since 1991. This waste is collected separately instead with a view to recycling.

The separate collection target of 69% was met in 2004 where 71% of waste was collected separately, see Table 5.6. This corresponds to 400 kg of waste per inhabitant. The separate collection of selected waste streams per inhabitant is shown in Figure 6.1.

Figure 6.1 Separate collection of selected waste streams, 1991-2005



Source: Statistics Flemish Region

The most significant increase is the collection of other waste, which is mainly construction and demolition waste, wood waste, packaging materials (metals and plastic), etc¹⁴.

The collection of vegetable, fruit and garden waste and green waste had been on the increase for some years and then it rose appreciably in 1996/1997. The green waste reached a level of 80 kg in 2000 where it, more or less, has remained at since. The vegetable, fruit and garden waste peaked at 62 kg per inhabitant but has decreased since by some 10 kg to 51 kg in 2005.

¹⁴ In 2002, 21.5% of separately collected waste was construction and demolition waste and 5.9% was wood waste (Parent et al. 2004, 10).

6.2. Waste paper

As shown in Figure 6.1, the collection of paper & cardboard increased in 1996 from 33 kg to around 73 kg per inhabitant in 1999 and it has remained at this level since. Based on this, it seems as if the Interregional Cooperation Agreement from 1996 has had major effect on the separate collection while the duty of acceptance for paper from 1998 may have supported and sustained the development.

The local authorities are still in charge of collection and waste management of waste paper. The agreement has been subject to criticism as the local authorities claim that the real cost of waste paper collection is 5 eurocent per kg. Moreover, the link between advertising space and the achievement of the environmental targets has been questioned, (Bracke and De Clercq 2005, 7).

According to the evaluation report of the Waste Management Plan 2003-2007, separate collection of paper and cardboard waste generated by households increased from 72.5 kg per inhabitant in 2001 to 74.7 kg per inhabitant in 2005. Thus the 85% separate collection goal by 2007 was reached in 2005, (OVAM 2007, 81).

6.3. Used tyres

The generation of used tyres has increased from around 60 000 tonnes in 2005 to 80 000 tonnes in 2007.

Table 6.1 Used tyres generated, tonnes

	2005	2006	2007
Tonnage	59 970	75 908	80 177
Collection	60 127	71 603	78 828
% collected	100.26	94.33	98.32
Management	56 466	59 192	70 079

Source: OVAM

The target of a 100% collection rate was almost achieved in 2007. The target of 25% re-treading was not achieved, however, as the re-treading of tyres was between 5% and 7%.

As regards the 100% collection target, there is no clear definition of how to estimate the 100%, which is an obstacle for meeting the target (Lorquet 2007). In addition, if the generation of used tyres varies considerably, it would seem difficult to set up a system to manage such changing amounts.

Table 6.2 Collection and management of tyres, tonnes

	2005	2006	2007
Cement industry	29 112	27 232	24 751
Granulation	20 005	23 879	27 553
Steel industry	2 669	2 257	4 737
Reuse	1 766	1 620	1 712
Retreading	2 914	4 205	4 452

Note: The amount for 2007 is based on real amounts up to 30 September 2007, which are extrapolated for 12 months.

Source: OVAM

It should be noticed that the producer responsibility organisation, Recytyre, only manages tyres from the replacement market.

In 2006, Recytyre collected 71 603 tonnes for Belgium, of which 45 065 tonnes was collected in Flanders. These were managed as follows (Recytyre, 2006):

- 40% granulation
- 4% steel industry
- 2.5% reuse
- 7% retreading
- 46.5% energy recovery

A disadvantage is that only end-of-life products with a negative value are collected through the system. Tyres that are suitable for retreading are likely to be collected through alternative collectors as the tyres are not regarded as a waste product (Lorquet 2007). However, from the authorities' point of view, tyres suitable for retreading are considered a waste product (Dierick, 2007). In 2007, only 7% of collected tyres were retreaded, compared to the target of 25%. The sector argues that more tyres are in fact retreaded, but these tyres are not collected by Recytyre as these tyres have a positive value.

There is a stock of used tyres from bankrupt companies (for which the central government is responsible to clean up) and agricultural tyres (industrial waste). If large amounts of used tyres from this historical stock are collected via Recytyre it may jeopardize the system as there is no financial contribution from the historical stock (Lorquet 2007).

Tyres from end-of-life vehicles should be managed by Febelauto. Unfortunately, those tyres mostly get into the system of Recytyre. This is a problem because Recytyre does not receive a contribution for these tyres (Dierick, 2007).

The current agreement between the regions and Recytyre runs until end 2007. Until now the regulation has been the same in all regions and according to Bracke (2003, 41) this has resulted in increased complexity and slowed down the introduction of policy agreements in Flanders.

When the agreement on tyres is to be renegotiated, there is a risk that Recytyre may have to negotiate an individual agreement with each of the regions. If a new agreement includes more flexibility for regions as regards choice of recovery methods, e.g. use of shredded tyres as drainage, this would limit the export problem (Lorquet 2007). OVAM is researching this solution and awaits technical information (Dierick, 2007). Today, only recovery methods that are approved in Flanders are also approved for export.

Bracke and De Clercq (2005, 14) argues that the introduction of the duty of acceptance for waste tyres (and waste paper) had no real impact on the collection or treatment of this waste stream. The main treatment is incineration with energy recovery in cement kilns. Retreading and granulation have higher costs, lack potential markets and have a low level of ambition of the targets stipulated in the negotiated agreement. OVAM finds that the duty of acceptance has had an impact on collection (almost 100% is collected) and on treatment. Before introduction of the duty of acceptance 80% of the waste tyres was used in the cement industry, for 2007 this has decreased to 35% (Dierick, 2007).

6.4. Construction & demolition waste

The generation of construction and demolition waste in the Flemish region has almost doubled between 1994 and 2006. During this time, recycling has increased from 75% to 92%.

Based on the figures shown in Table 6.3, the recycling target has been met, while the long-term prevention target has not yet been met.

Table 6.3 Generation and management of C&D waste

	Unit	1994 ¹⁾	2006 ²⁾
Generation	Million tonnes	4.7	9.0
Recycling	%	75	92
Physicochemical treatment	%	11	
Incineration	%	0.6	
Landfill / disposal	%	14	

Source: 1) Suikerbuijk (1999, 31), 2) OVAM personal communication, October 2007

7. Effectiveness of the implemented policy

7.1. Socio-economic aspects

In general, the facilities for recycling and recovery had been established gradually since the early 1990s when the policy of waste diversion from landfill was initiated. Thus, the need for new capacity to divert waste has not been a major issue when implementing the Landfill Directive. The waste plan for 2003-2007 did specify a need for expanding the MBT treatment capacity by 600 000 tonne per year and fluidised bed incineration plants. The Flemish government had also started a process to reduce the landfill capacity.

The average municipality in the Flemish region has around 19 000 inhabitants and is thereby quite large compared to the other countries included in the study. In comparison, the average municipality in Germany has about 5 000 inhabitants. Large volumes of waste to be managed enables a municipality to obtain large scale benefits, e.g. to negotiate better contracts with waste collectors and with recycling and treatment facilities. More populated municipalities also have better possibilities for employing staff with specific competences in waste management. This is further supported by the existence of intermunicipal associations. Since the 1980s municipalities have collaborated in these associations, and today there are 27 in the Flemish region and they have an average size of 220 000 inhabitants.

7.2. Policy measures

A series of policy measures have been introduced to divert household waste from landfill and these measures include regulatory instruments, market based instruments as well as information and communication.

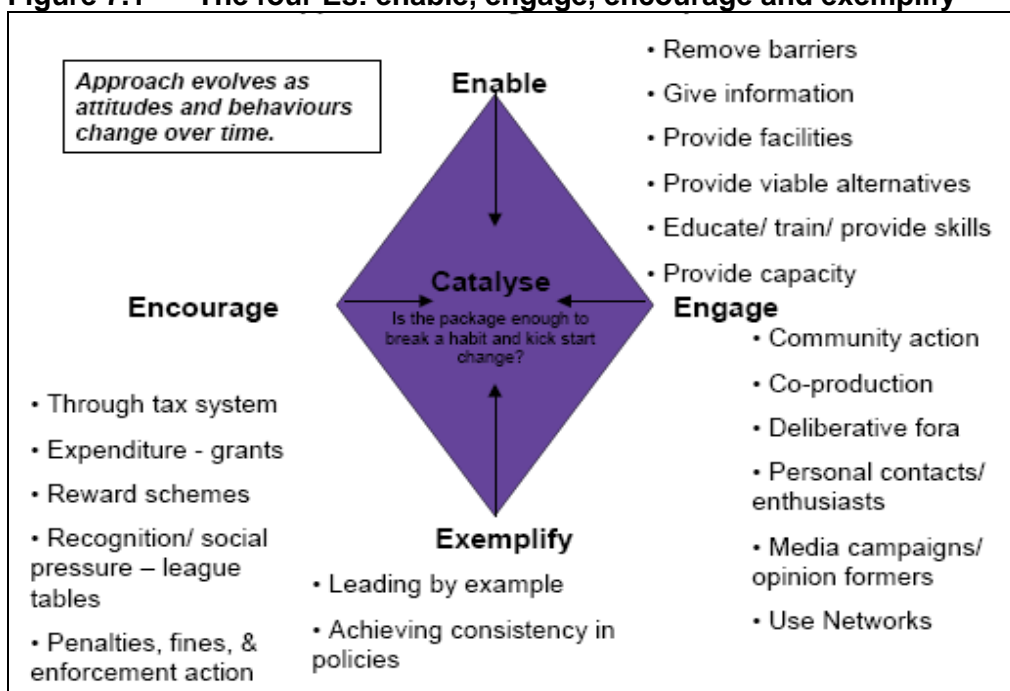
The measures work through engaging and encouraging stakeholders, enabling a change and recognising that government must lead by example. Figure 7.1 illustrates what the various elements may comprise. Policy makers have to consider if these elements exist in the current policy and are sufficient to catalyse people to change behaviour.

From the implemented policy measures it is clear that voluntary agreements or consensus based instruments are preferred in the Flemish region. In addition to the environmental agreements with municipalities, agreements with commerce and industry have been made for paper, used tyres, packaging, ELVs and several other waste streams. So far, the agreements for tyres, packaging and ELVs have been made with the two other regions, Wallonia and Brussels, so that the producer responsibility organisations operate under the same framework conditions throughout Belgium.

There is also a tradition for engaging relevant stakeholders (e.g. Flemish Compost Organisation, Association of Flemish Cities and Municipalities, Association of Flemish Provinces, private companies) through regular meetings with OVAM and involving these stakeholders in the preparation of waste plans, as negotiation partners, etc.

The regulation on waste plans is a key measure as the provisions of the plans apply to public authorities and require them to implement the policy outlined in the adopted waste plan. Thus, the regulation on waste plans provides the Flemish government with a powerful instrument to steer developments. The environmental agreements with municipalities serve to motivate them to go further than the targets set in the waste plan but they are not supposed to finance the implementation of the plan.

Figure 7.1 The four Es: enable, engage, encourage and exemplify



Source: UK Government (2005)

Several of the policy measures presented in this paper were introduced very early (before 1993) compared to other Member States, and most of the measures were introduced before the Landfill Directive from 1999. As the diversion of waste from landfills started in the early 1990s and as only 29% of generated BMW was landfilled in 1995, the Landfill Directive did not play a significant role in this respect. Having said that, it should be kept in mind that Member States knew that since 1989 the European Commission had been interested in improving the standards for waste management¹⁵ and later that a future regulation in this field was in progress.

7.2.1. *Municipal environmental agreements*

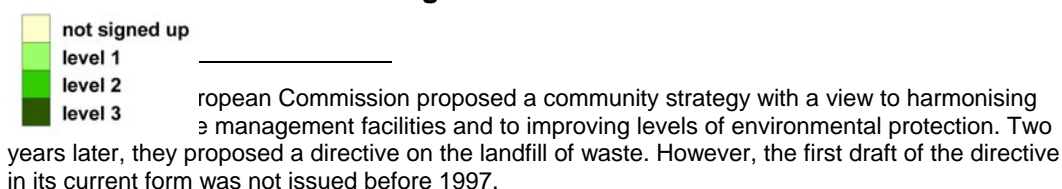
The agreements aim at providing a motivation (with the subsidies) for municipalities to improve their waste management system and go a little further than required in the waste plan. The agreements include a minimum level to be met for all municipalities who sign and then the subsidies aim to encourage municipalities to further actions.

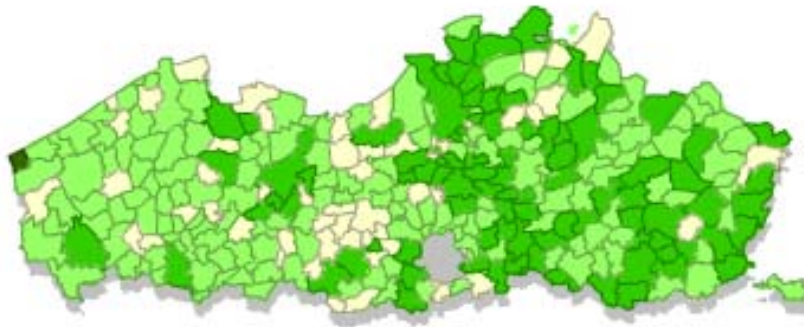
Participation in the agreement

Of the 308 municipalities, 294 signed the first generation of agreements (1992-96), 284 signed the second generation (1997-2001), and 251 signed the third generation (2002-06). Thus, with more than 80% of municipalities having signed the agreement participation is very high, but it has been declining since the beginning in 1992 until today.

The municipalities' choice of level of the third generation agreement is shown in Figure 7.2. The lowest of the three levels, level 1, has been chosen by approx. 60% of the municipalities under the agreement, 40% have chosen level 2 and only one municipality has chosen level 3.

Figure 7.2 Local authorities having signed the third generation of the environmental agreement





Note: All 5 provinces signed the agreement (4 level 2 -- 1 level 3), 250 local authorities signed the agreement (157 level 1; 92 level 2; 1 level 3). The numbers in the figure do not match the ones in Table 3.2 as the figure covers the whole of the environmental agreement (all 9 clusters).
Source: Ministry of the Flemish Community, PPT presentation

The reasons for the decline in the participation of municipalities are several: the design of the agreements have become more complex; more administration is necessary to document the achievement of requirements, and finally there is a question of costs and level of the subsidy.

Design of the agreements

The design of the agreements has become more complex over the years. The first agreement could only be signed in full (i.e. all articles had to be accepted), the second and third generations include a basic element and a number of options. Moreover, in the third generation a minimum level for participation has been defined. One of the municipalities that decided not to sign the third generation of agreements¹⁶ was afraid that it would have to reduce efforts in some areas (e.g. waste) and intensify efforts in others (e.g. water) in order to meet the requirements.

This complexity is also reflected in the nature of the agreement. While the first generation of agreements was a 9-page contract and easy to comprehend, the third generation is a 70-page contract with a manual of 500 pages (Delatter 2007).

Nevertheless, the municipality of Aalst finds that the agreement has been able to motivate municipalities into introducing several initiatives at community level. It is also important that the agreement continuously aims at pushing the municipalities forward, so at the same time it should not be too easy to meet the requirements in the agreements. Moreover, when requirements origin from the Flemish government (i.e. an authority up the hierarchy) it is easier to get them adopted in the city council (Singelyn 2007).

It is also important that municipalities are left with options to choose from so they can adjust the waste policy to the conditions of the municipality (e.g. to have a choice between collecting bio-waste and green waste) (Vandenbroek 2007).

There have been no specific changes in the covenants (agreements) due to the Landfill Directive (Putseys 2007).

Both the waste plan and the agreement clearly specify the obligations of the parties involved: OVAM, municipalities and provinces. For example, they specify that municipalities must make a separate collection of bio-waste or green waste (whichever the municipality has chosen to collect).

¹⁶ The municipality of Aalst signed the first and second generation of agreements (Singelyn 2007).

Administration of the agreements

Every year, each municipality is to provide OVAM with a report comprising detailed information on the status of waste collection and management. This is an administrative burden for municipalities and particularly for small municipalities. In Aalst, which has 77 000 inhabitants, it was assessed that the subsidies would have been eaten up by new staff to provide documentation and reports (Singelyn 2007).

OVAM is to evaluate these reports and assess whether the requirements have been met. This process takes around six months. However, the quantity of collected residual waste per capita has proved to be a good approximation for assessing whether separate collection works well or not and this information is available after three to four months (Putseys 2007).

Costs and level of the subsidy

With an average subsidy of EUR 22 000 per municipality per year, the subsidy is marginal compared to an overall waste management budget. The subsidy has also decreased from EUR 25 000 in the first agreement to EUR 22 000 in the third. However, it is important to keep in mind that the subsidy does not finance requirements that municipalities are to meet in accordance with the Flemish waste plan. Thus, the aim of the subsidy is to provide a motivation for municipalities to go further than required in the waste plan.

The next generation of agreements

The next generation of agreements is to be negotiated in autumn 2007. For the negotiations, the Association of Flemish Cities and Municipalities, VVSG, has suggested that the next generation should be made more flexible and with less red tape. The suggestion is that all targets/tasks in all clusters are assigned a number of points and then the total number of points scored by a municipality will determine if the subsidy will be paid or not. This also implies that municipalities can perform well in one cluster and less well in another (Delatter 2007).

OVAM acknowledges the shortcomings of the current agreement, but finds that it may be difficult to change these elements in the next generation of the agreement (Putseys 2007).

7.2.2. Waste disposal levy

The total cost of managing household waste is important for municipalities (and the intermunicipal associations). As a result, many initiatives have been taken in order to reduce the cost of managing waste, in particular the landfill (and incineration) tax. Moreover, in the 1990s the waste disposal levy was approx. EUR 0.5/tonne and today it is EUR 75/tonne. This provides a strong incentive to divert waste from landfills and to some extent incineration (Macken 2007).

The Flemish government uses around 40% of the revenue from the levy to finance the subsidies of the environmental agreement. Based on the data for management of household waste 2002-2005 in Table 5.6, the municipalities paid approx. EUR 16 million in taxes annually. The average, annual subsidy 2002-2006 was EUR 5.6 million or 40% of the revenue of the waste disposal levy.

7.2.3. Financing of waste management service

An important aspect of the waste management system is the costs. As noticed by Bracke, Flanders has one of Europe's highest recycling rates and the associated costs of such ambitious environmental objectives weigh increasingly heavy on the public budget (Bracke in Tieleman and Leroy 2003, 40).

In general Flemish municipalities are in a good position to finance their waste management initiatives. The majority of municipalities differentiate the tariffs according to the volume or weight of waste generated.

7.2.4. Communication

This paper does not include all the communication activities made by OVAM, VLACO, VVSG, the municipalities and the producer responsibility organisations. One of the prominent initiatives is the Compost Masters Programme that enables households not only to receive information but also to obtain training on composting. Several other initiatives have been introduced such as learning how not to generate garden waste and training at schools just to mention a few.

Communication that makes citizens change behaviour has played a leading role in achieving high recycling rates. An evaluation of the first and second generations of co-operation agreements learned that the attention for the environment increased in the municipalities that participated, e.g. in selective collection of household waste (WasteBase).

The Flemish Compost Organisation, VLACO, has learned that it is important to actively keep the awareness levels high. If information activities are reduced the awareness drops and the quality of separately collected waste decreases (Vandenbroek 2007).

An experience from the municipality of Aalst is that for a policy to be successful the administration needs to target the policy to specific groups; there have to be personal contacts; and the administration should look for partners to cooperate with. Information alone is not enough, the municipality needs to focus on action, i.e. how to make people act. Further, convenience and well-being need to go hand in hand with environment policy (Singelyn 2007).

An interesting effect of the dedicated waste policy to divert waste from landfills is that separate collection and home composting have been going on for so long that most people consider it to be the normal thing to do. As a result, authorities are also able to set high requirements for citizens as regards separate collection and waste prevention (Delatter 2007). In Aalst the new initiatives were not popular among all citizens at first, but when the system proved to work well most people have accepted it and think it is natural (Singelyn 2007).

These experiences are generally in line with the seven principles of behavioural economics by Dawney and Shah (2005) presented in Box 7.1. It shows that people are not 'rational' as assumed in economic theory and that they also respond to other factors than regulation and economic incentives.

An experience from OVAM is that the target for residual waste (measured in kg/capita) is easy to communicate to the public. Some inhabitants are even very determined in achieving 'their' target of 150 kg per capita. Moreover, kilos of residual waste per capita are a good approximation for assessing whether separate collection works well or not (Putseys 2007).

Box 7.1 Behavioural economics: seven principles for policy-makers

1. Other people's behaviour matters: people do many things by observing others and copying, and people are encouraged to continue to do things when they feel other people approve of their behaviour.
2. Habits are important: people do many things without consciously thinking about them. These habits are hard to change – even though people might want to change their behaviour, it is not easy for them.
3. People are motivated to 'do the right thing': there are cases where money is demotivating as it undermines people's intrinsic motivation, for example you would quickly stop inviting friends to dinner if they insisted on paying you.
4. People's self-expectations influence how they behave: they want their actions to be in line with their values and their commitments.
5. People are loss-averse: they hang on to what they consider 'theirs'.
6. People are bad at computation when taking decisions: they put undue weight on recent events and too little on far-off ones; they cannot calculate probabilities well and worry too much about unlikely events; and they are strongly influenced on how the problem/information is presented to them.
7. People need to feel involved and effective to make a change: just giving people the incentives and information is not necessarily enough.

Source: Dawney and Shah (2005, 2)

8. Main findings

The Flemish region is a 'first mover' in the waste management field and has attained impressive results. In 2004, 71% of household waste was collected separately and only 4% was landfilled. Likewise, around 40% of the population is engaged in composting at home. In general it seems as if most of the targets of the waste management plan 2003-2007 have been met or are likely to be met within the time frame of the plan.

Other interesting outcomes of the policy are that there is a high acceptance in the population to spend time and money on separating and composting waste; that concerns about waste management and littering rank high on the political agenda; and that some of the initiatives go further than seen elsewhere in Europe (examples with 'no waste from gardens', handing out free chickens if they are fed with organic waste, etc.).

A mix of policy measures has supported this diversion of waste from landfills. The mix comprises several measures on regulation, voluntary agreements, market-based instruments and a high level of communication to motivate the inhabitants. The agreements or the consensus-based policy appears to be a preferred approach in the Flemish region. Many of these agreements are made on a national basis for Belgium which of course adds to the complexity of regulation when three regions with different policies are to reach a conclusion.

It also seems as if the waste plan (approx. every 5 years) is a key measure as – once approved by the government - it comprises provisions that applies to all public authorities. Because of this regulatory nature, all relevant parties are involved in the process and contribute with suggestions. Accordingly, the link between the targets of the waste plan and the agreements with municipalities is logical. Another key measure is the relatively high landfill tax that has been a strong incentive for municipalities and waste organisations to recover and recycle waste.

The environmental agreement, and its *quid pro quo* nature, is specific for Flanders. On the one hand, it is remarkable that a relatively low subsidy of, on average EUR 22 000, seems able to motivate municipalities into introducing collection systems and facilities faster than defined in the waste plan. On the other hand, the administration of the agreement has become more burdensome as the requirements have become more demanding (or complex).

Having said all this, it should also be kept in mind that over the years many resources, human as well as economic, have been invested in the waste management system. Unfortunately, information on the total costs of the system is not available.

Turning to the influence of the Landfill Directive, it does not seem to have had an effect on the diversion of waste from landfill in the Flemish region. The reason is that several of the policy measures were introduced before 1993, and most of the measures were introduced before the Landfill Directive from 1999. Thus, in 1995 only 29% of the generated BMW was landfilled.

Still, the generation of BMW in 1995 was very high. With 3.4 million tonnes of generated BMW each inhabitant generated 579 kg of BMW. In other EU-15 Member States the generation of BMW varies between 150 kg per inhabitant (Netherlands) and 350 kg per inhabitant (Germany). Moreover, in 1995 the generation of municipal waste for *Belgium* was 4.6 million tonnes (Eurostat, Structural Indicators) and in this light the generation of BMW in the *Flemish region* indicates that there are differences in the methodology for waste statistics in the Flemish region and Belgium.

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I. Annex: Contents of the third generation agreement

This annex presents selected contents of the agreement from 2002-2004.

Box I.1 Solids cluster: three ambition levels

Level 1 is the policy minimum that any municipality or province should be able to implement in its own operations or through its contacts with the population and other target groups. This level is made up of the following parts:

- introducing environmentally justified product consumption to its own operations;
- waste prevention through increased awareness;
- building and operating a recycling centre and organising selective collection;
- meeting targets for residual waste;
- taking part in the provincial household waste platform.

Level 2 consists of:

- developing targeted operations on environmentally justified product consumption for schools and own services
- raising awareness of the population for environmentally justified product consumption and leading by example;
- developing a compost master scheme for waste prevention;
- meeting objectives for residual waste, step-by-step;
- developing targeted operations on waste prevention, reuse and separate collection for schools and own services.

Level 3 is part of an integrated project involving all clusters. The solids cluster works on two main themes: environmentally justified product consumption and waste prevention.

Source: Ministry of the Flemish Community (2002)

The third generation agreement goes further than the previous two by introducing actions for waste prevention (e.g. home composting) and setting quantitative targets for the collection of residual waste. Table I.1 shows some selected requirements that municipalities need to achieve in order to reach one of the three levels and thus receive a certain level of financial support.

Table I.1 Solids cluster: requirements to be met in the three ambition levels, extract

Level 1	Level 2	Level 3
<i>Waste prevention</i>		
<ul style="list-style-type: none"> offer means of composting at home offer anti-advertising stickers raise awareness of waste prevention in relation to bio-waste (vegetable, fruit, and garden waste), paper waste and packaging waste flanking policy with use of other support measures 	<ul style="list-style-type: none"> develop network of compost masters build demonstration area for home composting 	<ul style="list-style-type: none"> integrate in project
<i>Selective collection</i>		
<ul style="list-style-type: none"> operate container park organise selective collection of bio-waste or garden waste, paper and cardboard, glass, PMD (plastic, metal, and drinks containers), KGA (household hazardous waste) and bulky waste (cf. current Implementation Plan) 	<ul style="list-style-type: none"> better sorting and higher degree of purification for selectively collected fractions 	<ul style="list-style-type: none"> integrate in project task setting for selectively collected waste (excl. garden waste, building and demolition waste, wood waste and scrap electrical and electronic appliances)
<i>Residual waste</i>		
<ul style="list-style-type: none"> task setting 2002 and 2003 cf. current Implementation plan task setting 2004: max. 200 kg residual waste per resident or 15% drop against previous calendar year 	Task setting, residual waste per resident: <ul style="list-style-type: none"> 2002: 200 kg 2003: 175 kg 2004: 150 kg 	<ul style="list-style-type: none"> task setting for residual waste lower than the long-term task setting of the Flemish Region
<ul style="list-style-type: none"> participating in the provincial platform on household waste 	<ul style="list-style-type: none"> Implementing the polluter pays principle in the municipal tax/charge scheme 	

Source: Ministry of the Flemish Community (2002)

II. Annex: List of interviewed stakeholders

All interviews were made in the period 19 June – 21 June 2007. A telephone interview was made with Mr Macken on 26 June 2007.

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