

# **The use of the waste hierarchy in certain parts of Europe**

*Examples of a flexible approach to the hierarchy*

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***FFact Management Consultants  
Rijen, The Netherlands***

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# 1. Introduction

End 2005 the Commission published a proposal for a directive on waste (COM(2005)667final, further: waste directive) which is currently under discussion in the European institutions. One element of the proposal is the establishment of a hierarchy of principles to be applied for waste management. The Commission proposal includes the following reference to the hierarchy:

*the Member States are to take measures, as a matter of priority, for the prevention or reduction of waste production and its harmfulness **and, secondly, for the recovery of waste by means of re-use, recycling and other recovery operations.***

This text is quite similar to the text that is included in the current waste framework directive. It provides for a flexible application of the hierarchy and does not explicitly make a preference between the different recovery options such as re-use, recycling and recovery of energy for example. Several institutions have problems with this text. Both the Committee for the Regions and the European Parliament would prefer a five step hierarchy. This is illustrated by one of the amendments as proposed by the rapporteur of the Parliament, Mrs. Caroline Jackson:

*the Member States are to take measures, as a matter of priority, for:*  
**(i) the prevention or reduction of waste production and its harmfulness,**  
**(ii) the re-use of waste,**  
**(iii) the recycling of waste,**  
**(iv) other recovery operations,**  
**(v) the disposal of waste.**

Moreover, another amendment is introduced that seeks to clarify the flexibility of the hierarchy by stating:

***When life-cycle assessments and costbenefit analyses indicate clearly that an alternative treatment option shows a better record for a specific waste stream, Member States may depart from the priorities established in paragraph 2. If necessary, the Commission will draw up guidelines for the application of such assessments and analyses.***

The way this amendment is phrased may give the impression that the current hierarchy is not flexible and that extensive studies are required to deviate from the hierarchy.

The European Organisation for Packaging and the Environment (EUROPEN) is concerned about this development, because it introduces a system which is difficult to handle in practise and may give raise to market distortions if Member States would require industry to perform LCA to justify the type of products they put on the market, e.g. if the packaging is not re-useable, but 'only' recyclable. Moreover, it is clear that the hierarchy has always been a guiding principle that has been applied with flexibility and there is no specific need to emphasis this.

European wants to issue a position paper on this issue and has asked FFact Management Consultants (FFact) to provide them with some examples how in member states and in particular on a regional and local level the waste hierarchy has been implemented. In this paper a number of such examples have been described shortly. This demonstrates that the current wording in the commission proposal of the hierarchy does not lead to any confusion and that the amendments of the parliament in this context are unnecessary and may even be unhelpful because they may hamper the implementation of sensible waste management strategies that would take into account the specific needs of the specific regions in Europe. The selected examples are:

1. biowaste collection and treatment in Amsterdam (the Netherlands)
2. selection of the best practicable environmental option for municipal waste in the Western Isles (Scotland, UK)
3. collection of plastic packaging in Vienna (Austria)
4. collection of householdwaste in Finland (PM)

These examples are chosen because of the differences they represent as regards geographic situations and state of development of the waste management system. They are meant to show examples of the mechanisms of application of the hierarchy in practice and the argumentation that is used to select options. No attempt was made to be exhaustive, neither in spread over Europe, nor in the type of waste covered, since these are only meant to illustrate the need for a flexible approach in real life cases, not to provide an overview of current practise in the EU.

## 2. Selected cases

### Biowaste collection and treatment Amsterdam (the Netherlands)

The Netherlands has since the mid-90's a legal requirement for municipalities to organise separate collection of kitchen and garden waste (in Dutch GFT, further biowaste) for all households. From the very beginning Amsterdam, as well as some other larger cities in the Netherlands, were opposed to this requirement to collect biowaste from all households. Amsterdam did not consider separate collection of biowaste to be a viable option for most parts of the city and currently only in one, relatively small part, of the town, biowaste is collected separately. The reasons for this opposition were:

- The environmental benefits of separate collection and composting of biowaste were at best marginal compared to collection with residual waste which is incinerated in an incinerator with high efficiency energy recovery.
- In urban areas with a high population density (e.g. the historic city centre and the parts of the city with dominantly high apartment buildings separate collection was difficult due to lack of space for bio-bins. This resulted in a low capture rate of bio-waste and large percentages of the biowaste will still be collected with the residual waste.
- The social structure of the cities is such that there is less environmental awareness and the quality of the collected biowaste was poor. Frequently the separately collected biowaste from Amsterdam was refused at the composting sites and had to be taken back and incinerated.

In its most recent waste management plan, after performing an LCA which showed only a marginal environmental preference of composting over incineration with energy recovery, the national government has acknowledged the need of flexibility and local authorities may decide to abandon separate collection of biowaste if:

- Organising it is difficult due to lack of space
- There are structural problems to obtain the necessary quality
- Or if it is substantially more expensive than incineration or landfilling<sup>1</sup>

Source of information: AfvalEnergieBedrijf Amsterdam.

### Best Practicable Environmental Option for municipal waste on the Western Isles (Scotland UK)

In its national waste plan of 2003 Scotland has determined for 11 regions covering the whole Scottish territory what would be the Best Practicable Environmental Option (BPEO) for managing municipal waste in that particular area. The BPEO consists of the *deliverable and affordable solutions for municipal waste, which meet statutory targets, and on which local stakeholders collectively agree.*

The determination of the BPEO for a specific area is a process involving the stakeholders that assesses the best option on the basis of, apart from environmental performance, economic and

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<sup>1</sup> Landfilling is expensive in the Netherlands due to a landfill tax of €85.54 per ton of recyclable waste. This excludes gate fees and additional costs which often put the total cost above €100 per ton.

social criteria, practicability and fit with policy. A tool was developed to assess and compare the environmental impacts of the different waste management options. This tool called WISARD<sup>2</sup> uses a (simplified) LCA type of calculation method that allows comparison of different options.

Each of the 11 area's developed their own waste plan determining the BPEO for their area. The results of the 11 plans was compiled and summarised in the national waste plan of Scotland. Examples for two of these areas are described in more detail.

The Western Isles are a chain of islands of 200 km along the Atlantic coast of Scotland. There are currently approximately 28.000 inhabitants. The results of determination process of BPEO for this area are indicated in the following table. They are compared with the results for the area of Glasgow and Clyde Valley, which is the most densely populated area in the centre of Scotland, as well as for Scotland as a whole.

Area	Situation in 2002				BPEO for 2020			
	recycling	composting	energy	landfill	recycling	composting	energy	landfill
Western Isles	<1%	0%	0%	>99%	10%	28%	14%*	48%
Glasgow and Clyde Valley	4%	1%	0%	95%	40%	15%	13%	32%
Scotland	4%	3%	2%	91%	35%	20%	14%	31%

\*depending on choices for specific technologies to be made later.

The determining factors for the choice of the BPEO for the Western Islands were:

- The geographic fragmentation and remoteness of the area;
- a highly dispersed human population;
- the absence of a local market for recyclables, but;
- a strong local demand for compost.

Separate kerbside collection of recyclable waste is difficult to justify in the remote parts of the islands, both on economic and environmental grounds. However, there is an obligation to meet the targets for reduction of landfilling of biodegradable waste. Moreover there is a local market for compost or digestate. The Western Islands therefore opted for a system where biological treatment of biodegradable waste (including a certain percentage of waste paper) is developed. Recycling activities will be limited, due to the logistic problems and the high costs of having to find outlets outside of the islands for relatively limited amounts of material.

To determine the BPEO the Western Isles did go through the recommended process of assessment and stakeholder consultation as suggested by the Scottish Environmental Protection Agency (SEPA). However, the assessments made to come to the selection of the BPEO were mainly based upon a descriptive analysis and appreciation of the different criteria to be taken into account, rather than an elaborated and quantified LCA or cost-benefit analysis. It was quite obvious that any option that would deviate waste from landfill, which was by far the dominant way of waste management, would have large environmental benefits, regardless the choice of any particular alternative option. Moreover, the factors that determined the choice of options were so dominantly going into one direction that further quantitative analysis probably would not have lead to dramatically different choices. Moreover, in local authorities the skill necessary to do such quantitative analysis are not

<sup>2</sup> WISARD: Waste Integrated Systems Assessment for Recovery and Disposal

available. They would need to rely heavily on outside help for such analysis, which would make the process very costly.

For Glasgow and Clyde Valley the BPEO came to different conclusions. Firstly the geographic situation and population density in that area differs greatly from the situation in the Western Isles. Therefore the possibilities for separate collection of recyclables are better. On the other hand, the separate collection of biowaste and compost are more difficult in this area. Therefore more emphasis was put on recycling and less on composting.

Contrary to the Western Isles, the working group for Glasgow and Clyde Valley did make (limited) use of the WISARD tool to underpin certain of the choices.

At the end of the day it was seen that the process of determining BPEO in a structured dialogue with all stakeholders was the most important aspect of the exercise. This assures that the option which is chosen does have the support of the stakeholders involved, which is necessary for successful implementation of the plan. The first results of the implementation of the plans become visible now. This is the part where in most of the municipalities systems were set up for the separate collection of waste fractions. The more difficult actions for implementation are still to come however. These involve decisions on the setting up of some of the larger scale treatment facilities, including some incineration plants, necessary to deliver the results necessary to meet the 2010, 2013 and 2020 targets included in the landfill directive.

The experience in Scotland shows that the outcome of the process and the choice for any particular recovery option depended largely on the local circumstances and the local priorities. In certain area's e.g. the potential of job creation was a far more important factor to opt for certain recycling options than environmental concerns. The LCA's and cost-benefit analysis were considered to be rather heavy instruments that should be used occasionally rather than as a rule.

Source of information: SEPA

### **Separate collection of plastic packaging in Vienna (Austria)**

Vienna, the capital of Austria, has approximately 1.6 million inhabitants who generate nearly 900.000 ton of municipal waste. The total amount of waste in the Vienna area is about 5 million tons per year, mainly consisting of construction and demolition waste.

Over the years Vienna has developed a very elaborated waste management concept that is based upon the application of the waste hierarchy. First priority is prevention of waste, then the recovery via recycling, composting and use of energy from waste and only inert waste is allowed to go to landfill.

One of the prevention measures is the creation of 19 recycling centres in the town where people can deposit items that are still working and that are sold on the municipal flea market in town as second hand goods.

There is an elaborated system in place for separate collection of recyclables that covers the whole of the territory of the town. This system includes separate collection of glass (separate collection of white and colored glass), paper and cardboard, metals, biowaste and plastic

bottles. There is also a system for separate collection of hazardous household waste. Currently approximately 40% of the municipal waste is recycled or composted.

Residual waste is thermally treated in installations that produce both electricity and heat for a district heating system.

Vienna continues to work on the improvement of its system. This includes e.g. improvements of the logistic system of containers for glass and biowaste. The part of the system that has proven to be the most complicated and that has been modified the most was the system of separate collection of plastics. This is a good example of 'learning by doing' and therefore described in more detail.

The system of separate collection of plastics was developed over the years and has been modified several times since it first started in 1989. The collection of plastic waste materials originally consisted of plastic film and yoghurt cartons. For economic reasons, reprocessing of yoghurt pots had to be discontinued after two years; from 1991, separate collection focused on plastic film. The collection of plastic containers within the system was taken up in 1993.

On 1 October 1993 the Packaging Ordinance came into force, which stipulates that all plastic packaging materials covered by the ordinance must be collected collectively within a mixed system of "plastic and composite plastic materials". At the end of 1995, Vienna's plastic collection scheme was reduced. The new objective of plastics collection was to have only large-size packaging material (film and containers) end up in the waste plastics collection. All small-size plastic packaging material should remain in the mixed residual waste to be used for energy recovery. This reduced the need for the separate collection of a fraction that in the end could not be recycled but had to go to a facility that treats this fraction thermally to recover energy. Setting up a separate collection scheme and a sorting facility for fractions that go for energy recovery is expensive and of doubtful ecological value. These are better collected via the residual waste stream, which in Vienna also goes to a facility to recover energy.

In 2004 it was decided to downsize the separate collection of plastics again. The experience of the system in place since 1995 was not satisfactory. The collected fraction contained still up to 40% non-plastic materials and the sorting of large films (mainly shopping bags) was difficult and resulted in a fraction that had to be delivered to the cement industry because it was of too poor quality to be recycled. Currently the plastic collection scheme only covers plastic bottles and other hollow plastic containers and this system works satisfactory. In order to invite people to use the collection scheme correctly the City of Vienna changed the lid of the collection bins. It has a lock to prevent people throwing in bags of residual waste and cylinders, which optically foster to put in plastic bottles.

This example of Vienna shows that one can learn from starting a process with probably too ambitious aims and modify it later on to be more realistic and more effective.

Information source: City of Vienna, MA 48.

### **Waste collection in Finland**

Finland has the particularity that a large part of the population lives in the south-western part of the country (the triangle formed by the cities of Helsinki, Tampere and Turku) and that the rest of the country has a very low population density. The average population density of

Finland is 17 inh/km<sup>2</sup> but in Lapland in the north this is only 2 inh/km<sup>2</sup>. The average for the EU 25 is 118 inh/km<sup>2</sup>.

In the cities separate collection of glass, waste paper and biowaste are in place. In many places the handling of biowaste separately is limited to the colder seasons, as handling of this waste is easier when the temperature is low. Metal and plastic packaging are mainly taken back via shops via a refund system. In some cities residual waste is converted into energy, but landfilling of residual waste is also quite common.

In the rural areas there is often not a collection service for waste from households. The householders have to bring their waste, including residual waste, to collection points. In the Northern part of Finland this is the dominant way of collecting waste.

The geographic and climatic situation in Finland has led to a system of collection which is particularly aimed at facing these challenges. This also influences the possibilities to manage the waste. The quantities collected in large parts of the country are very small and the driving distances are large. Therefore, mixed collection and landfilling is for large parts of the country the preferred option for the mixed municipal waste. The dependency on landfill is still quite important in Finland. In 2003 recycling of municipal waste was 28%, 9% was incinerated and 63% was landfilled

Source: PYR, Eurostat

### **3. Concluding remarks**

#### **Flexibility is essential**

A general characteristic of the examples that are given in the previous section is that all actors involved in the application of the waste hierarchy agree that it should be applied in a flexible way, because each local situation and each product or waste stream is different. The current hierarchy is a good guideline against which one would set the options, but the outcome of the assessment depends largely on the local situation and possibilities. It does help channelling the debate in particular when waste management plans are developed but cannot be dictated centrally to apply in the same way for Europe as a whole.

#### **The hierarchy is not a rule, but a guideline**

The current text of the Parliament seems to suggest a system in which full application of the hierarchy is the rule and that in exceptional cases, supported by LCA and cost-benefit analysis, one may exempt from this rule. In practise nobody uses the hierarchy in this way. The practical use of the hierarchy is rather that it is used as a guideline to assess in what direction one would like to improve waste management taking into account the current situation and the specific local possibilities and needs. In order to assess the options several techniques and methods may be used, included in some cases LCA like instruments and cost benefit analysis. The need for such instruments in the process depends largely on the specific questions one would need to answer and cannot be prescribed as a general rule.