

European Commission
Environment DG

Preparing a Waste Management Plan

A methodological guidance note

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European Topic Centre on Waste and Material Flows

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1 Introduction

1.1 About this document

Nature

EU legislation requires the competent authority in each Member State to draw up one or more waste management plans in accordance with relevant EU directives. Applying the principles of these directives when implementing a national waste management system is the responsibility of each individual Member State. As such, waste management planning has become a permanent element in public planning efforts in all EU Member States.

These Guidelines aim to provide a tool for waste management planning and promote the development of more coherent and appropriate planning practices across the EU Member States, in compliance with the requirements of the relevant EU legislation.

The main target group of these guidelines is the competent authorities for preparing waste management plans, i.e. national administrations and environmental protection agencies and local and regional authorities. However, it is clear that the focal point in waste management planning differs substantially at national and local/regional levels and this should be taken into account when reading the document.

Furthermore, several parties play a role in the planning process: politicians, administrative staff and planners, contractors, various public organisations, stakeholders in general and the wider public. Each of these groups may find parts of this document of particular interest to them.

The Guidelines are generally applicable and can be used in the drafting of both national waste management plans in EU Member States and local management plans for a municipality or region in a given country. Drawing up guidelines with such a broad aim is not an easy task. Therefore many sections include an indication of the administrative level to which the stated conditions apply. National requirements for regional/local waste management plans have been left out of the document, but the need to consider such requirements has been mentioned on several occasions.

These Guidelines have been prepared by the European Topic Centre on Waste and Material Flows on the initiative of the European Commission. As such, they should not be read as representing any official views of the Commission or imposing or suggesting any procedural requirements.

Structure

The Guidelines contain a review of the overall policies and principles applying to planning in the field of waste management in the EU. This includes a review of legislation in force, and in some fields practical methods are indicated for filling in the framework set up by the EU and the various Member States for the contents of management plans. Furthermore, a framework – or a “step-by-step model” – is presented as a source of inspiration for drawing up an individual waste management plan.

Throughout the Guidelines there are boxes with examples from waste management plans or from other guidelines, as well as links to relevant information when drafting a waste plan. Furthermore, Chapters 3, 4 and 5 include a checklist with relevant items to consider in the planning process.

At the end of the document a list of key references, including useful websites, is provided for further assistance.

1.2 Why waste management plans?

Waste management plans have a key role to play in achieving sustainable waste management. Their main purpose is to give an outline of waste streams and treatment options. More specifically they aim to provide a planning framework for the following:

- Compliance with waste policy and target achievement: Waste management plans, national as well as local/regional are important instruments contributing to implementation and achievement of policies and targets set up in the field of waste management at the national and the European Union level.
- Outline of waste characteristics and sufficient capacity for managing waste: Waste management plans give an outline of waste streams and quantities to be managed. Furthermore, they contribute to ensuring that the capacity and the nature of collection and treatment systems are in line with the waste to be managed.
- Control of technological measures: An outline of waste ensures identification of areas in which technological measures should be taken to eliminate or minimise certain types of waste.
- Outline of economy and investment requirements: Waste management plans make way for a statement of financial requirements for the operation of collection schemes, treatment of waste etc. On this basis, the needs for future investments in waste treatment plans may be determined.

As the solution to many waste management problems requires the involvement of several participants/authorities, coherent planning helps to avoid unnecessary duplication of effort and thus benefits all participants in their work together.

The increasing complexity of waste issues and the standards set by EU directives entail increased requirements in terms of the suitability of treatment plants. In many cases, this means larger and more complex plants for waste treatment, which involves the co-operation of several regional units on the establishment and operation of the plants. In order to enjoy the benefits of large-scale operation covering a larger region, the service is often provided by either intermunicipal units or by private enterprises. This makes sense, especially for waste streams or waste treatment methods requiring expensive large-scale equipment, e.g. incineration plants.

1.3 Structure of a typical waste management plan

There is no rigid pattern for how to structure a waste management plan or strategy. However, it may be expedient to structure the plan with a *status part* and a *planning part* as the key elements of the plan.

The Waste Framework Directive sets up a number of requirements for a waste management plan. In addition, in a number of other EU directives some elements are stated that must be included in a plan. The European legislative basis is discussed in more detail in Chapter 2.

A *national* waste management plan will often be of a strategic nature, though often with certain objectives, whereas *regional* or *local* plans will be more action-oriented - operational plans with detailed descriptions of current collection systems, treatment plants etc.

National waste management strategies/plans or regional/local waste management plans, however, may contain more extensive measures depending on national legislation and the waste policy applying regionally or locally.

In Box 1.1 below, an example is given of the possible elements of a waste management plan. It should be noted that a waste management plan may be structured in other ways.

Box 1.1 Elements in a waste management plan

Background

1. Overall waste problematics
2. EU legislation
3. National legislation
4. Description of national waste policy and prevailing principles
5. Description of objectives set up in specific areas
6. Inputs from the consultation process

Status part

1. Waste amounts, e.g.
 - a) waste streams
 - b) waste sources
 - c) waste management options
2. Waste collection and treatment
3. Economy and financing
4. Assessment of previous objectives

Planning part

1. Assumptions for planning
2. Determination of objectives, e.g. for
 - a) waste streams
 - b) waste sources
 - c) waste management options
3. Plan of action, including measures for achieving objectives
 - a) collection systems
 - b) waste management facilities
 - c) responsibilities
 - d) economy and financing

1.4 Planning process and public consultation

The waste management planning process runs in cycles, i.e. in principle it is a continuous process, where the plan or strategy is revised at regular intervals. The process may be broken down in six phases: general considerations, status part, planning part, consultation process, implementation and plan revision. The planning process is presented in Figure 1.1.

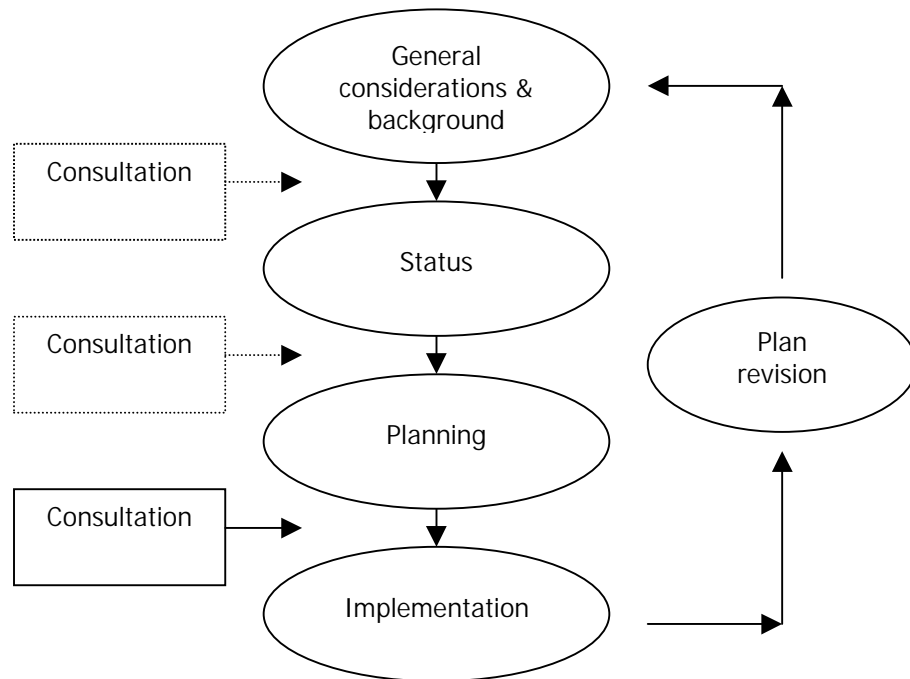


Figure 1.1 Planning process

General considerations and background

As a starting point, the initiative is taken to draw up a waste management plan, and all assumptions are gathered. In this phase the planning period is determined, and any other boundaries of the planning scope are clarified. An important issue here is public participation, who should be involved in the planning process and how? Time schedules and work plans for preparing the plan are set up. Moreover, the relationship with other plans, such as spatial and energy planning, is considered. The general considerations are presented in Chapter 3 of this document.

The background part of the waste management plan includes considerations regarding the EU waste management principles as well as current and expected new EU directives. The legislative framework of the EU is presented in Chapter 2.

Status

In this phase all data and information on the current situation in the waste management field are gathered and analysed. Then the current waste management system is evaluated, i.e. problems relating to the current system are identified and also the possible solutions to these problems. Questions to be answered in this phase are: does the current system comply with the objectives that are set and may be expected in the future (for example from the EU) and if not, how can the system be improved? The status part is presented in Chapter 4.

Planning

The planning part is prepared on the basis of requirements in EU and national legislation, the status part and relevant assumptions for projecting future developments. A central element is determination of political objectives, e.g. for priority waste streams or waste treatment, and to develop indicators to monitor if the objectives are met. Another central element is to evaluate how these objectives may be met most effectively.

For this purpose the choice of measures and instruments for the implementation of the plan or strategy is relevant. The planning part is presented in Chapter 5.

Consultation process

The public should be involved in the determination of the future waste management system and a consultation phase must be included in the planning process before adopting the final waste management plan and its initiatives.

Public consultations may take place at various stages in the planning process. Thus, it may take place as a kick-off meeting before the status part, allowing the competent authority to receive ideas and inputs from selected stakeholders or the general public. Alternatively, consultations may be placed just before the planning part when the problems and possible solutions have been identified.

However, in the preparation of a national waste management plan the public in practice is often involved in a consultation round when the first draft of the plan is available. The consultation round may be very limited – the draft plan is sent for written comments to selected stakeholders (political parties, industrial organisations in the waste management sector, consumer and environmental organisations, NGOs etc.).

The preparation of a regional/local waste management plan often includes a more extensive consultation phase, for example with public meetings, distribution of information pamphlets and information about the plan on the Internet. Public consultation and the participants in the planning process are presented in Section 3.2.

Implementation

After the adoption of the waste management plan, its orientations are put into practice either via legislation and regulation, negotiations with the industry, or information to the general public. The implementation of the waste management plan/strategy is not dealt with in further detail in these guidelines.

Plan revision

Well ahead of the expiry of the planning period covered, initiatives are taken to revise the plan. At the start of a new planning period the process set out in Figure 1.1 is repeated.

Initially, all assumptions are gathered, and the results of the previous plan are analysed in detail during the conduct of a new status report. Special questions of interest include: which objectives have been met? which activities were not implemented or did not have the desired effect? and, did any of the initiatives have an unexpected impact on other sectors?

Against the background of the new status report and any new political objectives or other requirements, for example from the EU, the next generation waste management plan is prepared.

Revision of the plan is not dealt with in further detail in these guidelines.

2 Legislative framework

The European legislative framework with respect to waste management planning is presented in this chapter. This presentation focuses primarily on the three directives that stipulate a planning obligation (the Directive on waste, the Directive on hazardous waste and the Directive on packaging and packaging waste). Subsequently, some possible elements that may be included in the waste management plan are presented.

2.1 Legislation on waste

Below in Figure 2.1 is a list of the EU directives on waste currently in force.

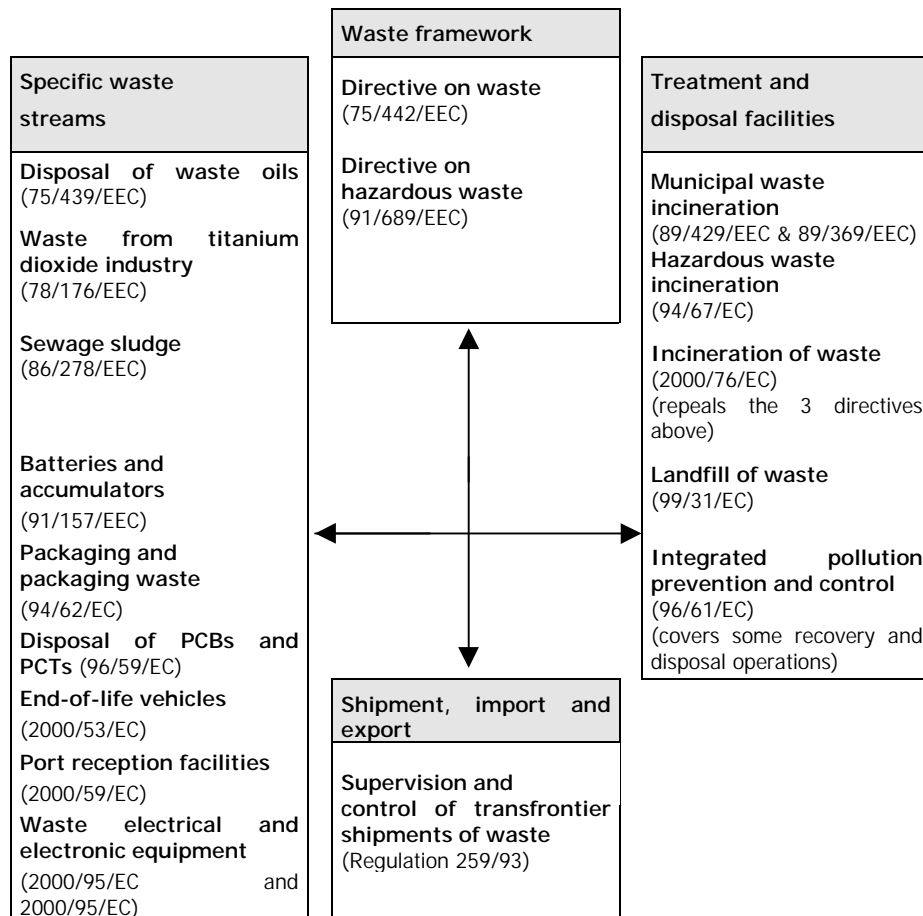


Figure 2.1 Overview of EU directives on waste

The directives are organised into four groups with the Directive on waste (75/442/EEC) representing the overall “framework” of EU regulations. This directive lays down requirements for all types of waste, unless they are specifically regulated by other directives. The other part of the waste framework legislation is the Hazardous Waste Directive, providing for the management, recovery and correct disposal of hazardous waste.

In addition to the Waste Framework Directive, a number of other directives regulate specific waste streams. These are titanium dioxide waste, packaging and packaging waste, waste oils, PCBs and PCTs, batteries and accumulators, sewage sludge, end-of life vehicles (ELV), waste electrical and

electronic equipment (WEEE). as well as port reception facilities for waste from ships and cargo residues.

Finally, a group of directives regulate waste treatment operations: incineration of municipal and hazardous waste, and disposal of waste through landfilling. A specific type of permit is required for certain waste management operations under Council Directive 96/61/EC on integrated pollution prevention and control.

Council Regulation 259/93 regulates transfrontier shipments of waste.

The Waste Framework Directive

The obligation for Member States to make a waste management plan is laid down in the Council Directive 75/442/EEC of 15 July 1975 on waste¹.

The legislation applies to any substance or object which the holder discards or intends to or is required to discard, which is generally all types of waste (Annex I). However, the legislation does not apply to gaseous effluents, as well as to certain categories of waste (e.g. radioactive waste, extractive waste, animal carcasses and agricultural waste, waste water) when they are subject to specific Community rules (Article 2(1)).

The main objectives, as set out in Articles 3, 4 and 5, are:

- Firstly, to prevent or reduce waste generation and its harmfulness, and secondly to recover waste by means of recycling, re-use or reclamation or any other process with a view to extracting secondary raw materials, or to use waste as a source of energy. Member States shall inform the Commission of any measures they intend to take to achieve these aims.
- Member States shall take the necessary measures to ensure that waste is recovered or disposed of without endangering human health and without using processes or methods which could harm the environment. They shall also take the necessary measures to prohibit the abandonment, dumping or uncontrolled disposal of waste.
- Member States shall take appropriate measures, in co-operation with other Member States where this is necessary or advisable, to establish an integrated and adequate network of disposal facilities, taking account of the best available technology not involving excessive costs. The network must enable the Community as a whole to become self-sufficient in waste disposal and the Member States to move towards that aim individually, taking into account geographical circumstances or the need for specialised facilities for certain types of waste.

According to Article 7 the competent authority is required to draw up a waste management plan, that relates in particular to:

- the type, quantity and origin of waste to be recovered or disposed of,
- general technical requirements,
- any special arrangements for particular wastes,
- suitable disposal sites or facilities.

Such plans may, for example, cover:

- the natural or legal persons empowered to carry out the management of waste,
- the estimated costs of the recovery and disposal operations,
- appropriate measures to encourage rationalisation of the collection, sorting and treatment of waste.

¹ The Directive is amended by: Council Directive 91/156/EEC of 18 March 1991; Council Directive 91/692/EEC of 23 December 1991; Commission Decision 96/350/EC of 24 May 1996; and Council Directive 96/59/EC of 16 September 1996.

Other EU legislation that includes provisions relevant to waste planning

In addition to the general requirement to develop waste management planning, the Directive on hazardous waste requires Member States to draw up specific plans for hazardous waste. The Directive on packaging and packaging waste requires Member States to include a specific chapter on the management of packaging and packaging waste in the waste management plans.

The legislation is presented in Table 1.

Table 1. Directives that stipulate a planning obligation

Directive 75/442/EEC of 15 July 1975 on waste	<p>Article 7</p> <p><i>In order to attain the objectives referred to in Article 3, 4 and 5, the competent authority or authorities referred to in Article 6 shall be required to draw up as soon as possible one or more waste management plans.</i></p>
Directive 91/689/EEC of 12 December 1991 on hazardous waste	<p>Article 6</p> <p><i>1. As provided in Article 7 of Directive 75/442/EEC, the competent authorities shall draw up, either separately or in the framework of their general waste management plans, plans for the management of hazardous waste and shall make these plans public.</i></p> <p><i>2. The Commission shall compare these plans, and in particular the methods of disposal and recovery. It shall make this information available to the competent authorities of the Member States, which ask for it.</i></p>
Directive 94/62/EC of 15 December 1994 on packaging and packaging waste	<p>Article 14</p> <p><i>Management Plans. In pursuance of the objectives and measures referred to in this Directive, Member States shall include in the waste management plans required pursuant to Article 17 of Directive 75/442/EEC, a specific chapter on the management of packaging and packaging waste, including measures taken pursuant to Articles 4 and 5.</i></p> <p>Article 4</p> <p><i>Prevention. Member States shall ensure that, in addition to the measures to prevent the formation of packaging waste taken in accordance with Article 9, other preventive measures are implemented. Such other measures may consist of national programmes or similar actions adopted, if appropriate in consultation with economic operators, and designed to collect and take advantage of the many initiatives taken within Member States as regards prevention. They shall comply with the objectives of this Directive as defined in Article 1 (1).</i></p> <p>Article 5</p> <p><i>Member States may encourage reuse systems of packaging, which can be reused in an environmentally sound manner, in conformity with the Treaty.</i></p>

Note: Text in italics is quoted from the Directives. For the exact wording of directives please consult the legislation in force. This is an overview only.

These directives are supplemented by a group of directives aiming at regulating specific waste streams. The provisions of these directives that are relevant to waste management planning are summarised in Table 2.

Table 2. Other EU legislation that may be taken on board in the waste management planning process

<p>Directive 78/176/EEC of 20 February 1978 on waste from the titanium dioxide industry</p>	<p>Article 9 <i>Member States shall draw up programmes for the progressive reduction and eventual elimination of pollution caused by waste from existing industrial establishments.</i></p> <p>The programmes shall:</p> <ul style="list-style-type: none"> ▪ <i>...set general targets for the reduction of pollution from liquid, solid and gaseous waste,..</i> ▪ <i>...contain intermediate objectives.</i> ▪ <i>...contain information on the state of the environment concerned, on measures for reducing pollution and on methods for treating waste that is directly caused by the manufacturing processes.</i> ▪ <i>...be sent to the Commission.</i>
<p>Directive 75/439/EEC of 16 June 1975 on the disposal of waste oil</p>	<p>Article 2 <i>Member States shall take the necessary measures to ensure that waste oils are collected and disposed of without causing any avoidable damage to man and the environment.</i></p> <p>Article 3 <i>Where technical, economic and organisational constraints so allow, Member States shall take the measures necessary to give priority to the processing of waste oils by regeneration.</i></p> <p>Article 7 <i>Member States shall inform the Commission of the measures taken to regenerate waste oils.</i></p>
<p>Directive 96/59/EC of 16 September 1996 on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT)</p>	<p>Article 11 <i>Member States shall... draw up:</i></p> <ul style="list-style-type: none"> ▪ <i>plans for the decontamination and/or disposal of inventoried equipment and the PCBs contained therein;</i> ▪ <i>outlines for the collection and subsequent disposal of equipment...</i> <p><i>Member States shall communicate these plans and outlines to the Commission without delay.</i></p>
<p>Directive 91/157/EEC of 18 March 1991 on batteries and accumulators containing dangerous substances</p>	<p>Article 6 <i>Member States shall draw up programmes in order to achieve the following objectives:</i></p> <ul style="list-style-type: none"> ▪ <i>reduction of the heavy-metal content of batteries and accumulators,</i> ▪ <i>promotion of marketing of batteries and accumulators containing smaller quantities of dangerous substances and/or less polluting substances,</i> ▪ <i>gradual reduction, in household waste, of spent batteries and accumulators...,</i> ▪ <i>promotion of research aimed at reducing the dangerous-substance content and favouring the use of less polluting substitute substances in batteries and accumulators, and research into methods of recycling,</i> ▪ <i>separate disposal of spent batteries and accumulators...</i> <p><i>...The programmes shall be reviewed and updated regularly, at least every four years, in the light in particular of technical progress and of the economic and environmental situation. Amended programmes shall be</i></p>

	<i>communicated to the Commission in good time.</i>
Directive 99/31/EC of 26 April on the landfill of waste	<p>Article 5</p> <ul style="list-style-type: none"> ▪ <i>Member States shall set up a national strategy for the implementation of the reduction of biodegradable waste going to landfills ... and notify the Commission of this strategy.</i> ▪ <i>This strategy should include measures to achieve the targets set out in paragraph 2 [of the Directive] by means of in particular, recycling, composting, biogas production or materials/energy recovery.</i> ▪ The national strategy shall ensure that the targets in the Directive are met.

Note: Text in italics is quoted from the Directives.

2.2 EU waste management principles

The principles established by the Waste Framework Directive 75/442/EEC and the EU Strategy for waste management² are highly relevant in the planning process and can be summarised as follows:

- To secure the conservation of nature and resources, waste generation must be minimised and avoided where possible (prevention principle).
- To secure a reduction in the impacts from waste on human health and the environment, especially to reduce the hazardous substances in waste, through the precautionary principle.
- To make sure that those who generate waste or contaminate the environment should pay the full costs of their actions through the principles of the polluter pays and producer responsibility.
- To secure an adequate infrastructure by establishing an integrated and adequate network of disposal facilities, based on the principle of proximity and self-sufficiency.

These principles mark the historical evolution of the waste management system, from giving the highest priority to aspects of infrastructure, then adding aspects of human health and the environment, and finally integrating concerns on conservation of nature and resources.

The Waste Framework Directive defines different forms of treatment relevant to waste management. It distinguishes between recovery (forms of treatment ensuring resource utilisation of waste, such as recycling and incineration with energy recovery) and disposal (forms of waste disposal where resources in waste are not utilised such as incineration without energy recovery and landfilling).

The *hierarchy* for waste management operations was laid down in Directive 75/442/EC and in the EU Strategy for waste management and gives waste prevention the highest priority, followed by recycling and other types of recovery. Optimum final disposal is at the bottom of this hierarchy.

The EU Strategy also stresses the need for:

- reduced waste movements and improved waste transport regulation

² Communication from the Commission on the review of the Community Strategy for Waste Management COM(96) 399 final. Council Resolution of 24 February 1997 on a Community strategy on waste management.

- new and better waste management tools such as:
 - regulatory and economic instruments,
 - reliable and comparable statistics on waste,
 - waste management plans,
 - proper enforcement of legislation.

These are strategic means to fulfil the objectives of the Waste Framework Directive.

In the remainder of this chapter, the waste hierarchy and objectives for specific waste streams are presented.

Waste prevention as a strategic element in the European waste policy is becoming increasingly important. It is clear that in Europe the amount of waste generated is growing every year, and it is growing faster than economic growth. Since one of the main goals of the EU is to secure economic growth and prosperity, it is imperative to de-couple the relationship between economic growth and the generation of waste.

Waste prevention initiatives address both the industrial sector, by promoting the use of cleaner technology, as well as schools and private households etc. in broader awareness campaigns.

As prevention has the highest priority in the EU waste management principles, efforts should be made in order to aim at reducing the quantity of waste generated. Two terms are often commonly used in this respect: 'waste prevention' and 'waste minimisation'.

At an OECD Conference³ a definition of waste minimisation and prevention was agreed. As it appears in the figure below, waste minimisation is a broader term than prevention. Waste prevention covers 'Prevention', 'Reduction at source' and 'Re-use of products'. Waste minimisation, however, also includes the waste management measures 'quality improvements' (such as reducing the hazardous substances) and 'recycling'.

Figure 2.2. OECD definition of waste prevention and waste minimisation

Preventive Measures			Waste Management Measures			
Prevention	Reduction at source	Re-use of products	Quality improvements	Recycling	Energy recovery	Pre-treatment
Waste Minimisation						

The European policy on waste emphasises the development of measures such as:

- promotion of clean technologies and products,
- reduction of the hazardousness of wastes,
- establishment of technical standards and possibly EC-wide rules to limit the presence of certain dangerous substances in products,
- promotion of reuse and recycling schemes,
- appropriate use of economic instruments,
- eco-balances,
- eco-audit schemes,
- life-cycle analysis,

³ "Building the Basis for a Common Understanding on Waste Minimisation", OECD Workshop October 1996 in Berlin.

- actions on consumer information and education and development of the eco-label system.

Box 2.1 Waste Minimisation Good Practice Guide

The Environment Agency for England and Wales has published a Waste Minimisation Good Practice Guide. The Guide is useful for small and medium sized enterprises in setting up a waste minimisation programme in the workplace. The Guide offers a step-by-step assistance in waste reduction through the introduction of a range of practical and tested solutions.

The guide is posted at:

http://www.environment-agency.gov.uk/commondata/105385/good_practice.pdf

Recovery contributes to utilising the resources embedded in waste and contributes to saving virgin raw materials.

Some directives of the European Union include specific targets on recovery, recycling and re-use. These are the packaging and packaging waste Directive, the Directive on management of end-of-life vehicles and the Directive on waste electrical and electronic equipment. The targets in each of these directives are presented below.

Table 3. Packaging and packaging waste Directive: existing targets and proposed new targets

By weight	Targets in 94/62/EC	New targets proposed*
Overall recovery target	min. 50%, max. 65%	min. 60%
Overall recycling target	min. 25%, max. 45%	min. 55%, max.80%
Material specific recycling targets:		
- Glass	15%	60%
- Paper/Board	15%	60%
- Metals	15%	50%
- Plastics	15%	22.5%
- Wood	-	15%
Year to achieve targets	30 June 2001	31 December 2008

* Source: Proposal for a Directive of the European Parliament and of the Council amending Directive 94/62/EC on packaging and packaging waste (COM (2001) 729 final) – Common Position adopted by the Council on 6/3/2003 (OJ C107 E, 6/5/2003, p. 17). The proposed new targets are subject to modification in the context of the ongoing legislative process, which can be monitored at

http://europa.eu.int/prelex/detail_dossier_real.cfm?CL=en&DossierId=170079#348577.

Table 4. Directive on management of end-of-life vehicles: targets

	Rate of re-use and recovery	Rate of reuse and recycling
By average weight per vehicle and year in 2006	85%	80%
By average weight per vehicle and year in 2015	95%	85%

Source: Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of-life vehicles

The Directive on waste electrical and electronic equipment (WEEE) includes a target that by the end of 2006 at the latest, a minimum rate of separate collection of four kilograms on average per inhabitant per year of waste

electrical and electronic equipment must be achieved. The Directive also requires producers to set up systems for the recovery and recycling of WEEE either collectively or individually. It is the responsibility of the producers that the recovery and recycling targets are met.

Table 5. Directive on waste electrical and electronic equipment: targets

	Minimum recovery rate	Minimum rate of component, material and substance reuse and recycling
Large household appliances and automatic dispensers, by an average weight per appliance	80 %	75 %
IT and telecommunications equipment and consumer equipment, by weight of the appliances	75 %	65 %
Small household appliances; lighting equipment; electrical and electronic tools; toys, leisure and sports equipment; monitoring and control instruments, by an average weight per appliance	70 %	50 %
Gas discharge lamps, by weight of the lamps	-	80 %
Year to achieve targets	31 December 2006	

Source: Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE) - Joint declaration of the European Parliament, the Council and the Commission relating to Article 9.

Landfilling is ranked lowest in the waste hierarchy due to the lack of utilisation of the resources in the waste. However, landfilling remains the most common waste treatment method in the European Union.

There may be several environmental impacts from landfills. One impact is contribution to the greenhouse effect through the emission of methane gas. Leachate may also damage groundwater if there is no liner system. Other impacts include odours and general inconvenience for neighbours to landfill sites.

Hence there are several reasons why the Directive on the landfill of waste (99/31/EC) aims at reducing the amount of biodegradable municipal waste going to landfill. By year 2016, the aim is to reach a reduction in the landfill of biodegradable waste to 35% of the total weight produced in 1995. This corresponds to a diversion away from landfill of some 70 million tonnes of biodegradable municipal waste⁴ in the EU in 2016, assuming that the total quantity will not increase.

⁴ *Biodegradable municipal waste management in Europe*, EEA Topic report No 15/2001. Table 6, BMW Baseline - 1995.
http://reports.eea.eu.int/topic_report_2001_15/en.

Table 6. Biodegradable municipal waste: targets for diversion away from landfill

Year to achieve target	On the basis of biodegradable municipal waste generated in 1995 ¹ , biodegradable municipal waste going to landfill must be reduced to:
16 July 2006	75 %
16 July 2009	50 %
16 July 2016	35 %

Note 1: Or the latest year before 1995 for which standardised Eurostat data is available.
Source: Council Directive 99/31/EC of 26 April on the landfill of waste

Member States which in 1995 (or the latest year before 1995 for which standardised Eurostat data is available) lead more than 80% of their collected municipal waste to landfill, may postpone the attainment of the targets by a period of maximum four years.

Box 2.2 Example: Diversion of waste away from landfill

In the Netherlands, the Waste Decree (Landfill Ban) came into force in 1995. The decree prohibits the landfilling of waste that can be recycled/reused or incinerated with energy recovery. The ban includes household waste, paper and paperboard, organic household waste and packaging. Since 1997 the ban has been extended to wood waste. Furthermore, there is a high tax on reusable or combustible waste. Although the quantity of household waste increased by 13.4% between 1995 and 1998, the quantities of biodegradable municipal waste being consigned to landfill decreased by more than 50%. In 1998 only 13.1% of biodegradable waste from households was consigned to landfill.

For further information, see:
http://reports.eea.eu.int/topic_report_2001_15/en

2.3 Other relevant EU legislation

In addition to legislation directly related to waste management, the waste management planning process should also have regard to a number of other relevant Directives which might influence decisions, especially as regards the siting and operation of waste management facilities. In particular:

- The 'Water Framework' Directive 2000/60/EC establishing a framework for Community action in the field of water policy;
- the 'Environmental Impact Assessment' Directive 85/337/EEC as amended by Directive 97/11/EC on the assessment of the effects of certain public and private projects on the environment;
- the 'Strategic Environmental Assessment' Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (presented in more detail under section 3.3 below);
- the 'Habitats' Directive 92/43/EEC on the conservation of wild fauna and flora and of natural habitats.

3 General considerations when drafting a waste management plan

Political support and understanding of the need to draw up a waste management plan is crucial. If a plan already exists, this plan may have to be revised. If, on the other hand, the first waste management plan has yet to be worked out, it is very important that the political level has accepted the need for a plan and allocated sufficient resources to its execution. Hence, it is recommended to create a political starting point in order to carry out the work on a waste management plan.

A political starting point should include a decision on the following questions:

- Why draw up a waste management plan?
- What is the scope of the waste management plan?
- Who will be involved in the preparation of the waste management plan?
- What is the time schedule for finalisation of the waste management plan?
- What is the relationship to other plans?

3.1 Definition of the scope of the plan

Before starting the planning, the scope of the plan must be defined.

This includes considerations of the following issues:

- What is the geographical coverage of the plan? National, regional or local?
- Which waste streams will be included in the plan? Total waste, municipal waste, hazardous waste, packaging waste, other?
- Which sectors will be included in the plan?
- What is the time horizon of the plan? e.g. 3, 5 or 10 years?

Waste streams and sectors to be included in the plan

The considerations about waste streams to be included should determine the sources, streams and quantities of waste generated, current collection, transportation and treatment, and how these might change in the future. Clear definitions of the waste streams are important. Additionally, the waste streams given priority must be clearly defined.

Decisions on waste streams included in the plan may also affect the economic sectors to be included. In most countries local authorities are responsible for managing municipal waste only. However, in some countries local authorities may either choose to manage industrial waste as well, or they may have been given the authority to manage all waste.

The time horizon for the waste management plan

The time horizon for the plan depends on a number of factors. To reflect this, the plan may consist of two parts: part 1, which will be for immediate action, and part 2, which will be a long-term perspective.

The reason for the long-term perspective part of the plan is that considerable difficulties can be expected in identifying suitable sites for waste treatment facilities or landfills within, or close to, urban areas. Furthermore, it will be necessary to put considerable effort into site selection, environmental impact assessment, and public consultation in order

to obtain permission for new sites. Finally, waste treatment facilities represent large investments that need to be recovered over a longer period.

Costs of collection are of a more short-term nature and less capital-intensive. The main items are more likely to be contracts with contractors that typically have a lifetime of no more than five years.

From a practical point of view, the time horizon of the plan should also be long enough to make it possible to evaluate whether targets in the plan are reached. Therefore, it will not be practical to re-evaluate the plan before at least three years. The time horizon of the plan may also reflect other considerations of the political scene, e.g. the period between local elections.

Thus, a time horizon of three to five years would be appropriate for revision of the action part of the waste plan.

3.2 Participants in the planning process

The involvement of the various stakeholders and the wider public in the planning process should aim at ensuring acceptance of the waste policy in general and contribution to the attainment of its objectives. This is to be done according to the various levels of administration concerned, reflecting cultural traditions and political organisation.

As part of the general considerations when drafting a waste management plan it should be made clear *who* will be the participants in the different stages of the planning process and *how* and *when* the administration/policy-makers will bring them in.

Involvement of the public is required by the Directive 2001/42/EC on Strategic Environmental Assessment, which covers waste management plans (see section 3.3). This is also in line with the UN/ECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters ("the Aarhus Convention"). The Convention has been signed by 40 countries and ratified by 22 countries. The European Union and its 15 Member States have signed the Convention which entered into force on the 30 October 2001.

Box 3.1 Objective of the Aarhus Convention

In order to contribute to the protection of the right of every person of present and future generations to live in an environment adequate to his or her health and well-being, each Party shall guarantee the rights of access to information, public participation in decision-making, and access to justice in environmental matters in accordance with the provisions of this Convention.

Full treaty text is available at: <http://www.unece.org/env/pp/treatytext.htm>

Access to environmental information and public participation

Two relevant Directives are currently part of the implementation of the Aarhus Convention in the EU.

The Directive on public access to environmental information establishes a framework for public authorities to deal with requests for access to environmental information. It also allows for disseminating environmental information to the public and specifies the minimum content of such information.

The Directive on public participation introduces a procedure for consulting the public when drawing up plans and programmes relating to the environment, including waste management plans. It specifies the type of information to be provided to the public for the purposes of public consultation and requires reasonable time-frames in order to ensure an effective involvement of the public in environmental decision-making at an early stage.

Box 3.2

Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC

http://europa.eu.int/eur-lex/en/dat/2003/l_041/l_04120030214en00260032.pdf

Directive 2003/35/EC of the European Parliament and of the Council of 26 May 2003 providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/333/EEC and 96/61/EC

http://europa.eu.int/eur-lex/en/dat/2003/l_156/l_15620030625en00170024.pdf

Who should be involved in the planning process?

Participants in the waste planning process should include a wide range of stakeholders in order to cover all the important aspects. They may include:

- representatives from the political and the administrative level (government departments, regional authorities, municipalities)
- waste experts
- representatives from the waste management sector (collection, recycling, composting, biogas, incineration and landfill)
- industry, industrial and commercial organisations
- consumer councils/associations
- NGOs.

Other parties may be involved in the planning process as well.

How should participants be involved?

The minimum involvement requirement is to submit the draft waste management plan to a public consultation. The consultation may be carried out as a written procedure where only the most relevant parties (e.g. the participants mentioned above) receive the draft plan and are given a certain period of time for commenting on it.

The draft plan may also be made publicly accessible through the Internet, from town halls and public libraries. This may include an invitation for all citizens to comment on the draft plan.

A more thorough approach is to set up a high-level advisory committee and a working group.

The purpose of the *advisory committee* is to guide the overall planning process and to give input to the waste management plan on important issues such as identifying priority waste streams, setting realistic objectives and measures to implement the plan. The advisory committee may even be

given a more influential role as a steering committee. It should consist of representatives from competent authorities (e.g. Environment, Finance, Energy and Industry), representatives from local/regional authorities, the waste management sector, industry, consumers and NGOs.

The purpose of the *working group* is to be in charge of all the practical work of collecting data, preparing analyses of the existing situation, identifying potential problems, writing proposals for objectives, implications of various measures for implementation, etc., and of course preparing the draft waste management plan. The working group would also act as a secretariat of the advisory committee. The participants of the working group would clearly include staff from the competent authority (e.g. a national Environmental Protection Agency or regional authority) but may also involve a representative from a local/regional authority (if it is a national or regional plan), and a representative from the waste management sector.

Terms of reference should be drawn up for the advisory committee as well as for the working group. Furthermore, the terms of reference should be prepared before the establishment of the two groups in order to avoid duplication of work and inconsistencies in organisational structure.

In addition to the advisory committee and the working group, participation may be extended to include a series of *workshops* during the planning process. An initial workshop may be held to create a mutual understanding of the waste problems and the necessity for action. The programme of the workshop may include a presentation of the current situation such as waste quantities generated, environmental impacts from waste treatment and treatment capacity. It would also be an opportunity to collect ideas for future development of the waste sector, priority waste streams and suggestions for objectives.

Workshops may also be held later in the process when the plan starts taking shape and suggestions for future objectives and targets are ready. The measures to implement the plan are usually also of interest to stakeholders. All in all, the main purposes of such workshops are to receive ideas from stakeholders and to exchange information on aspects of waste planning.

Finally, another option is to establish either working groups or workshops dealing with specific waste streams. This may be relevant for priority waste streams, "new" waste streams that have not been collected and managed before, or if radical changes are needed for particular waste streams.

Box 3.3 Example: Participation in development of regional waste management plans

The 'National Waste Strategy: Scotland' was adopted at the end of 1999. In order to implement the strategy, Area Waste Plans for each of eleven areas are to be developed. The Area Waste Plans will go through an integration process to produce an integrated plan for Scotland.

In the development of the Area Waste Plans, a Waste Area Strategy Group (WASG) has been established, including partnerships of local authorities, the waste management industry, waste generators and the local enterprise network.

The status of each of the Area Waste Plans and the consultation process for each plan are made public via the internet site of the Scottish EPA: <http://www.sepa.org.uk/>

Public awareness

The public consultation on a draft waste management plan may be an integral part of awareness-raising activities. However, public awareness is much more than just commenting on draft plans, and it should be considered important for the acceptance by the general public of waste management issues.

The raising of public awareness is dealt with in more detail in section 5.4 on possible measures for the implementation of a waste management plan.

3.3 Assessment of the effects of certain plans and programmes on the environment

The Directive on the assessment of the effects of certain plans and programmes on the environment applies to plans and programmes likely to have significant effects on the environment and which are prepared and adopted by a competent authority.

Environmental impact assessment is automatically required for plans and programmes which are prepared for town and country planning, land use, transport, energy, waste management, water management, industry, telecommunications, agriculture, forestry, fisheries and tourism. Prior to the adoption of a plan or programme or its submission to the legislative process, the competent authority of the Member State concerned will be required to carry out an environmental impact assessment and, after consulting the competent environmental authorities, to prepare an environmental report.

The draft plan or programme and the environmental report must be made available to the authorities responsible for the environment and to the public. The authorities and the public will be able to express their views on the draft plan or programme prior to its adoption or submission to the legislative process.

Box 3.4 Further information on the assessment of the effects of certain plans and programmes on the environment

Directive 2001/42/EC of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment:

http://europa.eu.int/eur-lex/pri/en/oj/dat/2001/l_197/l_19720010721en00300037.pdf

The European Commission's web site for Environmental impact assessment – EIA:

<http://europa.eu.int/comm/environment/eia/home.htm>

3.4 Time-schedule for the planning process

A time-schedule showing the expected duration of the different stages and the expected finalisation date of the waste management plan should be made. The time-schedule should also make provision for the consultation period with the public, which may be time-consuming.

In general, the entire planning process can be expected to take around 18 months, but this may vary according to the circumstances.

The time-planning should also include an indication of the decisions to be taken at each stage and when workshops may take place.

3.5 Relationship with other plans and policies

Waste management planning should be an integral part of the overall national planning system, both as a wider approach to sustainable development and in order to achieve the overall goals set down in the waste management plans. A number of different planning areas relate directly to waste management planning and should be carefully considered when deciding on the scope and content of a waste management plan.

Spatial planning

Spatial planning regulations, which set out a framework for regulating all development in an area, may affect local responsibilities in waste management. Such regulations may include specific requirements for permitting or licensing waste treatment or disposal facilities, and focus on ensuring good operational control. National legislation regarding privatisation may also be relevant.

Comprehensive planning, which designates land for specific purposes, creates the basis for carrying out private and public activities and is a means of resolving conflicts between different activities/land uses.

Environmental planning

Waste planning has strong links with environmental planning in general. On the one hand, waste planning is part of overall planning to ensure that certain environmental goals are reached, on the other hand the goals in the waste plan can only be achieved if environmental standards are set and controlled for all waste management activities.

Energy planning

Waste treatment facilities can also be power stations, incineration plants and biogas or other industrial plants using waste as a fuel. In order to use the energy produced by certain plants, they have to be incorporated into overall energy planning. Energy production at incineration or biogas plants may even be part of the measures in achieving targets on climate policy.

Human health

Waste often contains chemical substances with a potential for affecting human health. Examples are hazardous waste, household waste, and waste from energy production and agriculture. Some substances may be hidden or lumped together in products or waste streams. Such issues should be integrated in both health planning and waste management planning.

Occupational health

Waste collection and treatment can heavily influence occupational health, and care should be taken in the initial planning stage to avoid negative impacts on workers. When planning collection systems, special care should be taken to avoid heavy lifting and strain from handling containers. Special attention should also be given to the occupational health conditions at incineration, composting or recycling plants.

Checklist:

It is recommended to set up a task force with clear responsibilities for the work to be carried out.

1. Are political understanding and support for the waste management planning process present?
2. Have sufficient resources been allocated to the process?
3. Scope of the waste management plan:
 - What is the geographical coverage of plan? National, regional or local?
 - Which waste streams will be included in the plan? Total waste, municipal waste, hazardous waste, packaging waste, other?
 - Which sectors will be included in the plan?
 - What is the time horizon of the plan? e.g. 3, 5 or 10 years?
4. Have the participants in the planning process been identified? Do they include government departments, local authorities, waste experts, representatives from the waste management sector and the waste generating industry, and NGOs?
5. Has the time schedule for preparation of the waste management plan been set? Time estimates for the work should be realistic.
6. Have any relationships between the waste management plan and other plans (e.g. spatial planning, energy planning, etc.) been identified? Do they influence elements in the waste management plan?

4 Status part

In order to set the objectives for the waste management plan and to assess the fulfilment of the objectives of the previous plan, if any, the status report should present an overview of the current situation. The status report is carried out as a point of reference, and it identifies the need for further development of the system. Furthermore, the status report is necessary to measure levels of achievement compared to previously defined objectives.

The current waste collection and treatment system should be described in physical, financial, and organisational terms. Hence, analysing the status of the current system allows us to see if it meets the objectives that are already set, such as an overall recycling target, collection of certain waste streams, or achieving certain environmental standards of waste management facilities, etc. The status report is mainly drawn up by the administrative authorities, in co-operation with the various parties within the current waste management system.

For the preparation of a status report, it is necessary to collect data and to provide general knowledge of waste sources, amounts, types, collection, transportation, treatment and disposal of waste, and the structure of the current waste management system.

The outline of the status report will differ from national, to regional, and to local levels since the need for information will differ. At national level aggregated data will be of importance, while the regional/local status report in all respects will have to be more specific. Thus regional/local status reports will contain for example amounts and types of waste generated in the different sectors and treated at different plants, the capacity of the plants in the area and characteristic regional/local conditions due to business structure or natural phenomena.

When a status report is to be drawn up, the first step is to collect data and information. The second step is to describe the current system including identification of areas for improvement in the system. The third step is to evaluate the performance of the current waste management system.

Both the status part and the planning part may be organised according to the "sources of waste" (different waste generating activities in the relevant area), waste streams (materials of which the waste is composed) and the waste management options (e.g. collection, sorting, treatment and disposal).

4.1 Waste quantities

To make the status report adequate and as precise as possible, it is important to use precise and valid data and information. Collection of all data often requires extensive work. It is therefore advisable to start the development of data collection systems as soon as possible in the planning process. At the start of the process, it may be difficult to get reliable figures. In this case, estimates can be made.

Basically, information and data are needed on waste amounts for:

- the "sources of waste";
- the waste streams;

- the waste management processes: generation, collection, transportation, sorting, treatment and disposal.

By identifying the “sources of waste” it is possible to direct awareness campaigns and waste prevention programmes towards the sources with the highest volumes of waste or towards those with the most hazardous waste generation. At the same time, this will create the platform for any specific regulation directed towards specific waste streams and waste generators. Finally, the effectiveness of inspection and enforcement may be improved.

Box 4.1 Example of relevant waste sources

- Households
- Municipal services
- Industries
- Agriculture/forestry
- Institutions, trade/commerce and offices
- Construction and demolition sites
- Power plants
- Mining
- Wastewater treatment plants
- Waste treatment plants

By addressing the waste streams it is possible to obtain information on the quantity and composition of different waste streams. In this way, the authorities will have a background for setting strategic objectives for each waste stream as well as the future treatment methods and facilities needed to attain the objectives. As an example, the Directive on packaging and packaging waste has various targets for a number of packaging materials.

Box 4.2 Example of relevant waste streams

EU Priority waste streams:

- | | |
|---|------------------------|
| ▪ Municipal waste | ▪ Hazardous waste |
| ▪ Packaging waste | ▪ End-of-life vehicles |
| ▪ Tyres | ▪ Health care waste |
| ▪ Waste electrical and electronic equipment | ▪ Waste oil |
| ▪ Construction and demolition waste | ▪ Sewage sludge |

Other relevant waste streams:

- | | |
|-----------------------------------|--------------------------|
| ▪ Organic residues (garden waste) | ▪ Food and organic waste |
| ▪ Cardboard | ▪ Paper |
| ▪ Plastics | ▪ Textiles |
| ▪ Iron | ▪ Inert residues |
| ▪ Other metals | ▪ Batteries |
| ▪ Agricultural waste | ▪ Bulky waste |
| ▪ Industrial waste | ▪ Mining waste |

The status of the current waste management system and the description of it allow for an identification of needs in terms of design, capacity, and new initiatives.

It is also relevant, and an obligation under the Waste Framework Directive, to present the amounts of waste that go through the different processes (generation, collection, transportation, sorting, treatment and disposal). This

is mainly in order to be able to assess whether the current capacity of waste management facilities is sufficient.

Box 4.3 Local and/or regional waste management system

When a local or regional waste management plan is to be prepared, it is relevant to include a detailed description of the waste management system in place. A description of the local system for municipal waste may include the following examples, as a minimum:

- Collection equipment (bins, vehicles)
- Transportation schemes (transport logistics, location of treatment plants)
- Transfer/sorting facilities
- Types of treatment plants (e.g. landfills, incineration plants)
- Recycling activities - both run by authorities and private organisations (e.g. the Red Cross)
- Payment schemes
- Regulation (national as well as local)

Methods of collecting data and information

When a national waste management plan is to be prepared, there are basically two methods of collecting data and information:

- collating reports from the local authorities
- utilising key figures based on local surveys or random tests.

Key figures may be in the form of waste generation per capita, per industrial sector, quantities of hazardous waste per employee in the electroforming industry, rate of glass and paper in municipal, solid waste, etc. In fact, a national waste management plan often contains data collected in both ways.

Box 4.4 Example: Status of waste streams and amounts

In the Finnish Waste Management Plan 1998-2005, the status report contains an overview of the waste situation in Finland based on data both collected by the local authorities and calculated on the basis of key figures. For example, specifications have been made of waste recovery by waste source and types of waste, industrial waste generated annually by the industrial sector, and manufacturing waste by sector.

The specification of total waste generated annually in Finland is included for the following waste streams:

- Mining waste
- Agricultural waste
- Industrial waste
- Construction waste
- Waste from energy and water supply
- Municipal waste
- Sewage sludge
- Hazardous waste

An overview in English may be found at

<http://www.vyh.fi/eng/orginfo/publica/electro/waste/waste.pdf>

Furthermore, for a national plan statistical data may be obtained, for example on demographic developments for the key assumptions in the planning part (see section 5.1). These data are normally collected by a national or regional/local authority and are thereby easy to obtain.

Collection of specific data and information for a local/regional waste management plan often means measurements directly in the waste stream. Such measurements can have varying degrees of sophistication. Where it is possible to weigh the waste, this is of course the most precise way to register the exact amount. If direct measurements are impossible, calculations can be made based on data from equipment currently in use (number of bins emptied, number of trucks arriving at the plant etc.).

The competent local authorities, waste management enterprises, waste generating or waste recycling enterprises can provide some of the necessary data. These parties often have important information on quantities of waste collected, recycled or treated, as well as its composition. They also have information on treatment costs etc.

Statistical information to be collected can include:

- Population size;
- Geographical size of the area from which waste is collected, divided into residential, industrial, and commercial areas;
- A detailed picture of the size and number of main sectors and activities generating waste (industries, commercial undertakings including agriculture, and tourism);
- Annual amounts of waste and its composition, analysed into seasonal fluctuations.

Box 4.5 EU Waste Statistics Regulation

The problem of incomplete and hardly comparable waste data due to different definitions and surveying methods may be overcome to a certain extent in the future thanks to the new EU Regulation on Waste Statistics. Three annexes to the regulation describe which data should be collected and the methods to do so.

Main statistics derived from the Waste Statistics Regulation will be presented in two main tables - a waste generation table (according to NACE-classification and the 'EWC-stat V2' classification for waste and hazardous waste) and a waste management table (recycling, incineration with energy recovery, incineration without energy recovery and landfilling).

The Waste Statistics Regulation was adopted on 25 November 2002 and entered into force on 29 December 2002. Hence, the first reference year for data collection is 2004, which would lead to a first publication in 2006 at the earliest.

EU Member States have employed different surveying methods and statistical waste definitions so far. The new regulation will lead to more harmonised main waste data in the EU.

The Waste Statistics Regulation (No 2150/2002) is available at:
http://europa.eu.int/eur-lex/en/oj/2002/l_33220021209en.html

4.2 Waste collection and treatment

First of all, a description of the current waste collection system and treatment facilities is necessary for achieving an overview of collected and treated waste streams. Secondly, the description establishes a basis for identifying where improvements could be made.

Systems for collection of all waste streams should be included in the description and, if possible, it should be combined with a statement of the responsible parties for the collection. This is especially relevant for waste

streams where collection and/or recycling/recovery targets are set in EU directives.

At national level, the description of collection systems would be a general outline of the systems in place while at regional/local it may be of a rather detailed nature, e.g. multi-storey buildings are served by one type of collection system and one-family houses by another.

The waste management facilities will often consist of many different treatment plants, such as incineration plants, landfills, and various types of recycling facilities (including composting plants).

The registered current usage, the capacity of each plant as well as the financial aspects of the treatment should be included in the description of the system. The description should contain the amount treated annually of each waste stream, the maximum capacity of the plants, the expected lifetime of the plants, the costs of treatment for each waste stream etc. Plans for extensions or renovations should also be described. The registration may be done through questionnaires or visits to the plants.

4.3 Economy and financing

There is a substantial amount of money involved in ensuring continuous development of a waste management system, and throughout Europe there are many methods of financing. Collection and transportation, treatment facilities and landfills are financed and operated by private enterprises, public enterprises, semi-public entities or inter-municipal partnerships.

It is beyond the scope of these Guidelines to make specific recommendations on this issue. However, in the financial statements of the plans it is important to have certain key figures on the economic consequences of the plan. This information is essential when an attempt is made to anticipate the financial consequences of proposed changes in the current waste management system.

The national plan may contain key figures for waste collection and treatment in the country as a whole, such as total costs of landfilling of waste in the country, average price for landfilling of one tonne of asbestos waste or upper and lower price of separation of waste paper. It is not normally possible to present a precise mapping of economic issues in a national plan/strategy.

The regional/local plan, however, should contain actual information on costs of authorities' administrative expenses, collection, transportation, separation, treatment and final disposal of waste. This includes key figures such as:

- Price of treatment of one tonne of waste at the various treatment plants (landfill, incineration, separation etc.);
- Costs in connection with collection of one tonne of waste split up between collection methods and waste streams;
- Costs in connection with transportation of one tonne of waste distributed on waste streams.

Financing of the waste management system depends on national legislation and the extent to which there is a tradition for making users pay for the service. Charges are rather commonly used for collection and treatment of waste although other financing systems, such as producer responsibility, are used for some waste streams.

Box 4.6 Financing municipal waste management

The Commission has conducted a study on the financing of municipal waste management. The study is intended to: (1) Complete existing data sets on prices and costs of waste management, which are needed to undertake an economic analysis. (2) Collate information on the various financing models used by local authorities and national Member States with a view to diffusing best practices including an evaluation of the experience with such systems.

The report of the study is posted at:

http://europa.eu.int/comm/environment/waste/studies/eucostwaste_management.htm

4.4 Basis for decision and evaluation of previous objectives

On the basis of the information and analyses of the current situation, it should be possible to evaluate the performance of the current system. Hence, the administrative level and the political decision-makers have a platform for identifying which problems need special attention in the future and which objectives are realistic and achievable within the timeframe of the waste management plan.

Moreover, before defining new objectives for the future planning period, it is natural to assess whether the previous waste management plan and its initiatives have had the desired effect. Thus, the plan should also contain a section on whether objectives of the previous plan, if any, have been achieved, and if not, why.

Checklist:

The status of the waste management system will give the parties involved in waste management planning an overview of the current waste management system.

The status report is mainly drawn up by the administrative authorities, in co-operation with the various parties within the current waste management system. Note that the work to be performed is rather extensive, no matter whether it is a revision of existing data or a status survey and data collection being done for the first time.

The status report should give the basis for answering the following questions:

1. Does the current waste management system meet the political objectives for:
 - waste prevention/minimisation,
 - recycling/energy recovery,
 - safe disposal facilities?
2. Does the current waste management system address the environmental, health and safety issues in the relevant area of the waste management plan?
3. Does the current waste management system represent an adequate administrative and organisational framework in terms of efficiency in the relevant area?
4. What is the preliminary list of possible changes in order to:
 - meet political objectives,
 - improve the environmental, health and safety performance of the current system,
 - improve the capacity and the physical performance (collection equipment, trucks, access to waste management facilities) of the waste system as a whole and in terms of proximity and self-sufficiency,
 - improve the efficiency and the organisational framework of the system?

5 The planning part

The planning part will be drafted on the basis of a) EU and national waste legislation and strategies, which may include objectives set out in specific areas, and b) the information in the status part, i.e. the analysis and evaluation of the current situation.

In the planning part the following aspects should be identified:

- the future political objectives, including targets and indicators
- the changes needed in order to improve the environmental, health and safety performance of the current system
- the changes needed in relation to the capacity and the physical performance of the waste system
- the changes needed in order to improve the efficiency and the organisational framework of the system.

Elements that may be included in the planning part are indicated in Table 7.

Table 7. Possible elements for inclusion in the planning part

1. Identification and analysis of the expected parameters of significance for waste generation – and identification of options for waste management	Amounts of waste and the composition of waste adjusted in relation to: <ul style="list-style-type: none"> - population growth - changes in economic situation (growth/recession) - changes in demand for and nature of consumer goods - changes in manufacturing methods - new waste treatment methods - effects of policy changes
2. Determination of objectives for	<ul style="list-style-type: none"> - waste prevention, recycling, recovery and safe disposal of waste - waste streams, e.g. priority waste streams - sources of waste, e.g. industry and households
3. The future waste management system – action plan	<ul style="list-style-type: none"> - collection (kerbside, bring schemes, recycling sites) - waste management facilities (recycling, incineration with energy recovery, landfilling) - distribution of responsibilities between local authorities and industry (municipal waste/industrial waste, producer responsibility, etc.). - economic consequences and financing: <ul style="list-style-type: none"> - total cost of management system - use of charges, fees and taxes, producer responsibility - measures to implement the waste management plan
4. Long-term development	<ul style="list-style-type: none"> - future investments in new waste management facilities - additional research and studies to be performed

The waste streams and amounts may be influenced significantly by a number of parameters in the planning period. In order to be able to plan realistically, the dominant parameters should be identified, and their expected influence on the waste streams should be described and evaluated. Necessary measures to counteract or control undesirable trends

should be included in the plan for implementation throughout the planning period.

5.1 Assumptions for planning

Significant *parameters* influencing the planning are:

- the waste types and amounts,
- the geographic origin of the waste and
- the availability of waste management facilities.

For example the status part may show that waste amounts in some areas have increased, and this may mean that preventive measures should be taken or that the treatment capacity for the waste types in question should be enlarged. Similarly, a decrease in amounts of certain waste types may mean that the treatment capacity should be adjusted. In any event, decreases and increases during a year should be analysed in detail to give an indication whether fluctuations are occasional or whether the trend is durable. These aspects have been analysed during the conduct of the status report as described in Chapter 4.

Other parameters may also influence waste generation in the planning period, and, in order to estimate the future needs for waste management services etc., it is necessary to estimate the influence of:

- Population growth
- Changes in economic situation (growth/recession)
- Changes in demand for, and nature of, consumer goods
- Changes in manufacturing methods
- New waste treatment methods
- Effects of policy changes (prevention, minimisation, re-use, recycling)

There are considerable elements of uncertainty attached to some of these parameters, and therefore the waste amounts and the needs for management facilities etc. can only be predicted with some approximation.

Thus, an absolutely certain and unambiguous forecast of future waste generation cannot be prepared. Nevertheless, there is obviously a need for a reliable basis for securing the necessary capacity of the system in the planning period, especially for future investments, establishment of collection systems etc. To overcome this problem, a number of *scenarios* covering variations in waste generation and treatment can be set up.

On the basis of the ability and capacity of the country, including the economy, the adopted policies and the existing mandatory targets such as targets fixed in EU directives, the most realistic scenario can be selected as a point of departure for the planning.

Taking into consideration the difficulties in predicting the influence of the above parameters, a certain degree of flexibility should be integrated in the scenarios to ensure that the plan based on the chosen scenario can be adapted to changes in the assumptions, waste amounts etc.

For example, changes in the size of the population in a given area may have a significant influence on the collection system, capacity of the waste management system etc. Therefore, the relation between the population size and the different activities etc. of the plan needs to be transparent, so

that necessary adjustments caused by changes in the population size can be made in the appropriate parts of the plan.

Another example is the possible development of a new technology for recycling of a waste stream that was hitherto incinerated or landfilled. The influence of this technology on the waste stream in question should be identifiable, so that it can be evaluated whether substantial changes in the current systems would be beneficial.

Thus, a tool for further flexibility in the planning is transparency, for example in the capacity calculations, making it possible to track the influence of the amounts and origin of different waste streams on the waste management system.

Box 5.1 Example of how to calculate the trend in household waste

Data for a given area:

- number of inhabitants registered for year n: A_{inhab}
- waste generation per inhabitant measured or estimated for year n: $P_{t/yr*inhab}$
- waste in this area for year n: $G_n = A_{inhab} * P_{t/yr*inhab}$

Hypotheses for development (values given as an example):

- population; low hypothesis +0.4% per year, high hypothesis +0.9% per year
- generation of waste per inhabitant; low hypothesis +0.6% per year, high hypothesis +1% per year

Estimate of waste to be managed in the year (n+5):

Application of low hypothesis for the development of the population and generation per inhabitant:

$$G_{n+5}: A_{inhab} * (1.004)^5 * P_{t/yr*inhab} * (1.006)^5 = G_n * 1.051$$

Application of high hypothesis for the development of the population and generation per inhabitant:

$$G_{n+5}: A_{inhab} * (1.009)^5 * P_{t/yr*inhab} * (1.01)^5 = G_n * 1.099$$

Source: *Management of household waste: Departmental Plans*, ADEME 2001. The Guideline is published at: <http://www.ademe.fr/collectivites/Dechets-new/Politique-planif/plans/guide.htm>

5.2 Setting objectives

The results of the status part will be a significant basis for defining objectives at the national, regional and local levels. Overall, objectives should lead to a balance between waste amounts and treatment capacity, for example by implementing initiatives limiting the generation of waste, increasing recycling and recovery or enlarging treatment capacity.

In the national waste management plans objectives may in some cases be determined beforehand, such as EU objectives for recycling. In addition, national objectives may be determined in relation to waste reduction or recycling. The overall strategy for determining new objectives is the waste hierarchy as described in section 2.2. However, for those waste streams or waste sources where objectives have not yet been set the environmental and economic impacts should be assessed in order to be able to choose the optimal waste management option.

Objectives and quantitative targets may be set for priority waste streams, for waste management options (prevention, recycling, etc.) and for economic sectors or households (waste sources).

In the regional and local waste management plan the strategy for compliance with the principles of the waste hierarchy should be reflected in objectives for the different fields of waste management. Regional or local objectives may be determined, contributing to solving local problems. In any event, objectives must harmonise with the overall national strategy on waste.

If previous waste management plans or objectives exist, the determination of objectives should take account of whether or not previous objectives have been achieved, or whether there are indications that objectives can be achieved in the period in question. Thus, previous objectives in some cases must be adjusted or maintained, or measures must be implemented which make achievement of objectives realistic.

Box 5.2 Example: Setting objectives

In 1999 the Norwegian Government set out its "White Paper No 8 The Government's environmental policy and the state of the environment in Norway". The paper includes a chapter on waste with three political objectives:

- growth in the volume of waste should be significantly lower than the rate of economic growth
- the quantity of waste subject to final disposal (landfilling and incineration without energy recovery) by the year 2010 should be 25 percent of the quantity of waste generated
- all types of special waste must be dealt with in a safe and acceptable manner

These objectives must be transformed into measures and quantitative targets. In the Norwegian paper the measures are for example: to increase differentiation in waste charges, to increase the requirements for incineration facilities and to increase the collection of waste oil through measures such as modification of the reimbursement scheme.

Source: <http://odin.dep.no/md/engelsk/publ/rapporter/022051-220006/index-dok000-b-n-a.html> – present methods

Monitoring progress of fulfilling objectives

Qualitative political objectives, forming part of the point of departure for the planning, must be transformed into quantitative targets to make them operational and measurable.

In order to monitor the achievement of political objectives, a control system can be attached to each political objective. Measurable targets, measurable indicators, measures and identification of preconditions for each objective can be used in a control system. The idea is to use the measurable indicator(s) to monitor if the objective is met.

If quantitative targets may be applied to the political objective, the indicator is often defined at the same time. If quantitative targets cannot be defined or if they need to be made more precise, indicators, showing whether the qualitative and quantitative objectives are met, are important to monitor progress and agreement with the adopted waste plan. In some cases more than one indicator is necessary to monitor an objective. Moreover, it is

recommended that these targets and indicators are measurable as it makes the monitoring more straightforward.

The measures are to ensure the achievement of the political objectives while the preconditions are studies, tests, information, etc. which need to be in place before a measure can be introduced.

Each of the political objectives may have several targets and instruments or measures. For example, it is possible to have an overall target for recycling and combine it with recycling targets for specific waste streams or specific sources.

The monitoring system is illustrated in Table 8 for a single objective. The political objective of reducing landfilling of biodegradable municipal waste is chosen as an example for use of the control system. The measurable targets are defined in the Landfill Directive, while the indicators and measures needed are decided in the Member State, as are the preconditions.

Table 8. Illustration of a monitoring system with indicators

Political objective	Measurable targets	Measurable indicators	Measures	Preconditions
Reducing the use of landfill	<p>Year 2006: The amount of BMW⁽¹⁾ going to landfill must be reduced to 75% of the total amount by weight of BMW generated in 1995.</p> <p>Year 2009: must be reduced to 50%.</p> <p>Year 2016: must be reduced to 35%.</p>	<p>Every year, the amount of landfilled BMW is monitored and forecasts are prepared in order to evaluate the ability to meet the targets</p> <p>Year 2004 Treatment facilities for BMW to be established in parallel to gradual development of separate collection schemes for paper, cardboard, garden waste, and food waste</p>	<p>Year 2002:</p> <p>a) Approve the legislative framework in order to secure the individual separation of biodegradable wastes.</p> <p>b) Increase the taxes on waste that goes to landfill by 20% each year</p>	<p>Year 2001-02: Conduct a baseline study on relevant treatment methods</p>

Note: Targets are from Council Directive 99/31/EC on the landfill of waste.

⁽¹⁾BMW: Biodegradable Municipal Waste.

5.3 The waste management system in the planning period - action plan

When the analyses of the current situation and the expected future developments in waste quantities have been made and the objectives agreed upon, it should be decided how these objectives can be met. This may be considered as the core of the planning process.

The action plan includes:

- Selection of collection systems
- Identification of necessary waste management facilities
- Assignment of responsibilities to the various parties
- Considerations of economic consequences and financing
- Considerations on the use of measures to implement the waste management plan (possible measures are presented in section 5.4).

Collection systems

Collection systems for the identified sources and waste streams need to be decided on. The collection system may play an important role in the achievement of targets, so considerations on which type of system is the most appropriate in view of the targets should be made. For example, a kerbside collection system may be more effective than a system where the individual waste generator must bring the waste to a central recycling site. A kerbside collection system, however, is often more expensive.

Thus, economic considerations may play an important role in the decision process regarding choice of collection system, but also political intentions regarding service standards and environmental aspects carry weight.

For each waste stream a statement may be made in the plan on collection method, treatment etc. In the regional/local waste plan detailed requirements for treatment, transportation etc. for some waste fractions may have been set out.

Current legislation may determine in detail the structure of a collection system, and similarly the introduction of collection systems may be furthered by new legislation laying down which type of collection system should be chosen.

Some waste streams are special due to requirements for recycling. It may be expedient to discuss such waste fractions under one description and one planning section. This applies, for example, to packaging waste for which objectives for rates of recycling have been set up at the EU level. Therefore, regardless of source – households or industry and commerce – packaging waste may be gathered under a specific section. The same may be the case for hazardous waste and batteries covered by the Directive on Batteries and Accumulators, as well as for several other waste streams. Moreover, some waste streams are given priority by the EU and should be included in the action plan.

A precondition in a regional or local waste management plan is that detailed planning is carried out for the actual management of waste, including its treatment and disposal.

Box 5.3 Example: Garden waste

The Biowaste (food waste) and Vegetation (garden waste) Waste Execution Plan of the Flemish Region of Belgium set the target that each inhabitant of Flanders should have access to separate collection of garden waste by the end of 1997. This garden waste is either collected at the kerbside (usually presented in bulk) or in a bring scheme. However, some local authorities also offer biodegradable plastic or paper bags with or without any additional charge. In such cases, the collection frequency is generally higher than for collection in bulk.

Source: *Biodegradable municipal waste management in Europe: Strategies and instruments*, European Environment Agency, 2001.
http://reports.eea.eu.int/topic_report_2001_15/en

Waste management facilities

The action plan should include decisions on the type and capacity of waste management facilities. Decisions on this issue should be thoroughly studied, as establishment of such facilities is rather costly.

The regional/local plans should contain a detailed assessment of the need for different types of plants and capacity. The action plan should contain estimates of whether the national strategies on waste are complied with, such as the proximity and the self-sufficiency principles. Furthermore, the action plan should assess whether the various types of plants have been adapted to the overall objectives of the waste strategy/plan in terms of capacity and treatment method, taking into account the waste hierarchy. Each treatment plant should be described and compared to amounts of waste expected to be generated within the planning period.

Moreover, facilities may have a useful life of several decades, so the location must be carefully selected.

The planning horizon for different methods of collection and treatment depends basically on economies of scale in the equipment involved. This sets minimum capacity sizes for the plant if it is to be operated economically and with minimum planning horizons in order to guarantee the pay-back time. Typical values based on experience are listed in Table 9.

Table 9. The minimum planning horizon for various collection and treatment methods

System	Minimum planning horizon
Collection of municipal solid waste	3 years
Composting plant (low tech.)	5 years
Sanitary landfill	10 years
Incineration	20 years
Composting plant (high tech.)	20 years
Hazardous waste treatment plant	20 years

Note: The values are based on experience and they depend on the capacity of plants and facilities.

In the planning it should also be estimated whether plants comply with present and future requirements, and plans for extension, upgrading etc. should be included in the plan. Finally, the need for new environmental permitting should be described.

Box 5.4 Example: Environmental and economic considerations

Staffordshire County Council and Stoke-on-Trent City Council state in the waste local plan that: Proposals for waste incineration will be permitted where the proposed development:

- i) represents the Best Practicable Environmental Option (BPEO);
- ii) includes energy recovery, either by combined heat and power or electricity generation; and,
- iii) will not undermine the provision of waste management facilities operating further up the waste hierarchy, including composting and material recycling and waste to energy facilities.

Regarding point iii) it is stated that: Incineration can represent a major investment, require long term contracts and substantial quantities of waste to guarantee viability. It is therefore important in the context of the BPEO, the waste hierarchy, and the proximity principle, to consider the economic implications of the proposed development, along with the environmental and social implications.

Hence the overall waste strategy should be kept in mind, when deciding on the establishment of waste treatment facilities. The effect on the provision of waste management facilities should be considered so that the proposed development

would not undermine more sustainable methods of waste management.

Source: <http://www.staffordshire.gov.uk/waste/revisedcontents.pdf>

Before deciding on treatment methods and location of waste management facilities, it may be useful to carry out one or more cost-benefit analyses of scenarios for waste streams and sources. The cost-benefit analysis is a tool to create an overview of the consequences/impacts of different options and a help to decision-makers. The use of cost-benefit analyses may also offer an opportunity to examine the impact from the waste management system on other plans, such as health, spatial planning etc.

Box 5.5 Example: Criteria for the location of waste treatment facilities

Staffordshire County Council and Stoke-on-Trent City Council have agreed on specific criteria for the location of waste treatment facilities.

Thus in the waste local plan it is stated that:

Proposals for new waste treatment facilities will be permitted where the proposed development represents the Best Practicable Environmental Options and would:

1. be compatible with other adjoining or nearby land-uses; and,
2. complement existing activities or form part of an integrated waste management facility; or,
3. bring degraded, contaminated or derelict land back into productive use, or re-use existing or redundant buildings.

Thus, local policy on the use of contaminated land and re-use of existing or redundant buildings is included in the decision-making process regarding location of waste treatment facilities.

Source: <http://www.staffordshire.gov.uk/waste/index.htm>

Responsibilities

Responsibility for waste management can be assigned to several parties such as the local authority or industry. Also, in some cases it is the responsibility of the producer to provide recycling or reuse options, when their products become waste. Such responsibilities may rest on legislation or agreements.

Irrespective of the current system's distribution of responsibility, the responsibility for all waste streams should be described unambiguously, and the responsible persons, institutions etc. should be clearly identified.

A time schedule for the implementation of all the activities necessary for achieving the objectives should be considered as an important part of the waste management plan. Milestone indicators may be useful, as they allow for deviations from the time schedule to be identified in time to introduce corrective measures.

Box 5.6 Example: Distribution of responsibilities

The waste plan of the Walloon region includes for each specific waste stream a table showing the organisation and responsible parties. An extract from the section on hazardous waste is shown below. The activities are subdivided into waste inventory, waste prevention, waste collection, disposal, etc. In the case of hazardous waste, the table in the plan contains 36 entries, of which two examples are shown below.

Activity	Promoter	Operator	Expiry
<i>Waste inventory</i> To make it compulsory to establish a standardised register recording quantitative, qualitative and economic information on hazardous waste, its origin, its destination and the treatment residues as well as a standardised semi-annual declaration containing the information of the register, which will be random-checked to ensure the correctness and objectivity of the declarations	Government of Wallonia	<ul style="list-style-type: none">▪ Industry▪ Waste sector▪ Association of municipalities	1999
<i>Waste collection</i> Establish a list of hazardous waste in dispersed amounts subject to separate collection	Government of Wallonia	<ul style="list-style-type: none">▪ Industry▪ Municipalities	1999

Source:

http://environnement.wallonie.be/cgi/dgrne/plateforme_dgrne/visiteur/frames.cfm

Economic consequences and financing

Achieving the preferred mix of treatment methods for each waste stream in the future system is the real puzzle of waste management planning. The final result may consist of a number of measures and instruments (legal and economic) to be activated, awareness campaigns, new waste collection schemes and access to new treatment facilities.

In addition to estimating the effectiveness of initiatives in terms of volumes of waste to be directed and redirected in the overall waste stream, the future waste management system will typically imply significant investment and additional operating costs.

A major component in making the final decisions and approving the new waste management system will be to decide on the economic consequences both regarding initial investments and operating costs, and the future level of user fees and charges. Again, each initiative should be evaluated in terms of economic consequences, and finally included in one aggregated overview.

The aim is to estimate the total costs in terms of capital costs and operating costs. However, as collection equipment, landfills and other facilities needed in the overall waste management system have various lifetimes and depreciation periods, calculations should be made in order to compare and aggregate the costs of numerous operations. One way is to calculate the total annual costs, i.e. operating cost plus the annual cost of investments.

If possible, the costs should be differentiated into:

- costs of general administrative initiatives such as costs of waste planning, permitting, legislation, etc.,
- general initiatives for waste prevention, and
- costs related to treatment of various waste streams including investment costs.

In this way it should be possible to keep track of the economic costs of achieving the objectives. It should also be possible to compare the costs of the current waste management system with the costs of the new waste management plan.

Calculations of the costs per tonne of waste may help to get an idea of the average costs, and it may be used to compare the costs with alternatives.

5.4 Possible measures for the implementation of a waste management plan

To implement a waste management plan a variety of measures is needed. Each objective in the plan should usually be supported by one or more targeted measures.

The key question in the choice of measures available to the relevant authority is, which measure will change people's behaviour in the most efficient way? For each objective the authority should assess not only which measure is the best to reduce the environmental pressure, but also the economic consequences of the measure and its political feasibility.

For some objectives the best option will be regulatory measures. This is especially the case if the objective relates to avoiding spread of specific dangerous substances. Economic incentives may be more effective for objectives such as reducing the generation of waste or increasing the recycling rate. However, there may well be other suitable measures. One such measure is public awareness raising.

In this section, measures that can be used for implementation of a waste management plan are presented. Legislation is considered to be the most common and well-known measure and is thus not presented in more detail. Focus in this chapter is on measures such as public awareness raising, economic incentives (e.g. taxes, charges/fees, subsidies), integrated product policy, environmental agreements and planning.

Public awareness

In order to have an efficient and well-functioning waste management system it is important that the public understands the system and supports it. The success of some recycling schemes relies almost completely on support among the users, e.g. the households. How does a local authority convince a citizen to carry empty glass bottles to the local bring bank or recycling centre, if he or she may just dump them in the waste bin?

Legal and economic incentives may change people's behaviour. However, creating public awareness and willingness to follow the instructions for waste management may also be a very efficient instrument.

Box 5.7 Public information – examples:

Austrian guideline on waste separation

In Austria, the Federal Ministry of Agriculture and Forestry, Environment and Water Management has made a comprehensive guideline on waste separation, *Abfall-Trenn-ABC*, which includes major waste streams, useful contacts and a waste dictionary. The guideline is available on the internet: <http://www.ooe.gv.at/umwelt/abfall/wegweiser/abfwegw.htm>

French practical guidelines

The French Agency for Environment and Energy Management, ADEME, has published a series of practical guidelines, *Les guides pratiques*, on household waste, home composting, waste electrical and electronic equipment and hazardous waste: <http://www.ademe.fr/particuliers/Default.htm>

There are several ways of raising public awareness on waste issues and providing information on how they can be dealt with.

Awareness may be increased through information campaigns or guidelines. When a new initiative is to be launched, such as collection of batteries or electrical and electronic equipment from households, suitable media may be TV spots or adverts in newspapers.

Another natural medium for information is the Internet. Designing an Internet site from which the public can download the waste management plan and leaflets is fairly easy and not costly. The Internet site may even be expanded with answers to frequently asked questions (FAQs) and relevant links to other Internet sites where the user may find further information.

Box 5.8 Low-cost tools for public awareness

1. Mass-education activities such as:
 - articles in newspapers
 - news releases
 - speeches
 - guest appearances of municipal staff in radio programmes
 - public service announcements
2. Guest lectures at
 - schools
 - universities
 - clubs
 - interest groups / NGOs
 - public events
3. Simple internet site
4. Poster contests and exhibitions
5. Workforce courtesy training
6. House-to-house visits by (voluntary) awareness workers
7. Neighbourhood committees for information and awareness building regarding public health, environment and waste.

Source: World Bank Group: *Strategic planning guide for municipal solid waste management*.

At local or regional level, the competent authority or waste management enterprise may establish a hotline telephone or email service where citizens may ask questions regarding the waste management system.

Another possibility is learning-by-doing, for example by having trained staff at the recycling centre to help people separate their waste correctly.

Economic instruments

Ideally, when designing economic instruments, the aim is to create incentives for the consumer or producer to change their current behaviour so that it causes less environmental pressure. This includes finding ways of preventing waste generation or selecting waste management options that are less damaging to the environment. Taxes, charges and fees⁵ are common economic incentives. Well-known examples are taxes on landfill and packaging, and fees or charges on collection and treatment of waste. The charges for collection and treatment of wastes may be designed in numerous ways, e.g. weight-based collection schemes, volume-based collection schemes or there may be a reduction on the charge if households carry out home composting.

However, charges and fees are not the only economic instruments. Subsidies may also be used to create an incentive. The owner of an end-of-life car may receive a premium, if the car is handed in to an authorised car breaker, who will make sure that the waste treatment takes place according to current regulation, e.g. that waste oils are collected and treated, etc. The relevant authority may also subsidise collection of certain waste streams, e.g. Ni-Cd batteries.

Box 5.9 Economic instruments - examples:

The Commission has had carried out a Study on the *Economic and Environmental Implications of the Use of Environmental Taxes in the European Union and its Member States*. One of the taxes studied is the landfill tax. The study is published at: http://europa.eu.int/comm/environment/enveco/taxation/ch10_landfill.pdf

Another study, *Financing and Incentive Schemes for Municipal Waste Management*, examines 20 case studies on innovative financing systems: See at: <http://europa.eu.int/comm/environment/waste/costwastemanagement.pdf>

The OECD has set up an Environmentally Related Taxes Database with pre-defined queries on national taxes, including waste taxes. See at: <http://www.oecd.org/EN/document/0,,EN-document-8-nodirectorate-no-1-3016-8,00.html#title1>

Integrated Product Policy

Integrated Product Policy is a framework for several measures such as producer responsibility, eco-labelling, life-cycle analyses and environmental management systems. It aims to integrate environmental considerations in the design of products to reduce environmental pressure during the entire lifecycle of the products. Reduction of environmental pressure is for example achieved by reducing the use of hazardous substances or increasing the recyclability of products.

⁵ In the OECD Environmentally Related Taxes Database, taxes are defined as any compulsory, unrequited payment to general government levied on tax-bases deemed to be of particular environmental relevance. Taxes are unrequited in the sense that benefits provided by government to taxpayers are not normally in proportion to their payments. Requited payments to the government, such as fees and charges are levied more or less in proportion to services provided (e.g. the amount of wastes collected and treated).

Producer responsibility has become a popular measure during recent years, mainly because it implements the polluter pays principle and hence reduces costs borne by the local authority. Furthermore, the decision on how to set up systems to handle producer responsibility is usually made by the producers themselves. On the other hand, financial issues may be less transparent to the public.

Box 5.10 Producer responsibility – examples:

Sweden - Producer Responsibility for WEEE

In Sweden an Ordinance on Producer Responsibility for waste from electrical and electronic equipment (WEEE) came into force on 1 July 2001. The producer bears *inter alia* the obligation to take back old equipment free of charge when the customer buys a new product and to present a take-back plan to the local authorities.

See at: <http://www.internat.naturvardsverket.se/index.php3>

Directive on waste electrical and electronic equipment

Producer Responsibility has also been implemented in the WEEE Directive at both collection and treatment level. Thus, when supplying a new product, distributors are responsible for ensuring that old products can be returned to the distributor at least free of charge on a one-to-one basis as long as the equipment is of equivalent type and has fulfilled the same functions as the supplied equipment. The producers are required to set up systems to provide for the treatment of WEEE.

See at: http://europa.eu.int/comm/environment/waste/weee_index.htm

Environmental agreements

Environmental agreements between industry and the authorities to achieve a certain objective may be a useful approach to reduce the environmental impact from industrial activities. Often, industry has been given a choice of either fulfilling certain legal requirements or entering an agreement on how to reach a set of targets.

Box 5.11 Environmental agreements – examples:

Study on environmental agreements

The EEA has carried out a study on *Environmental Agreements*. The study aims to inform policy makers and the general public on the use of environmental agreements in the European Union by providing a brief review of the current application of such agreements in Member States. It is available at:

<http://reports.eea.eu.int/92-9167-052-9>

Dutch Packaging Covenant

When the Dutch government transposed the Packaging Directive into Dutch legislation, various obligations on individual producers and importers of packaging were imposed. However, the packaging supply chain was given an opportunity to conclude a covenant in which the relevant parties would agree on how the obligations in the regulation would be implemented. The second Packaging Covenant was signed in 1997. One of the targets in the covenant is that the growth in the quantity of packaging being placed on the market must be limited to the growth in GDP less 10%. A third Packaging Covenant is being negotiated.

See at: <http://www2.minvrom.nl/pagina.html?id=5001>

Planning

In the choice between various collection and treatment options, it is necessary to consider the future capacity of waste management facilities to make sure that there is sufficient capacity to achieve the objectives in the waste management plan.

In doing so, there are two issues to be taken into consideration. The first issue relates to the financial requirements and who should carry the financial burden if the capacity is to be expanded. The second issue concerns the potential location of future facilities. A common problem is that nobody wants a waste management facility as a neighbour, so the issue often requires planning well ahead.

Box 5.12 Planning – example:

The Danish Environmental Protection Agency has made an estimate of the amount of waste suitable for incineration and the waste incineration capacity. Information has been gathered from the Danish waste incineration plants on current and future incineration capacity, number of incineration units, calorific value of waste, annual working time, authorisations and expected changes in capacity or other major changes scheduled before the year 2008. Future amounts of waste suitable for incineration are compared with the expected incineration capacity in the years 2004 and 2008.

The report, *Affaldsforbrænding i 2004 og 2008, mængder og kapaciteter*, is posted at (summary in English): <http://www.mst.dk/udgiv/Publikationer/2001/87-7944-724-4/pdf/87-7944-725-2.PDF>

5.5 Long-term development

As mentioned in Section 3.1, the plan may only cover three to five years. However, it may be necessary to have a long-term perspective to establish the necessary capacity to manage future quantities of waste. Thus, considerations on the long-term capacity and costs may be useful.

Furthermore, future initiatives may be necessary to achieve targets. For example if the targets for biodegradable municipal waste in the Landfill Directive are to be met, new collection systems and recovery facilities may be needed over the next 12 years.

Checklist:

- ◆ Setting of objectives:
 - Are the objectives in line with the EU waste management principles?
 - Have objectives been set for EU priority waste streams?
 - Has any environmental and economic assessment of objectives been made?
- ◆ Monitoring and evaluation of objectives for revision of the strategy/plan:
 - Have measurable targets been set for all objectives? Either in EU or national legislation or as a result of the planning process?
 - Have indicators been identified in order to monitor the development? Are they measurable?
 - A time schedule should be made for revision of the strategy/plan: how and when is it going to be revised?
- ◆ Strategy formulation and action plan:
 - Has an estimation of the future waste amounts been made? Are the chosen assumptions reasonable and do they cover all the parameters that may influence the waste generation in the future?
 - Which types of waste management facilities are in place? Do they have sufficient capacity for future requirements (based on estimated future waste amounts) and new objectives?
 - Has any distribution of responsibilities been made between government, local authorities, industry, etc.?
 - Have the costs of implementing the plan been estimated? Is the plan to be financed via waste charges/fees, income taxes or other means?
 - Has a time schedule for implementation of the new activities in the action plan been set?
- ◆ Implementation measures:
 - Does the plan include measures to support its implementation? awareness raising? Economic incentives? Other administrative or regulatory measures?

6 Useful websites and publications

A non-exhaustive list of references available on the Web is given below. It includes sources of further information on waste management planning, various guidelines, as well as national or regional plans and equivalent strategic documents.

Furthermore, an overview of relevant publications is provided.

6.1 Further information

<p>The European Commission, DG Environment, Nuclear Safety and Civil Protection</p>	<p>General website: http://europa.eu.int/comm/environment/index_en.htm EU focus on waste management: http://europa.eu.int/comm/environment/waste/facts_en.htm Integrated Product Policy: http://europa.eu.int/comm/environment/ipp/home.htm</p>
<p>EU Legislation, EUR-Lex</p>	<p>Section 15.10.30.30 – Waste management and clean technology http://europa.eu.int/eur-lex/en/lif/reg/en_register_15103030.html</p>
<p>The European Statistical Office – Eurostat</p>	<p>http://www.europa.eu.int/eurostat.html</p>
<p>The European Environment Agency</p>	<p>General website: http://www.eea.eu.int/ On waste: http://themes.eea.eu.int/Environmental_issues/waste</p>
<p>European Topic Centre on Waste and Material Flows</p>	<p>http://waste.eionet.eu.int/ Wastebase, an electronic database with information on waste, waste policies, planning, management and treatment in Europe: http://wastebase.eionet.eu.int/</p>
<p>The Secretariat of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal</p>	<p>http://www.unep.ch/basel/</p>
<p>The Aarhus Convention</p>	<p>http://www.unece.org/env/pp/ Implementation of the Aarhus Convention into European legislation: http://europa.eu.int/comm/environment/aarhus/index.htm</p>
<p>OECD Environment Directorate</p>	<p>http://www.oecd.org/oecd/pages/home/displaygeneral/0,3380,EN-home-8-nodirectorate-no-no--8,FF.html The Environmentally Related Taxes Database http://www1.oecd.org/scripts/env/ecolnst/index.htm</p>
<p>ACRR (Association of Cities and Regions for Recycling)</p>	<p>http://www.acrr.org/german/about-us/uber-uns.htm</p>
<p>The Association for the Sustainable Use and</p>	<p>http://www.assurre.org</p>

Recovery of Resources in Europe	
The Resource Recovery Forum	http://www.residua.com/rrf/index.htm

6.2 Guidelines

Strategic Planning for Sustainable Waste Management: Guidance on Option Development and Appraisal	The UK Government's Office of the Deputy Prime Minister (ODPM) has published a good practice guidance on strategic planning for sustainable waste management. http://www.planning.odpm.gov.uk/spswmgod/index.htm
Méthode de révision des plans and Gestion des déchets: état des connaissances	Published by the French Agency for Environment and Energy Management, ADEME. The French version is published at: http://www.ademe.fr/collectivites/Dechets-new/Politique-planif/plans/guide.htm . An English summary, Management of household waste: Departmental Plans, is also available.
Strategic Planning Guide for Municipal Solid Waste Management	Published by the World Bank. The Guide aims to provide information, supporting methodologies and tools to assist development of Strategic MSWM Plans at the local and regional level. The primary target audience is local and regional authorities in developing countries and economies in transition, but much of the material in the Planning Guide will be relevant and of use to all countries. http://wbln0018.worldbank.org/External/Urban/UrbanDev.nsf/Urban+Waste+Management/349F2CDAE6E96C6285256B3A007DB3D1?OpenDocument
National Waste Strategy: Supporting Guidance	Guidance document by the Scottish EPA in preparing Area Waste Plans as a key means of implementing the national waste strategy. http://www.sepa.org.uk/nws/guidance/nws/nws_supporting_guidance.htm
Waste Framework and Strategies for Waste Management in European Cities	Published by the Environmental Protection Agency of the City of Copenhagen, with the support of the European Commission Environment Directorate-General, 1999. http://euronet.uwe.ac.uk/waste/
Waste Minimisation Good Practice Guide	Published by the UK Environment Agency. The Guide is useful for small and medium sized enterprises in setting up a waste minimisation programme in the workplace. http://www.environment-agency.gov.uk/commondata/105385/good_practice.pdf
Les guides pratiques	The French Agency for Environment and Energy Management, ADEME, has published four practical guidelines: Les déchets des ménages, Le compostage individuel, Les appareils électroménagers and Les déchets dangereux. http://www.ademe.fr/particuliers/

6.3 National waste management plans and strategies

Austria	<i>Federal Waste Management Plan 2001</i> , Austrian Federal Ministry of Agriculture, and Forestry Environment and Water Management:
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	http://gpool.lfrz.at/gpoolexport/media/file/federalwaste.pdf
Belgium	Flanders: <i>Strategic Waste Plan</i> (2002-2006) and other waste management plans: http://www.ovam.be/ Wallon: <i>Horizon 2010, Plan Wallon des déchets</i> , Wallon Ministry of the Environment http://environnement.wallonie.be/cgi/dgrne/plateforme_dgrne/visiteur/frames.cfm Brussels: <i>Plan de prévention et de gestion des déchets 1998-2002</i> .
Denmark	<i>Waste 21, Waste Management Plan 1998-2004</i> , Danish Environmental Protection Agency: http://www.mst.dk/udgiv/Publications/1999/87-7909-571-2/pdf/87-7909-570-4.PDF
Finland	The <i>National Waste Plan</i> , 1998-2005, Ministry of Environment: http://www.vyh.fi/eng/environ/policy/waste/planning.htm A booklet, <i>Finland's National Waste Management Plan in brief</i> : http://www.vyh.fi/eng/orginfo/publica/electro/waste/waste.pdf
France	Examples of Plans départementaux: Adopted or published: Pas-de-Calais : <i>Plan départemental révisé d'élimination de déchets menagers et assimilés</i> 13 September 2002 Alpes de Haute-Provence: <i>Plan départemental d'élimination de déchets menagers et assimilés</i> 15 February 2002
Germany	Examples of Abfallwirtschaftsplanen: Adopted or published: Bavaria: <i>Abfallwirtschaftsplan Bayern, Verordnung und Begründung</i> December 2001 Freie Hansestadt Bremen: <i>Abfallwirtschaftsplan und Abfallbilanz</i> February 2002
Greece	A summary of the plan is available in English at WasteBase (not an official summary): http://waste.eionet.eu.int/wastebase/plans/details.html?pk=P-GR01-0
Ireland	" <i>A policy statement, waste management – changing our ways</i> ", The Department of the Environment and Local Government, September 1998: http://www.environ.ie/environ/envindex.html Example, regional plan: <i>Waste Management Plan for the Dublin Region 1999-2003</i> .
Italy	A summary of the plan is available in English at WasteBase (not an official summary): http://waste.eionet.eu.int/wastebase/plans/details.html?pk=PI1 Examples of regional plans: Adopted or published: Lazio: <i>Piano di gestione dei rifiuti</i> September 2002 Puglia: <i>Piano di gestione dei rifiuti e delle bonifiche in Puglia – Completamento, integrazione e modificazione</i> September 2002
Luxembourg	<i>Plan national de gestion des déchets</i> (2001-2006). http://www.mev.etat.lu/home.html

d. measure and analyse, with several concrete examples, the environmental and economic gains connected to the prevention of waste.

The study is published at:

<http://europa.eu.int/comm/environment/waste/studies/prevention&minimisation.htm>

Financing and Incentive Schemes for Municipal Waste Management

The specific objective is to carry out 20 case studies on innovative financing systems at local and national level, to be chosen in agreement with the European Commission. These case studies focus in particular on systems that were able to give incentives to reduce waste quantities and increase recycling and composting. The experience and results of such systems are described. The study is published at:

http://europa.eu.int/comm/environment/waste/studies/financingmunicipalwaste_management.htm

Costs of Municipal Waste Management in the EU

The European Commission has published a substantial report on municipal solid waste (MSW) management costs. The report gives an overview of the costs of different waste management options at local and national levels for all 15 EU Member States. The study constitutes an attempt on the part of the Commission to generate baseline data for the costs of future policy changes. The report and the appendices are available from:

http://europa.eu.int/comm/environment/waste/studies/eucostwaste_management.htm

Municipal Waste Management in Accession Countries

Eurostat has collected information on the ten Central and Eastern European countries and the two Mediterranean countries.

<http://europa.eu.int/comm/eurostat/Public/datashop/print-catalogue/EN?catalogue=Eurostat&product=KS-47-02-301--N-EN>

Success stories on composting and separate collection

This project has involved identifying a number of successful centralised and home composting schemes in the six Member States of Spain, France, Ireland, Italy, Portugal and the United Kingdom. For each scheme a case study has been completed, highlighting the reasons for the scheme's success.

<http://europa.eu.int/comm/environment/waste/compost/index.htm>

Economic analysis of options for managing biodegradable municipal waste

The main objective of the study was to conduct an economic evaluation that considers both private and social welfare costs and benefits of existing options for managing the biodegradable fraction of municipal waste. The main emphasis has been on the separate collection and composting / anaerobic digestion. The study focuses on the Member States of the European Union and on the first wave of Accession countries.

<http://europa.eu.int/comm/environment/waste/compost/>

Biodegradable municipal waste management in Europe

This report from the EEA is intended as guidance to help decision-makers in their efforts to comply with the EU Landfill Directive targets for reducing the landfilling of biodegradable municipal waste.

http://reports.eea.eu.int/topic_report_2001_15/en

Environmental instruments

The EEA carries out a number of studies on policy measures and instruments. An example is *Environmental taxes - Recent developments in tools for integration*, where the EEA reports on developments in the use and impact of environmental taxes and on progress made with ecological tax reforms. Published at:

http://themes.eea.eu.int/Actions_for_improvement/policy/reports.

Applicable methods and tools for the assessment of information related to waste and material flows

The study includes an overview of various tools such as lifecycle assessment (LCA), Environmental Impact Assessment, Cost-Benefit Analysis, geographical information systems (GIS), indicators, etc. and gives a description of applications. Forthcoming, to be published by the European Environment Agency: <http://www.eea.eu.int/>

Environment and health

The Danish Environmental Protection Agency published a report in 2001 that describes its work in protecting human health with the aid of legislation on chemicals and the environment. The report focuses on human exposure to health risks from air, soil, drinking water, bathing water, swimming pools, waste, wastewater, noise, and chemical substances. The report was primarily prepared for use in Central and Eastern European countries. More information: *Environmental Factors and Health -The Danish Experience*, published at:

http://www.mst.dk/udgiv/Publications/2001/87-7944-519-5/html/default_eng.htm