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COMMUNICATION FROM THE COMMISSION

Towards a thematic strategy on the prevention and recycling of waste

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EXECUTIVE SUMMARY

Waste presents our society with a two fold environmental challenge. All waste has to be recovered or disposed of through operations which inevitably have environmental impacts and economic costs. Waste can also be a symptom of inefficient consumption and production patterns, in the sense that materials may be used unnecessarily. These materials not only create waste but also have different impacts during their production and use phase.

The 6th Environmental Action Programme calls for a number of inter-related measures designed to reduce the environmental impacts of resource use in line with the EU's Sustainable Development Strategy. This includes a thematic strategy on the recycling of waste and initiatives in the field of waste prevention, notably proposals on Community waste prevention targets.

This Communication is a first contribution to the development of a thematic strategy that will cover both waste prevention and recycling. It is the starting point of a consultation process which will continue until the Commission adopts proposals both for the overall framework of the thematic strategy and for the individual measures through which the strategy will be implemented.

This Communication has been inspired by a life-cycle approach to resources management and takes the waste phase as its starting point. Indeed, waste prevention and recycling can reduce the environmental impact of resource use in two ways: avoiding negative environmental impacts from the extraction of primary raw materials and from the transformation of primary raw materials in production processes.

Waste prevention and recycling should also be seen as part of a broader waste management strategy. The challenge for policy makers is to find the optimal recycling rate and the best combination of different approaches. Additionally, the focus on environmental benefits achievable through waste prevention and recycling at upstream phases of the life-cycle of resources must be complemented by reducing environmental impacts at the waste management phase including in waste recycling.

In relation to waste prevention, the objective of this Communication is to launch, for the first time, a consultation process leading to the development of a comprehensive strategy, including waste prevention targets and the instruments needed to achieve them. The communication invites a very broad discussion, including on:

- Identifying potentials for waste prevention;
- Exchange of good practices and experience with a view to defining how the EU may contribute to these;
- The role of the future chemicals policy as regards qualitative prevention of waste;
- Exploring how voluntary or mandatory waste prevention plans could contribute to waste prevention;
- Assessing the waste prevention potential of the directive on Integrated Pollution prevention and Control (IPPC).

For waste recycling, this Communication invites comments on options to promote recycling, including on:

- The development of material based recycling targets in articulation with end-of-life products based targets;
- Getting the prices of the different waste treatment options right by using economic instruments, which could include tradable certificates, the co-ordination of national landfill taxes, promoting pay-as-you-throw schemes and making producers responsible for recycling;
- Ensuring recycling is both easy and clean. In some cases, implementation of EU waste law may have led to unnecessary burdens on the recycling industry. Such problems need to be identified and solved. Additionally, common approaches for recycling could ensure that recycling businesses apply the best available technology.

The European Parliament, the Council, the Economic and Social Committee, the Committee of the Regions and all stakeholders are invited to provide comments on this Communication by 30 November 2003. The final Strategy will be produced in 2004.

1. INTRODUCTION

Waste presents our society with a two fold environmental challenge. All waste has to be recovered or disposed of through operations which inevitably have environmental impacts and economic costs. Waste can also be a symptom of inefficient consumption and production patterns, in the sense that materials may be used unnecessarily. These materials do not only create waste but also cause a wide range of impacts during their production and use phase.

Improving waste management is recognised as a major environmental challenge at the international level. The plan of implementation agreed at the World Summit on Sustainable Development (Johannesburg, September 2002) builds on *Agenda 21* and calls for further action to “[p]revent and minimise waste and maximise reuse, recycling and use of environmentally friendly alternative materials, with the participation of government authorities and all stakeholders, in order to minimise adverse effects on the environment and improve resource efficiency.”¹

The Commission's proposal for a European Union strategy for sustainable development also highlights the need to break the link between economic growth, the use of resources and the generation of waste.² The European Council meeting in Göteborg (June 2001) concluded that “[t]he relationship between economic growth, consumption of natural resources and the generation of waste must change. Strong economic performance must go hand in hand with sustainable use of natural resources and levels of waste [...]”.³

This theme is further developed in the Community's 6th Environmental Action Programme (6EAP),⁴ with the overall aim of achieving “better resource efficiency and resource and waste management to bring about more sustainable production and consumption patterns, thereby decoupling the use of resources and the generation of waste from the rate of economic growth and aiming to ensure that the consumption of renewable and non-renewable resources does not exceed the carrying capacity of the environment.” This overall aim will be addressed in the context of the thematic strategy on the sustainable use and management of resources (“the resources strategy”).

The impacts of resource use can arise at all stages in the life-cycle of the resource, including extraction and initial processing, transformation and manufacturing, consumption or use and, finally, waste management. Measures to prevent waste generation and to re-incorporate waste in the economic cycle (“closing the materials loop”), i.e. waste recovery, are therefore an important element of a comprehensive approach to resource management.

¹ http://www.johannesburgsummit.org/html/documents/summit_docs/2309_planfinal.htm, in particular paragraph 21.

² Commission Communication COM (2001) 264 final of 15.5.2001: “A sustainable Europe for a better World: a European Union Strategy for Sustainable Development”.

³ See the Presidency Conclusions available at <http://ue.eu.int/en/Info/eurocouncil/index.htm>, especially paragraph 31.

⁴ Decision N° 1600/2002/EC of the European Parliament and of the Council of 22 July 2002 laying down the Sixth Community Environment Action Programme, OJ L 242, 10.9.2002, p.1.

The 6EAP decision calls for a number of measures to be adopted to further promote waste prevention and recycling, including a thematic strategy on the recycling of waste and initiatives in the field of waste prevention, notably proposals on Community waste prevention targets.

This Communication is a first contribution to the development of a thematic strategy that will cover both waste prevention and recycling. It includes an assessment of Community waste policy in relation to prevention and recycling, with a view to identifying means to further develop waste management policy in line with the hierarchy of objectives set out in the Community's waste strategy.⁵ It focuses on the means to promote more sustainable waste management, by minimising the environmental impacts of waste while also taking into account economic and social considerations. Community measures should therefore be based on a thorough analysis of costs and benefits, as well as of the cost-efficiency of different options. The objective of this Communication is to launch a process of consultation of the Community institutions and of waste management stakeholders to contribute to the development of a comprehensive and consistent policy on waste prevention and recycling. Waste prevention and recycling policies shall contribute together with energy recovery and sound disposal options to the achievement of an optimal waste management strategy aimed to minimise environmental impacts through the adoption of the most cost-efficient option.

The future thematic strategy on the prevention and recycling of waste shall identify the most efficient combination of measures and targets necessary to promote more sustainable waste management. In relation to waste prevention, the objective of this Communication is to launch, for the first time, a consultation process leading up to the development of a comprehensive strategy, including a discussion on waste prevention targets and the instruments needed to achieve them. For waste recycling, this Communication investigates ways to promote recycling where potential exists for additional environmental benefits and analyses options to achieve recycling objectives in the most cost-effective way possible.

The Commission is not yet in a position to propose specific environmental targets at this early stage of the thematic strategy. Such targets will be defined during the development of the strategy, building on the results of the foreseen consultation process and studies currently underway. In relation to instruments, this Communication emphasises the need to develop an appropriate mix of instruments including legislative, voluntary and economic instruments. Complementing current Community waste policy with economic instruments is explored in some depth given the high potential of such instruments to promote changes in the behaviour of all economic actors, including households, towards more sustainable waste management. The objective is to improve the effectiveness of the Community's waste management policy, while ensuring that rules are both simple and cost-effective, consistent with the Commission's efforts to achieve better regulation.⁶

⁵ The Community Strategy for Waste Management was adopted in 1989, see SEC(89)934 final of 18 September 1989. The Strategy was reviewed in 1996, see COM(96)399 final of 30.7.1996.

⁶ See Commission Communication COM(2002)275 final of 6.6.2002: "European Governance: better lawmaking".

This Communication builds on existing Community policy and analysis carried out by the Commission, including the Commission's Communication on *The Competitiveness of the Recycling Industry*⁷ and the work of the Recycling Forum.⁸

This Communication is structured as follows:

- **section 2** assesses the environmental context for waste management, in particular trends in waste generation, the main environmental impacts of waste;
- **section 3** describes the Community's existing waste policy, its achievements and areas which can be improved or further developed;
- **section 4** analyses the role of target setting in the context of an overall approach to prevention and recycling;
- **section 5** introduces a framework for the future thematic strategy and highlights the main issues for discussion as part of the latter's development;
- **section 6** describes the link between waste management and human health;
- **section 7** sets out the challenges facing waste management in the context of the enlargement of the EU;
- **section 8** briefly describes work ongoing at OECD and international levels concerning waste management;
- **section 9** indicates that the final Thematic Strategy will be subject to an extended impact assessment and invites stakeholder comments on the policy options outlined in section 5;
- **section 10** describes future steps in the development of the strategy.

2. THE ENVIRONMENTAL CHALLENGE OF WASTE

2.1. Introduction

This chapter summarises trends in waste generation and management. It also highlights the main environmental impacts of waste management. These include both the environmental impacts of waste treatment (including disposal) and the environmental impact of resource use that can potentially be avoided through waste prevention and recycling initiatives.

More detailed information about waste generation and management trends can be found in annex II.

⁷ Commission Communication COM(1998) 463 final of 22.7.1998: "The competitiveness of the recycling industries".

⁸ See <http://europa.eu.int/comm/enterprise/events/recycling/recycling.htm>.

2.2. Trends in waste generation and management

Total waste generation in the EU is about 1.3 billion tonnes per year (excluding agricultural waste). This means that total waste, which includes municipal waste, industrial waste, etc, amounts in the EU to approximately 3.5 tonnes per capita and year. According to information published by the European Environment Agency (EEA), five major waste streams make up the bulk of total waste generation in the EU: manufacturing waste (26%), mining and quarrying waste (29%), construction and demolition waste (C&DW) (22%) and municipal solid waste (MSW) (14%), and agricultural and forestry waste which estimation of amounts is particularly difficult. 2% of this waste is hazardous waste, i.e. about 27 million tonnes.⁹

Data limitations prevent a comprehensive assessment of most of the waste streams in Europe. However, recent reports give some information on the current trends in waste generation.

In its third assessment of Europe's Environment¹⁰ the EEA reports that "Total waste quantities continue to increase in most European countries. Municipal waste arisings are large and continue to grow. The quantities of hazardous waste generated have decreased in many countries but increased in others due to change of definitions.../...Total waste generation has been decoupled from economic growth in a limited number of countries." This confirms the previous findings of the EEA¹¹ that waste generation seems to be decreasing in some European countries since the 1990s, demonstrating progress towards decoupling of waste generation from economic growth. Additionally, indicators from OECD projects point in the direction of increasing waste generation for some waste streams (e.g. municipal waste, construction and demolition waste and industrial waste), but for others the trends are more complex.

Central and Eastern European Countries appear to have experienced decreasing generation of waste during the 1990s, mainly due to economic restructuring which accompanied the transition to a market economy, including the phasing out of obsolete industrial capacity¹². Additionally, the EEA reports in its third assessment that "quantities are increasing in most European countries and to a lesser extent in most central and eastern European countries and the countries of EECCA".

It is generally agreed that, in the absence of additional policy measures, waste generation in the EU is likely to increase for the foreseeable future. The Organisation for Economic Co-operation and Development (OECD) estimates that MSW generation in the OECD region will increase by 43% from 1995 to 2020, reaching 640 kg of MSW per capita. The OECD also projects significant future growth for a number of other major waste streams, such as industrial waste and C&DW.

⁹ Waste generated in Europe, data 1985-1997, Eurostat, 2000, p.37.

¹⁰ EEA, 2003: Europe's environment: the third assessment, p. 151.

¹¹ EEA, 2002: *Environmental Signals 2002 – Benchmarking the millennium*, Environmental assessment report N. 9, Copenhagen: European Environment Agency, chapter 12, pp. 100-105.

¹² Regional Environmental Centre for Central and Eastern Europe, 2001: *Waste Management Policies in Central and Eastern European countries – Current Policies and Trends*, executive summary, p.6.

Comprehensive information about trends in the treatment of waste is difficult to obtain. The most reliable information is available for MSW. This shows that there has been some progress in moving away from landfilling as the main treatment method, although landfilling still accounted for the majority (57%) of waste treatment in the late 1990s. Some progress can be observed in recycling and composting of MSW, which went from 15% in 1995 to 20% in the late 1990s.

Figures for the EU as a whole should be treated with care in this context, since they include a tremendous variety of national situations. In some Member States, landfilling is still the dominant treatment method for MSW, with a share of 80% or more. In other Member States, less than 20% of MSW now goes to landfill. The situation shows even greater variation for the biodegradable fraction of MSW.

Similar wide variations prevail for other waste streams. For example, the EEA reports that while about 90% of C&DW is recycled in the Netherlands, less than 10% is recycled in Luxembourg. Given this wide variety of national situations, it is clear that not all Member States will be able to make progress at the same rate in the future. In general, it can be expected that those Member States which are furthest advanced today will only be able to make incremental progress on their current recycling rates.

One should note that Municipal Solid Waste (MSW) often receives the most attention from policy-makers, partly due to the fact that collection and treatment of MSW is generally a responsibility of public authorities. Whereas MSW is an important waste stream for a number of reasons including its heterogeneity, other waste flows are at least of a comparable importance. For example, only a minor part of waste from households (the bulk of MSW) is hazardous and this accounts for about 1 % of the total hazardous waste quantities¹³; whereas the major contributor to hazardous waste generation in several Member States is the manufacturing industry, accounting for more than 75% of total hazardous waste generation.

Finally, estimates concerning the total waste generation and the contribution of different sectors to it should be interpreted with caution, since the weight or volume of waste generated is not necessarily the most appropriate indicator of the environmental burden of waste. In practice, the relationship between the generation of waste and the latter's environmental impacts is more complex and depends on a number of factors, including the nature and composition of the waste concerned.

2.3. Environmental issues related to waste management

Historically, concern about the impact of waste on the environment and human health has focused on poor practices and standards in the whole area of waste management. Some waste incinerators gave rise to toxic emissions (esp. dioxins/furans and heavy metals) and some landfills were not well controlled. In addition there have been a number of incidents where waste did not even reach the designated waste management facilities but was dumped in a totally uncontrolled manner. Whilst there has been significant improvement in these areas significant environmental problems remain in some places.

¹³ EEA, 2002: *Hazardous waste generation in EEA member countries*, Topic report N. 14/2001, Copenhagen: European Environment Agency, p. 22.

Notwithstanding remaining problems with uncontrolled waste dumps and non-compliant waste incinerators, which the Commission will continue to pursue vigorously in its role as guardian of the Treaties, considerable progress has been made in recent years. Both Member States and the Community have enacted legislation that requires significantly higher environmental standards for landfills and incinerators.

This has already begun to yield significant environmental benefits. For example, stricter legislation on waste incineration adopted at national and European level has significantly reduced and will further reduce emissions of dioxins from municipal waste incinerators. The full implementation of the incineration directive will mean that this process is no longer a major contributor to dioxin emission in the EU. Development of new combustion technologies have contributed to this achievement and will facilitate energy recovery also in future.

Existing economic assessments indicate that the environmental costs of emissions from waste incinerators are dominated by particulate matter (PM₁₀), SO₂ and NO_x; followed by disamenity effects.¹⁴ Some studies indicate that the costs due to dioxin emissions are at least two orders of magnitude, i.e. 100 times, smaller than the health costs due to emissions of nitrates, particulates and sulphates from this source.¹⁵ For modern-standard landfills, disamenity effects and the contribution to global warming currently seem to be the most important impacts.¹⁶ These estimates provide a broad indication of the most important environmental impacts of waste treatment. However, they should be interpreted with caution, since techniques to express environmental impacts in monetary terms still have methodological limitations.

Waste treatment is only one of the ways in which waste generates environmental impacts. Improving the efficiency of resource use is just as important. This is where waste prevention and waste recovery, whether energy recovery or material recovery can make a specific contribution to reduce the environmental impact of resource use, above and beyond what can be achieved by regulating waste treatment processes.

Waste prevention should include cleaner technologies at the level of production processes, better product eco-design and, more generally, more eco-efficient production and consumption patterns. However, every material object placed on the market is bound, sooner or later, to become waste. In addition, every production process produces some waste. Even waste recovery processes, whether energy recovery or material recovery, generate some “residual” waste that is not amenable to further recovery and therefore requires disposal. Waste prevention must therefore be complemented by a policy to promote environmentally sound waste recovery, in particular material recycling but, also, taking into account the benefits of energy recovery to increasing energy demand.

¹⁴ See COWI, 2000: *A study on the economic valuation of environmental externalities from landfill disposal and incineration of waste*, Brussels: European Commission, esp. chapter 9. Disamenity effects are impacts on the welfare of the local population due to increased traffic congestion, odour, noise, litter, etc. This can, for example, reduce the price of local property prices in the area surrounding a waste management installation.

¹⁵ See <http://externe.jrc.es/>.

¹⁶ See COWI, 2000, op. cit., esp. chapter 9.

Waste prevention and recycling can thus reduce environmental impacts of resource use in two ways:

- i. the avoided environmental impacts from the extraction of primary raw materials. For example, each tonne of recycled metal avoids the mining of several tonnes of metal ore,¹⁷ thus reducing the environmental impact of mining. The latter can include “air pollution (mainly dust), noise, soil and water pollution and effects on ground water levels, destruction or disturbance of natural habitats, and the visual impact on the surrounding landscape.”¹⁸
- ii. the avoided environmental impacts from the transformation of primary raw materials in production processes. For example, recycling of plastics can reduce emissions of aerosols and particulate matter – both of which have strong links to human health – by avoiding the production of virgin polymer. Moreover, producing materials by recycling waste often requires less energy than doing so using primary raw materials.

The Wuppertal Institute has calculated that the “ecological rucksack” (the amount of waste generated in producing everyday products) is 1.5 kg for a toothbrush, 75 kg for a mobile phone and 1,500 kg for a personal computer. Use of substantial amounts of natural resources and the associated impacts on the environment can therefore be avoided by re-using or recycling these products in their waste phase and by designing them in a more eco-efficient way. Only in terms of greenhouse gases emissions, recycling one tonne of paper saves 900 kg of CO₂ equivalent over production of virgin paper. The corresponding figure for Polyethylene Tere-Phtalate (PET) (a type of plastic) is 1,800 kg and for aluminium it is 9,100 kg.¹⁹

3. ASSESSMENT OF THE COMMUNITY’S WASTE MANAGEMENT POLICY

This section highlights the achievements of EC waste management policy and areas that require further development. In particular, it reviews the different elements of the Community’s legal framework for waste management. Annex I provides a more detailed description of this legal framework.

It should be noted that the Community framework is only the backbone of waste management practice. It necessarily needs complementary action by Member States and local authorities. The nature of this document is, however, rather to open a discussion about strategic options for the further development of Community policy on waste prevention and recycling than giving a full analysis of waste management policy at all levels. This would go beyond the role and available resources of the Commission.

¹⁷ How much depends on the metal content (known as “the grade”) of the ore. This can vary from a few parts per million (gold) to a few percent or higher, e.g. 30 per cent for manganese, 40 per cent for iron. See “Mining – facts, figures and environment”, *Industry and Environment*, Vol. 23, p. 5. Recycling one tonne of metal whose ore is of average grade of 10 per cent avoids the mining of 10 tonnes of metal ore.

¹⁸ See Commission Communication COM(2000) 265 final of 3.5.2000, p. 8: “Promoting sustainable development in the EU non-energy extractive industry”.

¹⁹ See AEA Technology, 2001: *Waste management options and climate change*, Brussels: European Commission.

3.1. Achievements

A common set of general principles and control procedures necessary to ensure a high level of protection of the environment and human health across the Community has been established by **horizontal legislation for waste management**, i.e. the waste framework directive²⁰ and hazardous waste directive,²¹ as well as the waste shipment regulation.²² They provide the foundation on which other elements of the policy framework rest:

- the waste management hierarchy, the polluter pays principle and the requirement that waste management may not adversely impact human health and the environment at large are key elements of Community legislation for guaranteeing environmentally sound management of waste;
- the permitting, registration and inspection requirements contained in the directives on waste and on hazardous waste are the backbone of a comprehensive control system for ensuring that waste management does not harm human health or the environment;
- the waste shipment regulation has established a harmonised system governing the cross-border shipment of waste, which seeks to reach a balance between the objective of a high level of environmental protection and the objective of ensuring the effective functioning of the Internal Market. Furthermore, the free trade regime for waste destined for recovery has an important potential for fostering the development of recovery of waste.

In order to guarantee a high level of environmental protection and to ensure the effective functioning of the Internal Market, the general principles and requirements of horizontal waste legislation are complemented by more detailed legislation in two areas:

1. legislation concerning waste treatment – including disposal – operations, such as the landfill, incineration directives;
2. legislation to regulate the management of specific waste streams. This legislation has been motivated by one or more of the following considerations:
 - the growing volumes or complexity of some waste streams, e.g. packaging, end-of-life vehicles and waste electrical and electronic products;
 - the need to subject them to specific controls due to their hazardousness, e.g. certain types of batteries, PCBs;
 - the fact that their uncontrolled use can have harmful effects on human health and the environment, e.g. the uncontrolled spreading of sewage sludge on agricultural land and the uncontrolled application of livestock manure on agricultural land, particularly in nitrates vulnerable zones.

²⁰ Directive 75/442/EEC of 15 July 1975 on waste, as amended by directive 91/156/EEC of 18 March 1991 amending directive 75/442/EEC on waste, OJ L 194, 25.7.1975, p.39 and OJ L 78, 26.3.1991, p.32.

²¹ Directive 91/689/EEC of 12 December 1991 on hazardous waste, OJ L 377, 31.12.1991, p.20.

²² Council regulation (EEC) No 259/93 of 1 February 1993 on the supervision and control of shipments of waste within, into and out of the European Community, as amended, OJ L 30, 6.2.1993, p.1.

The environmental impacts of **waste treatment** have been reduced in recent years through legislative measures. This trend will be reinforced through three recently adopted directives: the directive on integrated pollution prevention and control (IPPC),²³ the landfill directive²⁴ and the incineration directive.²⁵ Due to the transition periods for existing installations foreseen in these directives, their full environmental benefits have not yet been achieved. Nevertheless, the implementation of this legislation means that this decade will be one of considerable evolution of the waste management sector towards more stringent environmental standards. For example, some of the problems of highest concern associated with waste treatment installations, such as emissions of dioxins from municipal waste incinerators, will be largely solved through the implementation of the incineration directive. Similarly, the EEA estimates that EU emissions of greenhouse gases from waste management will decrease significantly from 1990 to 2010, principally due to the implementation of the landfill directive, which more than compensate for emission increases due to forecasted increases in waste generation.²⁶

The implementation of the landfill directive will be a major driver for the development of waste management policies at national level during the current decade, including efforts to promote the diversion of waste towards material recycling and biological treatments.²⁷ Particularly important in this context are the restrictions on landfilling introduced by the directive, in particular the reduction in the amount of biodegradable waste going to landfill and the prohibition on the landfilling of a number of waste types, including liquid wastes and tyres. Moreover, the stricter environmental standards introduced by the landfill and incineration directives will to a certain extent promote the diversion of waste towards material recycling.

Better management of a number of problematic waste streams has been achieved through Community directives on **specific waste streams**. Important hazardous wastes have been addressed such as waste oils,²⁸ PCBs/PCTs²⁹ and batteries.³⁰ Heavy metals have and are being further restricted by Community waste legislation in a number of products, aiming at qualitative prevention. Recycling and recovery targets have been set for some key complex waste flows, i.e. packaging,³¹ end-of-life vehicles (ELVs)³² and waste electrical

²³ Council directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control, OJ L 257, 10.10.1996, p.26.

²⁴ Council directive 1999/31/EC of 26 April 1999 on the landfill of waste, OJ L 182, 16.7.1999, p.1.

²⁵ Directive 2000/76/EC of the European Parliament and the Council of 4 December 2000 on the incineration of waste, OJ L 332, 28.12.2000, p.91.

²⁶ See EEA, 2002: *Analysis and comparison of national and EU-wide projections of greenhouse gas emissions*, Topic Report 1/2002, Copenhagen: European Environment Agency.

²⁷ Biological treatment includes composting, anaerobic digestion and mechanical/biological treatment. The Commission has announced that it will present a proposal for a directive on the biological treatment of biodegradable waste by end 2004.

²⁸ Council directive 75/439/EEC of 16 June 1975 on the disposal of waste oils, OJ L 194, 25.7.1975, p.23.

²⁹ Council directive 96/59/EC of 16 September 1996 on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT), OJ L 243, 24.9.1996, p.31.

³⁰ Council directive 91/157/EEC of 18 March 1991 on batteries and accumulators containing certain dangerous substances, OJ L 78, 26.3.1991, p.38.

³¹ European Parliament and Council directive 94/62/EC of 20 December 1994 on packaging and packaging waste, OJ L 30, 3.2.1994, p.1.

³² Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of-life vehicles, OJ L 269, 21.10.2000, p.34.

and electronic equipment (WEEE).³³ Such targets are necessary where separate collection and recycling are not profitable under free market conditions but are beneficial from a societal point of view. Although these targets are generally the subject of much debate during the adoption process, once adopted they provide the legal certainty and stability necessary to allow the recycling industry to programme investments in the knowledge that there will be a demand for recycling services.

In addition, the principle of producer responsibility has also provided a stable source of financing to off-set the cost disadvantage of recycling versus energy recovery and landfilling. While the current packaging directive is not based on this principle, almost all Member States have chosen to implement it at least partly on the basis of producer responsibility, although there are some exceptions such as Denmark and the Netherlands where the financing is ensured mostly via municipalities and waste charges and taxes.³⁴ Both the ELV directive and the WEEE directive explicitly include an element of producer responsibility.

Separate collection systems have and will continue to be widely implemented to achieve the objectives of Community directives on specific waste streams, especially for end-of-life products which would otherwise enter the MSW stream. One of the characteristics of MSW is its heterogeneity. Obtaining good quality recyclates from mixed MSW is therefore generally difficult from a technical point of view and costly from an economic point of view. However, by ensuring that recyclable materials are collected separately, a supply of relatively homogenous and high quality recyclate can be obtained.

In this context, one should not neglect the indirect effect on consumers behaviour of the implementation of separate collection schemes at the municipal level. Separate collection, especially if carried out through kerb-side schemes, requires the active involvement of citizens in waste management issues. This involvement may be a spur for a more general awareness of the environmental dimension of waste, thus promoting changes in consumer behaviour.

3.2. Elements to be further developed

Despite the important progress highlighted above, the Community's policy framework on waste management still contains a number of gaps or areas where further progress can be made. These are described below.

3.2.1. Implementation

Timely and full implementation of existing Community waste legislation is a prerequisite to ensure effective waste management. Unfortunately, Member States regularly fail to transpose Community waste legislation on time and to correctly apply important elements of the Community's legal framework on waste management. This may sometimes be a symptom of the ambitious deadlines and approaches contained in

³³ Directive 2002/96/EC of the European Parliament and 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, OJ L 37, 13.2.2003, p. 24

³⁴ See Commission Communication COM (2001) 729 final of 7.12.2001, p. 11: "Upgrading the investment services directive".

Community legislation, but in general it also shows insufficient efforts by Member States to transpose and enforce agreed legislation.

Efforts should be made to ensure that Member States dedicate sufficient resources to implementing Community legislation, while ensuring that deadlines and targets set in directives are realistic.

3.2.2. *Limited progress towards waste prevention*

Waste prevention includes both quantitative and qualitative prevention:

- quantitative prevention refers to a reduction of the **amount** of waste generated;
- qualitative prevention refers to a reduction of the **hazardousness** of waste generated.

In practice, qualitative prevention can be seen as a special case of quantitative prevention, since it implies a reduction of the quantity of hazardous waste generated. This is a somewhat crude approach towards qualitative prevention, since it assumes that all hazardous waste is equally hazardous. However, more sophisticated approaches based on a composite index of “hazardousness” are not currently feasible given the methodological problems that they would raise, e.g. weighting of different hazard-properties. In what follows, qualitative prevention is therefore defined as a reduction of the quantity of hazardous waste generated.

As discussed in section 2.1, the available evidence suggests that the volume of waste generated in the EU is likely to increase. Some measures have been adopted at Community level that will undoubtedly promote waste prevention. The most significant measure adopted so far is the IPPC directive, which lists among the basic obligations of the operator that waste production is avoided in accordance with Council directive 75/442/EEC of 15 July 1975 on waste. Moreover, the use of low-waste technology and the use of less hazardous substances are listed among the considerations that should be addressed as part of the definition of Best Available Techniques (BAT) in accordance with the IPPC directive. This means the latter will be an important instrument to promote waste prevention in the industrial sector, although it is not yet possible to estimate the significance of this impact due to the early stage of implementation of the directive.

A number of directives on end-of-life products address waste prevention, although these have either limited scope or are at an early stage of implementation. The ELV directive and the directive on the restriction of certain hazardous substances (RoHS) in electrical and electronic equipment³⁵ have focused on qualitative prevention by restricting the use of hazardous substances in products. Quantitative prevention is to a certain extent addressed in the packaging directive. However, the balance between packaging volume, weight, functionality and environmental impact is a complex question about which there continues to be much debate.

There have been several attempts to define **waste prevention targets** in the past, which have generally been unsuccessful. Three examples illustrate the point:

³⁵ Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, OJ L 37, 13.2.2003, p.19.

- Spain’s National Plan for Municipal Waste (2000-2006) aims at stabilising MSW generation per capita at 1996 levels by 2002.³⁶ However, Eurostat data indicates that Spanish MSW generation increased from 390 kg/capita in 1996 to 621 kg/capita in 1999, suggesting that it is highly unlikely that the target will be achieved;
- the overall objective of the Danish “Waste 21” policy (the Danish government’s waste action plan for the period 1998–2004) is to stabilise the total volume of waste by 2004 and to gradually reduce it thereafter. However, recent assessments estimate that waste generation in Denmark increased by 17% over the period 1994-2000 and that it will further increase by about 27% between 2000 and 2020;
- the Community’s 5th Environmental Action Programme (5EAP) included a target to stabilise annual MSW generation at 300 kg per capita, the EU average for 1985,³⁷ although it did not identify a deadline by which this target should be achieved nor the measures necessary to achieve it. It is estimated that annual MSW generation currently stands at about 550 kg per capita (average across the EU), while the OECD estimates that MSW generation will reach 640 kg per capita in 2020.

It therefore remains true that, although waste prevention has been the paramount objective of both national and Community waste management policies for many years, limited progress has been made so far to turn the objective of waste prevention into practice.

This lack of progress can partly be explained by the absence of a comprehensive strategy to promote waste prevention. In particular, targets were sometimes defined without considering their justification and the means to achieve them, therefore undermining the credibility of the exercise. In addition, there was generally no robust assessment of waste generation patterns in different sectors of the economy allowing credible and effective waste prevention targets can be defined.

This experience shows that a successful policy on waste prevention will need to be based on a fuller scientific analysis, in particular the relationship between the weight or volume of waste generated, the hazardousness of the waste and the related risks, and its environmental impacts. Moreover, any targets would have to be based on a robust assessment of waste generation trends in different economic sectors, as well as their potential for waste prevention. Finally, the definition of waste prevention targets must be accompanied by an evaluation of the potential range of measures through which they can be achieved. Ideas on how to build on this experience are given in sections 4.3 and 5.2.

3.2.3. Lack of a comprehensive approach to recycling

Directives on specific waste streams have so far targeted individual waste streams on a case-by-case basis. These directives are an important success of Community waste policy in reducing environmental impacts by promoting source separation and recycling of waste streams such as batteries, packaging, ELV and WEEE which are waste flows of particular importance in terms of hazardous character, increasing complexity or growth rate of waste generation. These measures have the effect of improving the quality of separated material which is an important factor affecting the costs of recycling and the

³⁶ See http://www.mma.es/calid_amb/residuos/plan/, section 6.1.

³⁷ [1993] OJ C 138/59.

quality of the recycled materials. However, these directives cover a limited proportion of all waste generated. For example, packaging waste represents about 5% of all waste generated, while both end-of-life vehicles and waste electrical and electronic equipment represent about 1% of total waste generation. Additionally, while Community legislation requires recycling of paper and cardboard from packaging, there is no analogous requirement for paper from other sources, e.g. office paper or newsprint. Paper from these sources is often appropriate for recycling from both an economic and environmental point of view. Similarly, while Community legislation requires the recycling of plastic packaging and, in practice, plastics from some other regulated waste streams (ELV and WEEE), there is currently no Community requirement for recycling of plastics from other important applications, e.g. construction materials. Thus, beyond closing existing gaps in Community legislation where necessary, Community legislation on recycling could be complemented by new initiatives focussing on given materials rather than on specific end-of-life products.

The implementation of the waste management hierarchy has contributed to encourage recycling. While recognising this general principle, the Commission considers that there is a need for further developing approaches for the determination of best environmental options and for the setting of targets for recycling and recovery of waste, taking into account the differences between products and materials and the possible alternatives.

The principle of producer responsibility is continuing to be successfully used in Community and national legislation to promote the recycling of end-of-life products. By requiring that producers bear the costs of recycling their products after these have been discarded by consumers, their specific role in the chain of producers, consumers and waste managers is used to finance recycling and to integrate waste management costs in the product price. This also aims to provide economic incentives for producers to reduce the cost of re-using and recycling their products, e.g. by improving design or materials to facilitate recycling.

Some work has been carried out to evaluate the advantages and disadvantages of producer responsibility.³⁸ This indicates that producer responsibility can be very successful to promote recycling for some waste streams while it may be less appropriate for others. This suggests that while the principle of producer responsibility will continue to be an important element of the Community's recycling policy, in particular for end-of-life products, it will need to be complemented by other instruments to promote recycling of important waste streams. Moreover, many factors influence the effectiveness of the economic incentives created by a producer responsibility scheme. Where recycling is already profitable under market conditions, it may not be necessary and useful to develop a legislative framework but voluntary approaches could be developed to optimise the functioning of these markets.

The 6EAP states that the recycling strategy should include "inter alia" measures aimed at ensuring source separation, the collection and recycling of priority waste streams. In addition, other elements of the 6EAP are strongly linked to recycling. In particular, article 8(2)(iv) calls on the Commission to propose new or revised legislation "including

³⁸ See, for example, OECD, 2001: *Extended Producer Responsibility – A Guidance Manual for Governments*, Paris: Organisation for Economic Co-operation and Development and SOU, 2001: *Resurs i retur - Slutrapport från utredningen för översyn av producentansvaret*, SOU 2001:102, Stockholm: Statens Offentliga Utredningar.

inter alia construction and demolition waste, sewage sludge, biodegradable wastes, packaging, batteries and waste shipments, clarification of the distinction between waste and non-waste and development of adequate criteria for the further elaboration of Annex IIA and IIB of the framework directive on wastes.”

Several of the above mentioned proposals contained in the 6EAP relate directly to recycling. The Thematic Strategy should help to clarify this relationship with a view to identifying priorities and ways in which recycling policy could be further developed in the most efficient way.

Moreover, the main barrier to progress towards higher recycling rates is in many cases the unfavourable economic situation facing recycling, as landfilling and incineration are often cheaper. This situation arises partly because the prices of resource use and waste treatment methods do not always reflect social costs, i.e. there are negative externalities. This means that market choices about waste management options are frequently sub-optimal. Overcoming this barrier will be central in future Community policy on recycling. However, increased recycling of particular end-of-life products, waste flows or materials would to a varying degree deliver additional environmental benefits. Therefore, new initiatives should as a matter of priority be designed to deliver environmental benefits in areas where recycling is most justified from a cost-benefit point of view.

More stringent environmental standards introduced by recent Community legislation (IPPC, landfill and incineration directives) may increase the costs of operating certain disposal facilities, thus providing an economic incentive to divert waste towards recovery, including material recycling. For example, the waste acceptance criteria prescribed by the landfill directive may increase the costs of disposal and thus also improve the relative economic position of material recycling for some materials. This may be the case, for example, for some categories of waste currently considered as inert waste, e.g. certain types of construction and demolition waste. However, by itself the implementation of the landfill directive, even where complemented by landfill taxes adopted at national level, is unlikely to bring into line the costs of landfilling and material recycling. In absence of other measures a significant proportion of combustible waste could be diverted towards energy recovery, which normally has a lower cost than material recycling. In addition, remaining differences in costs of landfilling across the EU may in some case generate unnecessary transport of waste over long distances.

Finally, another dimension that should not be disregarded in developing further initiatives is the optimisation of allocation of resources, i.e. the administrative and financial resources required at the national and European levels. Resources needed to implement legislation addressing waste flows case by case should not be underestimated, in particular due to the potential inflation of the number of directives and to the high degree of technical complexity of such legislation.

The “mandate” of the 6EAP and the above considerations lead to the conclusion that there is a need for an appropriate mix of instruments to address the issues of waste management and to ensure both the effectiveness and the cost-efficiency of Community waste policy. This mix could include new legislative initiatives, the negotiation of environmental agreements and the development of economic instruments. The latter could play a prominent role given that the current economics of waste tend to give signals that discourage recycling. As regards legislative initiatives, the Commission considers it worth exploring the merits of complementing existing directives with a new

approach addressing materials rather than end-of-life products. This could include developing producer responsibility obligations where most appropriate from both an environmental and an economic perspective. Discussion on the mix of instrument would cover how to implement the waste management hierarchy and which instruments should be used to define the best waste management options. Potential ways forward are described in sections 4 (targets) and 5 (instruments).

3.2.4. Harmonised standards for recycling operations

Many **treatment operations**, in particular recycling operations, are not covered by harmonised environmental requirements across the Community. Some of these operations fall within the scope of the IPPC directive and will therefore have to apply Best Available Techniques (BAT). However, the extent to which this harmonises the environmental performance of these facilities will depend on the way in which BAT is implemented at local level.

The absence of mandatory waste treatment standards at EU level undermines the creation of a high level of protection across the Community and has also raised concerns about “standards dumping”. The argument that different environmental standards lead to significant differences in costs incurred by waste management facilities is in principle plausible, although little factual information is available about these economic issues and the actual waste flows involved. Nevertheless, there have been allegations that waste destined for recycling tends to be driven out of countries with higher standards and that, as a consequence, installations in these countries do not receive sufficient quantities of waste to be economically viable. It is therefore argued that Member States are impeded from developing and enforcing environmentally superior waste treatment technologies and requirements in the field of recycling, as waste tends to flow towards countries with lower standards.

According to the jurisprudence of the European Court of Justice, wastes destined for recovery are to be considered as tradable goods covered by the provisions of the Treaty (Articles 28 to 30) on the free circulation of goods. Thus national measures that could impede exchanges of waste destined for recovery could be considered to be incompatible with Article 28 of the Treaty unless the measures are justified and proportionate to the objective pursued.

The definitions of disposal (D) and recovery (R) operations contained, respectively, in **annexes II A and II B of the WFD** are the key elements determining what set of rules apply to a given waste treatment operation. In particular they determine the rules that apply to cross-border shipments of waste within the Community in the context of the Waste Shipment Regulation. Moreover, they also determine which operations can contribute towards the achievement of recycling and recovery targets contained in certain directives.

These definitions are general in nature and leave a relatively substantial leeway for interpretation which can be used to undermine obligations for waste destined for disposal by sending this waste to operations which may or may not be recovery operations. They can also be used by Member States to stop the shipment of waste out of their territories. These implementation problems and criticism by various stakeholders have materialised in litigation both at national and European level.

In recent jurisprudence the European Court of Justice developed a criterion for distinguishing between waste recovery and waste disposal. According to the Court, a waste treatment operation is to be classified as recovery when the fundamental objective of the operation is that the waste substitutes the use of primary resources. The Court has notably concluded that filling a mine with waste could be a recovery operation if the waste is used in replacement of primary resources that would have otherwise been used for the purpose of filling the mine³⁹. This could for instance be the case when, for the purpose of stabilising land a mine must be filled. The Court also concluded that use of waste as a fuel in a cement kiln is recovery when excess heat is generated and this heat is used in the process⁴⁰. In contrast, the Court decided⁴¹ that incineration in a dedicated municipal waste incinerator has for primary objective to dispose of the waste. The Court added that, in the cases analysed, this classification as disposal operation would not be changed if, as a secondary effect of the process, energy is generated and used

The Court also underlined that pursuant to Article 7(4) fifth indent of Regulation (EEC) 259/93 on shipments of waste, Member States may object to shipments of “if the ratio of the recoverable and non-recoverable waste, the estimated value of the materials to be finally recovered or the cost of recovery and the cost of the disposal of the non-recoverable fraction do not justify the recovery under economic and environmental conditions”. Application of this provision should enable Member States to avoid that sham recovery is taking place.

Section 5.5.1.1 further develops issues that should be debated in the framework of this Communication.

3.2.5. Other aspects of the legal framework

In addition, certain aspects of the legal framework relevant to waste recycling have been the subject of previous work by the Commission. For example, the Recycling Forum⁴² analysed the cost complying with waste legislation, esp. concerning the requirements of the waste framework directive and of the waste shipment regulation. This section focuses on ways in which compliance costs could be reduced by taking advantage of existing provision of EC waste legislation and by clarifying certain of its elements.

The Commission is finalising a proposal for the review of the waste shipment regulation. Through this review the Commission aims at incorporating international obligations of the EU as well as clarifying and streamlining the control procedures that apply to transboundary shipments of waste. This review should clarify and where possible simplify the rules that apply to trade of waste both within the Community and with third countries.

The **definition of waste** contained in article 1(a) of the WFD is the keystone of waste legislation. This definition has been the subject of considerable discussion and the European Court of Justice has provided valuable guidance on the interpretation of this definition. However, debate about definition of waste is likely to continue. Moreover,

³⁹ Case C-6/00

⁴⁰ Case C-228/00

⁴¹ Case C-458/00

⁴² <http://europa.eu.int/comm/enterprise/events/recycling/recycling.htm>.

article 8(2)(iv) of the 6EAP calls for a "clarification of the distinction between waste and non-waste."

The definition of waste is a legal construction which it may well be possible to improve. However, the criticisms levelled against the current definition are often of a general nature. For example, it is sometimes claimed that recyclable materials should be excluded from the definition because the economic costs of complying with waste legislation and the negative image linked to the term "waste" undermine the creation of a competitive recycling sector. However, these allegations are rarely supported by an assessment of the actual economic cost of compliance.

Section 5.5.1.2 further develops issues that should be debated in the framework of this Communication.

4. SETTING OF TARGETS

4.1. Introduction

In general, an optimal waste management strategy to minimise environmental impacts will include a combination of waste prevention, material recycling, energy recovery and disposal options.

Cost-Benefit Analysis (CBA) provides a framework to define optimal recycling rates, although relatively little experience exists for CBA of waste prevention measures. CBA provides estimates of the monetary value of different environmental impacts, which are often not reflected in market prices (externalities). It therefore allows the environmental benefits of waste management choices to be compared to their economic costs. Although there continues to be debate about certain methodological aspects of CBA – such as monetisation factors⁴³ and discounting⁴⁴ or taking into account local conditions – the Commission considers that this technique provides the best available basis for the assessment of targets in the field of waste management policy.

The Commission has launched a study to assess cost-benefit scenarios for future recycling in the EU, based on different assumptions concerning legislative and technical developments. This will inform the development of recycling targets in the context of this strategy and will allow the Commission to further develop the approach used for the revision of the recycling targets of the packaging directive. The first results of this study should be made available by end 2003.

4.2. Waste prevention

Waste generation trends are driven by several factors, including levels of economic activity, demographic changes, technological innovations, life-style and, more generally,

⁴³ Monetisation factors are used to assign a monetary value to environmental impacts, e.g. the "economic cost" of emitting one tonne of CO₂.

⁴⁴ Discounting involves choosing an interest or "discount" rate to account for the changing economic value of assets over time.

patterns of production and consumption.⁴⁵ This close link makes it difficult to deal with waste prevention in isolation from resource management and product policy. This is likely to be the main explanation for the lack of success of existing policies to promote waste prevention in general and setting waste prevention targets in particular.

Most previous attempts to define waste prevention targets have focused on the weight or volume of waste generated. However, it is questionable whether weight or volume are always the most appropriate indicators of the environmental burden of waste. In practice the relationship between the generation of waste and the latter's environmental impacts is more complex, since changes in waste generation patterns generally affect not only the quantity of waste generated, but also the type of waste generated. Such changes may also influence impacts in other stages of the product life cycle, e.g. through changes in product design. For example, moving towards more lightweight packaging does not necessarily reduce the environmental impact of packaging, either during its end-of-life phase or over its entire life-cycle. Nevertheless, given the complexity inherent in any attempt to develop composite indicators of the environmental impact of waste, there does not currently appear to be a practical alternative to using weight or volume to express waste prevention targets. In that context, it is important to recognise that to maximise the results a direct link between waste prevention and IPP has to be established. The first step towards a global strategy for waste prevention should be strengthening of the coherence between all available instruments.

Any attempt to define waste prevention targets at EU level is also confronted with the unsatisfactory status of current statistics about waste generation. These shortcomings mean it is not possible at this stage to propose any operational, quantified waste prevention targets based on a comprehensive environmental and economic analysis. Moreover, in the absence of reliable statistics and a robust baseline scenario for future waste generation, monitoring progress would be almost impossible.

The Waste Statistics Regulation⁴⁶ is intended to close these gaps in our knowledge of waste generation and will provide a legal basis for a complete statistical data collection on waste generation and treatment in the Community. When fully applied, the Waste Statistics Regulation will provide a comprehensive picture of waste generation and waste treatment for the whole economy in the Community, by type of waste and by sector of economic activity. Data collection will take place every second year, starting with the reference year 2004. The first set of statistics will be made available to the Commission in 2006.

Consequently, a satisfactory knowledge of waste generation and treatment patterns at EU level will be available in 2006 at the earliest. However, trends cannot be estimated on the basis of data for a single year. Therefore, a first assessment of trends in waste generation across the EU will only be possible in 2008, when the second set of statistics collected in the context of the Waste Statistics Regulation will become available.

⁴⁵ See, for example, OECD, 2002: *Household Energy & Water Consumption and Waste Generation: Trends, Environmental Impacts and Policy Responses*, ENV/EPOC/WPNEP(2001)25, Paris: Organisation for Economic Co-operation and Development, pp. 67-62.

⁴⁶ Regulation (EEC) N° 2150/2002 of the European parliament and of the Council of 25 November 2002 on waste statistics, OJ L 332, 9.12.2002, p.1.

Additionally, a protocol to the Aarhus Convention⁴⁷ is currently being negotiated within the United Nations Economic Commission for Europe (UNECE) for the implementation of Pollutant Release and Transfer Registers (PRTR). This could be implemented via a revised European Pollutant Emissions Register (EPER)⁴⁸ with an expanded scope. The EPER could then provide information on production and management of waste and cover a large number of significant waste producers. This would provide a potential basis for target setting for specific industrial sectors or for groups of sectors.

There continues to be significant uncertainty about the scope for waste prevention in different sectors of the economy and about the effectiveness of different instruments to achieve waste prevention. Despite the potential usefulness of setting a political ambition in relation to waste prevention, the risk is that new targets would merely raise hopes that might be as much disappointed as in the 5th EAP. Thus, the Commission intends to launch a debate on the fundamental analysis that can justify waste prevention targets and, in particular, on the link between waste prevention, resource management and Integrated Product Policy. Before proposing targets, the Commission also wishes to obtain more clarity with which measures such targets can be achieved and whether such measures would be supported by the respective legislators. Furthermore, stakeholders are invited to report about past experiences related to waste prevention, which effects could be achieved and how much such measures could contribute to achieving overall waste prevention targets.

4.3. Recycling targets

In contrast to waste prevention, target setting is both better established and less complex in the field of recycling. This thematic strategy should therefore focus on improving the efficiency of recycling targets. Firstly, the Community's approach to setting recycling targets has until now focused on end-of-life products, without distinguishing between different materials. The packaging directive provides a partial exception to this, as the directive requires that minimum recycling targets are reached separately for each material. In its proposal to revise the directive's targets, the Commission proposed differentiated targets for each material, arguing that the optimal recycling rates should be based on the costs and benefits for the specific material concerned, which would clearly be different from one case to another.⁴⁹

Setting targets for end-of-life products has been a successful way of promoting separate collection and recycling. However, in some cases questions arise why specific materials were addressed in one waste streams but not in others. For example, while Community legislation requires recycling of paper and cardboard from packaging, there is no analogous requirement for paper from other sources, e.g. office paper or newsprint. Paper from these sources is often at least as appropriate for recycling from both an economic and environmental point of view. Similarly, while Community legislation requires the

⁴⁷ Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, signed by the Community at the inter-ministerial conference on 23/25 June 1998.

⁴⁸ See Commission Decision of 17 July 2000 on the implementation of a European pollutant emission register (EPER) according to Article 15 of Council Directive 96/61/EC concerning integrated pollution prevention and control (IPPC), OJ L 192, 28.7.2000, p.36.

⁴⁹ See 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 of 7.12.2001, esp. p. 12ff.

recycling of plastic packaging (and, in practice, plastics from some other regulated waste streams, in particular WEEE), there is currently no Community requirement for recycling of plastics from other important applications, e.g. construction materials.

It would be possible to combine the waste-stream oriented and material-specific approach. In general, it may well be the case that the former is more appropriate to ensure separate collection and dismantling of complex end-of-life products. A material-specific approach could then be used to set recycling targets. Following such an approach would suggest a separation of separate collection and dismantling requirements from recycling targets in future waste legislation. The intrinsic differences between the materials, the recycling processes and the market structures should be carefully taken into consideration while assessing the efficiency of setting-up complementary material based targets.

Secondly, current directives foresee that all Member States should achieve the same recycling target. However, the question is legitimate whether this uniformity in targets is most effective from both an environmental and economic point of view. From an environmental point of view, it is more important to optimise collection and recycling in the Community as a whole than whether this takes place in a particular Member State. From an economic point of view, it is more important to create fair competition within the Internal Market rather than achieve the same level of collection and recycling everywhere. This could be reflected in an overall recycling target at Community level and letting market forces determine which recycling facilities can achieve the objective in a most cost-effective manner. Such an approach would require a more market oriented legal framework. However, it is likely that such an approach will only be feasible if the environmental standards for recycling facilities were more harmonised across the Community than is currently the case. Such a legal framework would have to include a clear distribution of responsibilities and an appropriate system to generate information on achievements to ensure that it is enforceable.

Finally, recycling targets contained in existing Community legislation, e.g. the packaging, ELV and WEEE directives, are legally-binding. This approach could be extended if material-oriented targets are included in future initiatives. In addition, complementary indicative targets could be defined for large waste streams such as Construction and Demolition Waste (C&DW) and Municipal Solid Waste (MSW). This would provide a means to monitor progress in different Member States, while leaving sufficient flexibility to take into account the variety of local conditions which prevail across the Community.

This Communication and the following debates should raise ideas on how to set targets which are more effective from an environmental and economic point of view. This could include targets focusing on materials rather than on end-of-life products, possible Community targets instead of national targets to allow more flexibility to focus collection and recycling to geographical areas where it is most effective, etc. This approach could be complemented by more general indicative targets for important waste streams, such as municipal solid waste.

The Commission would therefore welcome input from stakeholders, in particular concerning the following points:

- the potential role and effectiveness of material-oriented targets;*

- *the costs of implementing material based targets in articulation with end-of-life products based targets;*
- *the possibility of introducing greater flexibility to take into account local conditions by setting targets for the Community as a whole. This would also have implications for competition in the recycling industry;*
- *the respective roles of legally-binding and indicative recycling targets.*

5. BUILDING BLOCKS OF A THEMATIC STRATEGY

5.1. Introduction

This chapter focuses on the instruments through which waste prevention and waste recycling targets discussed in chapter 4 can be implemented. On the basis of the assessment of existing Community measures in chapter 3, the Commission considers that the future Thematic Strategy on the prevention and recycling of waste should be structured around four building blocks:

- Block 1. core instruments to promote waste prevention;
- Block 2. core instruments to promote waste recycling;
- Block 3. measures to close the waste recycling standards gap;
- Block 4. accompanying measures to promote waste prevention and recycling.

These building blocks are intended to set priorities for the coming years and are additional to the implementation of existing legislation and approaches. Although existing EC waste legislation has led to considerable progress towards more sustainable management of waste, it does not yet provide a comprehensive framework in which to promote waste prevention and recycling. Moreover, several existing directives are characterised by considerable technical complexity. A few elements such as the phase-out of certain hazardous substances apart, waste prevention policy has so far failed due to a lack of clarity on possible approaches. In order to ensure a maximum effect of waste policy, it will therefore be necessary to focus efforts on those elements with the biggest potential to reduce environmental impacts and problems in the application of waste legislation.

Choices about resource use and waste management depend to a large extent on the relative prices of different waste treatment options (landfilling, incineration, gasification, material recycling, etc.). Legislation can be used to mandate changes in behaviour, but as long as price signals run counter to legislative objectives, an incentive exists to circumvent the latter and ever more complex mechanisms are necessary to implement and control the application of legislation. Moreover, the Commission pointed out in its Communication on *A European Strategy for Sustainable Development*⁵⁰ that it would give priority in its policy and legislative proposals to market-based approaches that provide price incentives, whenever these are likely to achieve social and environmental

⁵⁰ Commission Communication COM(2001)264 final of 15.5.2001: “A sustainable Europe for a better World: a European Union Strategy for Sustainable Development”.

objectives in a flexible and cost effective way. Such approaches would have to be consistent with international rules on trade. Furthermore, the Commission considers that the economic dimension of the waste management industry, in general, and of the recycling industry, in particular, is an integral part of the challenge that the EU is facing today. The Commission will ensure that the economic dimension will be fully taken into account in the elaboration and implementation of future Strategy on Waste prevention and Recycling.

This Communication analyses means to ensure that a mix of regulatory, voluntary and economic instruments provides the appropriate incentives to promote more sustainable waste management in the areas of prevention and recycling. In addition, this Communication analyses ways to close the existing gap in Community waste recycling standards and to clarify the fundamental definitions of Community waste legislation.

These approaches will be additional to the currently planned directives, i.e. proposals for the revision of the directive on sewage sludge and of the waste shipment regulation and for directives on biodegradable waste⁵¹ and on mining waste. Further proposals, e.g. concerning construction and demolition waste, may follow as an integral part of the Thematic Strategy.

Section 5.2 reviews the applicability of various instruments to promote waste prevention and section 5.3 makes a similar review as regards recycling. Some of the available instruments analysed below will promote both waste prevention and waste recycling. They are discussed under the heading for which they will have the main impact. The objective of these sections is not to advocate the use of a particular instrument but rather to launch a debate on the potential role and effectiveness of these instruments in the context of a comprehensive thematic strategy. The effectiveness of a given instrument will vary depending on the economic and technical context, so there is unlikely to be a single policy response that will be applicable in all cases. Therefore, the Commission does not take a firm view at this stage about the way in which instruments should be used and how they should be combined.

Section 5.4 addresses the need to ensure a level playing field for recycling across Europe. This becomes particularly important if a more market-oriented policy is implemented, as differences in environmental standards for recycling facilities across Europe could exacerbate concerns about unfair competition through “standards dumping”. Finally, section 5.5 examines a number of accompanying measures that could be used to stimulate recycling. These measures would not be sufficient by themselves to achieve significant progress, but could usefully support the core measures included in Blocks 1 and 2.

⁵¹ The directives on sewage sludge and biodegradable waste are closely linked to the Thematic Strategy for Soil Protection. Therefore, the problems these directives address are discussed in that context rather than in this strategy.

5.2. Instruments to promote waste prevention

5.2.1. Measures specific to quantitative prevention

Achieving significant progress towards waste prevention means changing the way resources are used in production processes and in products. This requires modifying behaviours, of households, producers and other actors in the economy. Although traditional regulatory measures can play a role, they are rarely effective in isolation in such a complex context. As all materials used in an economy sooner or later become waste, major changes in waste generation require changes in production and consumption patterns. This requires policy approaches which go beyond waste policy in its strict sense and enter into fields such as resource management and Integrated Product Policy.

There are a number of options to address waste prevention from a waste management perspective. Often, such measures take the form of economic instruments or information campaigns and can have an effect both in encouraging waste prevention and directing wastes to preferable treatment options such as recycling. However, in general there are not many practical experiences for instruments which could lead to significant quantitative reductions of waste generation and in which the Community could play a role.

Nevertheless, there could be added value in the co-ordination of national approaches that address the players in the marketplace. In particular the consumer's choice as well as voluntary schemes implemented by public purchasers are potentially a powerful signal for the development of greener products, including products which in their production, use and consumption generate less waste. National and local experiences in designing incentives for consumers to select such greener products could possibly benefit from an exchange of information and debate at European level. This is also true of national incentives for greening production. Debate on such an approach in the framework of this Communication could be a useful contribution for understanding how the prevention of waste could be included in the Integrated Product Policy.

The Commission therefore welcomes input from all stakeholders with a view to carrying out a comprehensive assessment of the effectiveness of different instruments to implement future waste prevention targets and the role the Community could play in developing these instruments. In particular, the Commission would welcome the views of Member States and stakeholders on the advantages of information exchange at European level concerning national incentive systems directed at the consumers as well as green procurement initiatives.

5.2.2. Measures specific to qualitative prevention

The future Regulation on Chemical policy will aim at ensuring a high level of protection for human health and the environment, while ensuring the efficient functioning of the internal market and stimulating innovation and competitiveness in the chemical industry. In 2001, the Commission adopted a White Paper⁵² setting out its proposals for a future chemicals policy strategy. Central to these proposals is the REACH (**R**egistration, **E**valuation and **A**uthorisation of **C**hemicals) system. The latter is based on a set of

⁵² White Paper – Strategy for a future Chemicals Policy, COM(2001) 88 final of 27.2.2001.

principles to improve our knowledge of and strengthen controls over chemicals which may have an adverse impact on human health and the environment. In particular, this would involve:

- producers and other downstream users would have to assess the safety of their products for the part of the life cycle to which they contribute, including disposal and waste management;
- the promotion of substitution of dangerous by less dangerous substances where suitable alternatives are available. The increased accountability of downstream users and better public information would create a strong demand for substitute chemicals that have been sufficiently tested and that are safe for the envisaged use;

For substances of very high concern, the White Paper foresees an authorisation system based on a risk assessment covering the whole life-cycle of the substance, including disposal, with respect to the particular use. An authorisation will be granted if the use presents a negligible risk.

The approach foreseen by the Commission in the White paper would allow much better control over the use of dangerous substances, including those that end up in waste, while promoting the substitution of dangerous substances when suitable alternatives are available. This should in turn lead to a reduction in the generation of hazardous (production and post-consumer) waste.

The Commission has now launched an 8-week Internet consultation open until 10 July 2003 on the workability of the proposed future REACH system.⁵³

Given the wide-ranging implications of the new chemicals policy and the close link between the use of dangerous substances and hazardous waste generation, the management of the risks related to such substances should be done through the REACH system. This could then cover also the qualitative waste prevention aspects. Nevertheless, the Commission does not exclude the possibility of adopting additional restrictions for particular substances and applications that may pose specific risks in the waste stage. This is in line with the approaches taken in the existing waste directives and would continue to apply until the REACH system would fully cover these aspects.

5.2.3. Other measures promoting both quantitative and qualitative prevention

5.2.3.1. Waste prevention plans

Waste prevention plans can contribute to both quantitative and qualitative waste prevention. Member States have launched a number of initiatives and programmes concerning the development of such plans by economic operators. Advocates of this approach argue that because of the complexity of waste prevention, it is only through intense discussion with the concerned economic sectors that cost-effective waste prevention measures can be identified. Furthermore, strong commitment of the authorities is needed for negotiated waste prevention plans to be successful.

⁵³

<http://europa.eu.int/comm/environment/chemicals/whitepaper.htm>

These plans may be elaborated at the level of entire economic sectors or of individual enterprises, for example in the context of environmental management systems such as the Community Eco-Management and Audit Scheme (EMAS).⁵⁴ Waste prevention plans could be negotiated at various levels, including the European, national and local levels with different but complementary focus. They could be made mandatory by Community legislation or remain at the level of environmental agreements.

Other options such as the use of tradable certificates for industrial waste could be mentioned. However, in general there are not many practical experiences for instruments which could lead to significant quantitative reductions of waste generation and in which the Community could play a role.

5.2.3.2. The IPPC directive and BREF documents

The IPPC directive lists among the basic obligations of the operator that waste production is avoided in accordance with Council directive 75/442/EEC of 15 July 1975 on waste and the use of low-waste technology and less hazardous substances (qualitative prevention) are listed among the considerations that should be addressed as part of the definition of Best Available Techniques (BAT) in accordance with the IPPC directive. The potential impact of this Directive on waste prevention should not be underestimated as most⁵⁵ significant industrial producers of waste fall under its scope.

Although it is not yet possible to estimate the impact of the Directive due to its early stage of implementation, it is desirable to promote good practice in implementing the waste related provisions of the Directive. The Commission intends to support and participate actively in the IMPEL project on waste related conditions in environmental permits, aiming at better and more consistent implementation in Europe. This project was approved by the IMPEL plenary meeting in December 2002 for submission for financing by the Commission and could begin mid-2003.

This assessment could lead to conclusions on how to optimise the efficiency of the IPPC process as regards both qualitative and quantitative waste prevention, e.g. through the publication of guidelines on addressing waste prevention in BAT reference documents ('BREFs') and in permits. Comments and suggestions are welcome on the best means to promote waste prevention through the application of IPPC.

5.3. Instruments to promote waste recycling

The main obstacle to further recycling is the latter's cost disadvantage compared to other waste treatment options. The use of economic and market-based instruments is therefore considered to be the most promising way to promote recycling.

However, if the outcome of the consultation process should reveal that economic instruments are not acceptable or feasible, for either political or technical reasons, the Commission intends to make full use of its right of initiative to propose legislative

⁵⁴ Regulation (EC) No 761/2001 of the European parliament and of the council of 19 March 2001 allowing voluntary participation by organisations in a Community eco-management and audit scheme (EMAS), OJ L 114, 24.4.2001, p.1.

⁵⁵ Sectors not covered include mining and quarrying, forestry, most agriculture.

measures aimed at achieving more sustainable waste management. This could include instruments reviewed under section 5.3.6. Prescriptive instruments.

5.3.1. Landfill taxes

Changing the relative costs of different waste management options, in particular so that they internalise external costs, can be a very powerful means to change waste management choices. The simplest means to achieve this change is to increase the cost of alternative waste treatment methods. This has led a number of Member States to adopt landfill taxes. However, landfill taxes need to be complemented by other instruments so as to avoid diverting mixed waste in bulk towards incineration. In particular, the effect of landfill taxes needs to be assessed taking into account the variations of costs of alternative waste treatment operations. Moreover, the uncoordinated introduction of landfill taxes could create difficulties where neighbouring countries or regions introduce taxes at very different levels.

The role of landfill taxes should be explored in the context of this thematic strategy, despite the political sensitivity associated with fiscal measures in general. This would not necessarily imply the introduction of a harmonised Community landfill tax. Closer co-ordination between competent authorities in Member States could be a useful first step to address this issue. This could initially focus on building consensus concerning the effectiveness of landfill taxes and later develop criteria for closer alignment of taxes adopted at national level.

5.3.2. Producer responsibility

The 6EAP decision refers to producer responsibility as one of the three elements to be addressed in the context of the recycling strategy. On the basis of the analysis given in chapters 3.1 and 3.2.3, the Commission intends to hold an open debate on producer responsibility. This will clearly have to build on the experience gained in the context of the relevant initiatives at the Community, national and international levels.

The Commission recognises the merits of these initiatives which, in many cases, have been very successful. Therefore part of the debate should be whether and to what waste streams this approach can be extended. In addition, some specific aspects of producer responsibility should also be addressed in the context of this strategy:

- **impact on product design:** relatively little is known on the effects of producer responsibility to promote eco-design. There are indications that the use of producer responsibility for packaging has in certain countries led to a reduction in packaging quantities put on the market. This is probably the result of the incorporation of the cost of recycling into the production costs. Effects of individual producer responsibility as applied in the ELV and WEEE directives are largely unknown due to the recent date of their adoption;
- **individual vs. collective responsibility:** in sectors characterised by considerable product differentiation, individual producer responsibility may provide a significant incentive to modify product designs in order to promote recyclability or reduce waste generation while collective producer responsibility may make more sense for standardised and large volume products with a low value. The lifetime of a product

can also be important. The longer the lifetime of a product, the less likely it is that future costs will influence design decisions today;

- **impact on competition:** the Commission has recently adopted three decisions concerning "green dot" companies⁵⁶ due to concerns about the practical application of producer responsibility schemes. The implementation of the ELV and WEEE directives may give rise to further cases. This point was also highlighted in a recent report to the Swedish government, which noted that "statutory producer responsibility has given rise ... to monopoly tendencies..."⁵⁷. The way in which producer responsibility schemes favour or hinder competition should therefore be an important factor in future discussions in the context of this thematic strategy.⁵⁸

Finally, from the point of view of the Commission, the first directive to be addressed in this context is the Packaging and Packaging Waste directive. Contrary to the more recent directives on End-of-Life Vehicles and Waste Electrical and Electronic Equipment, this directive does not contain an obligation to introduce producer responsibility (compare section 3.1.). Given that most Member States have implemented the directive through some form of producer responsibility, it is a fair question whether this should not be harmonised on a Community level. On the other hand, harmonisation will also entail costs related to changing existing systems which have so far operated quite successfully. The results of this debate could then feed into a report called for by the European Parliament and the Council in the context of the ongoing revision of the Packaging directive.

The producer responsibility principle may also be included in the revisions of directive 91/157/EEC of 18 March 1991 on batteries and accumulators containing certain dangerous substances,⁵⁹ which several Member States have implemented through producer responsibility schemes.⁶⁰ Further waste streams may be targeted in the future, once the debate on this strategy is concluded.

For all the merits of producer responsibility described above, the Commission considers, however, that there are limits to its application. In particular, not all waste streams are appropriate to be addressed in this way. Moreover, addressing smaller waste streams through producer responsibility may involve significant resources (both in legislative/administrative and financial terms) for a relatively limited environmental benefit. This Thematic Strategy should therefore make an important contribution to clarifying the applicability of producer responsibility in different circumstances, building

⁵⁶ See Commission decision 2001/463/EC of 20 April 2001 relating to a proceeding pursuant to Article 82 of the EC Treaty (OJ L 166, 21.6.2001, p. 1) and Commission decision 2001/837/EC of 17 September 2001 relating to a proceeding under Article 81 EC Treaty and Article 53 EEA Agreement (OJ L 319, 4.12.2001, p.1) for the DSD case and Commission decision 2001/663/EC of 15 June 2001 relating to a proceeding under Article 81 of the EC Treaty and Article 53 of the EEA Agreement (OJ L 233, 31.8.2001, p. 37) for the Eco-Emballages case.

⁵⁷ SOU, 2001: *Resurs i retur - Slutrapport från utredningen för översyn av producentansvaret*, SOU 2001:102, Stockholm: Statens Offentliga Utredningar, p. 32.

⁵⁸ For a general discussion see H. Vedder, 2002: *Competition Law, Environmental Policy and Producer Responsibility*, Amsterdam: Centre for Environmental Law, University of Amsterdam.

⁵⁹ Council Directive 91/157/EEC of 18 March 1991 on batteries and accumulators containing certain dangerous substances, OJ L 78, 26.3.1991, p. 38.

⁶⁰ For example, the Belgian BEBAT system (<http://www.bebat.be/>).

on an assessment of existing schemes and of analytical work done at national and international level.

The first question to address is how to best combine more general and applicable tools such as economic instruments with existing legislation based on producer responsibility to move towards the goals of a more sound resource, waste and recycling policy. This should aim at attaining more environmental benefits with lower legislative and administrative requirements. More specifically on producer responsibility, comments and experiences on advantages and drawbacks of such schemes are invited along with ideas how existing systems can be improved and whether and to what waste streams the producer responsibility concept should be extended to. Comments are also welcome on the essential characteristics that producer responsibility systems developed at Community level should display in order to remain both effective and economic in terms of the administrative resources needed at Community and national levels.

5.3.3. Tradable certificates

Article 3 of the 6EAP calls for an analysis of the environmental efficiency of tradable environmental permits (also known as tradable certificates) as a generic instrument with a view to promoting and implementing their use where feasible. Tradable certificates have been widely used in environmental policy.⁶¹ However, they are a relatively new concept in the field of waste management.⁶² In the EU, only the United Kingdom has used them extensively, notably in the context of directive 94/62/EC on packaging and packaging waste. In addition, the UK is also introducing a system of tradable certificates to limit the amount of biodegradable municipal waste landfilled by local authorities.⁶³ Finally, the European Commission has in the past analysed the possibility of using tradable certificates to implement Community legislation in the field of waste management.⁶⁴

From an economic point of view, tradable certificates are generally favoured as providing the most cost-effective means to implement environmental objectives.⁶⁵ In addition, they give a long-term price signal which directs investment in new technologies.⁶⁶ Tradable certificates could also be a way to implement recycling targets at a Community level, for example in the context of a producer responsibility scheme. They would allow companies to fulfil their obligations by buying certificates both nationally and in other countries, either freely on the market or from recycling organisations. This would be one way to create an incentive to separately collect and recycle more waste at a lower cost by putting

⁶¹ For a review, see OECD, 1999: *Implementing Domestic Tradable Permits for Environmental Protection*, Paris: Organisation for Economic Co-operation and Development.

⁶² See OECD, 2001: *New areas for application of tradable permits: Solid waste management*, Paris: Organisation for Economic Co-operation and Development.

⁶³ See <http://www.defra.gov.uk/environment/waste/strategy/cm4693/index.htm>, chapter 5. A consultation document has been published at

<http://www.defra.gov.uk/environment/consult/tradeperm/pdf/tradable.pdf>.

⁶⁴ See ERM, 1999: *Tradable certificates for recycling of waste electrical and electronic equipment (WEEE)*, Brussels: European Commission.

⁶⁵ See, for example, Pearce, David W. and Turner, R. Kerry, *Economics of Natural Resources and the Environment*, Baltimore: Johns Hopkins University Press, esp. chapter 8.

⁶⁶ See, for example, Egenhofer, C. and Legge, T., 2002: *Greenhouse Gas Emissions in Europe, Conditions for Environmental Credibility and Economic Efficiency*, CEPS Task Force Report N. 43, Brussels: Centre for European Policy Studies.

into competition the various recycling organisations and other actors involved in the recycling chain.

While a system of tradable certificates is in principle feasible and cost-effective in this context, several practical aspects would need to be defined before it can be implemented. These include the scope of the scheme and the means of allocating recycling obligations. Effective monitoring and enforcement mechanisms would also have to be established, including penalties for non-compliance. Simplicity of the system would be an asset to promote the use of tradable certificates and to deter fraud.

The Commission intends to canvass opinion among stakeholders regarding the acceptability and feasibility of tradable certificates as a means to implement waste recycling targets. In parallel, the Commission will analyse the practical aspects referred to above.

5.3.4. Pay-As-You-Throw schemes

One of the options to encourage separate collection and, to a limited degree, quantitative waste prevention is the introduction of charging systems.⁶⁷ Pay As You Throw (PAYT) are a particularly interesting example. They are mainly applicable to household waste and similar MSW, e.g. waste from retail and small businesses. Pay-As-You-Throw (PAYT) schemes⁶⁸ rely on volume- or weight-based waste charges and have become increasingly popular. PAYT schemes provide citizens with an economic incentive to reduce the amount of “residual” waste they throw away because the cost of waste collection increases with the volume or weight of waste they dispose of. This encourages citizens to participate in separate collection schemes (since collection of recyclables is generally subject to a lower or zero charge), thus boosting recycling of MSW. PAYT schemes are therefore most effective where combined with the promotion of separate collection schemes for recyclable materials.

There is substantial evidence that PAYT schemes are an effective means to reduce the amount of “residual” waste disposed of by households, though the effect on waste generation is much more uncertain. In addition, many communities that have implemented PAYT schemes also reduce the overall costs of municipal waste management.

The introduction of PAYT schemes has raised concerns about potential increases in illegal dumping, as some citizens seek to circumvent the cost of disposing of their waste.⁶⁹ However, most communities that have introduced PAYT schemes have not

⁶⁷ See, for example, Ernst & Young, 2002: *Analysis of the Application of the Producer Pays Principle to Producers of Household Waste as a Driver Towards Sustainability, A Preliminary Discussion Document*, London: Ernst & Young; and Skumatz, Lisa A., 2002: *Variable-rate or “Pay-as-you-throw” Waste Management: Answers to Frequently Asked Questions*, Los Angeles: Reason Foundation.

⁶⁸ PAYT schemes are also referred to as variable-rate schemes or unit pricing schemes.

⁶⁹ See, for example, Tønning, K., 2001: *Vægtbaserede indsamlingssystemer for dagrenovation, Undersøgelse i Tinglev og Nørre Rangstrup Kommuner*, Miljøprojekt Nr. 645, Copenhagen: Miljøstyrelsen.

experienced large and sustained increases in illegal dumping. Moreover, this problem can be mitigated by appropriate accompanying measures.⁷⁰

The European Commission has funded a research project in this field, the objective of which is to provide a comprehensive analysis of the drivers, barriers and potentials of PAYT to identify workable ways for a successful introduction of such systems by urban decision-makers. The project will produce a guidebook aimed at decision-makers and institutions working on the development of policies to improve urban waste management.⁷¹

An issue to be clarified is the potential role of the Community in promoting such schemes. Financing of MSW management is often a politically sensitive issue and local conditions and preferences may vary. Inevitably, this raises questions about subsidiarity. The extent to which PAYT schemes could be mandated at Community level therefore requires careful analysis and consensus building among all parties concerned, involving especially local authorities.

5.3.5. Incentive systems

Incentive systems to encourage final consumers and industry to recycle waste have been designed at national and sub-national levels. These include for example programmes promoting Environmental Management Systems and encouraging the participation of SMEs or combinations of PAYT systems with tax rebate systems upon proof of participation in selective collection or home composting programmes. Other approaches seek to develop incentives for consumers based on rating, e.g. through eco-points systems, environmental friendly behaviour including participation in recycling programmes. National experiences in designing incentives for citizens and businesses to participate in recycling campaigns could possibly benefit from an exchange of information and debate at European level.

The Commission would welcome the views of Member States and stakeholders on the advantages of information exchange at European level concerning national incentive systems encouraging citizens and businesses to participate in recycling programmes. The Commission therefore welcomes input from all stakeholders with a view to carrying out an assessment of the possible role the Community could play to contribute to the development of these instruments.

5.3.6. Prescriptive instruments

In practice, landfill bans have the effect of diverting waste to other waste treatment techniques such as incineration, energy recovery or recycling. Which waste treatment operation they are diverted to would depend on the nature of the waste and on the relative costs of the remaining waste treatment options. Thus, such bans can in some cases be a way to allocate the cost of recycling or recovering waste to its final holder. The landfill directive already bans the landfill of tyres and partially bans landfill of biodegradable waste. Several Member States are implementing additional landfill bans. Bans decided at Community level could be a strong incentive for recycling. However, such measures

⁷⁰ Eunomia, 2001: *Costs for Municipal Waste Management in the EU*, Brussels: European Commission, p. 39.

⁷¹ For a description of the project, see <http://www.payt.net/>.

should be carefully assessed to ensure that the incentive is towards recycling and not towards incineration. Obligatory source separation of specific wastes is another possible method of allocating the cost of recycling to the final holder. Once waste materials are separated, it is usually economical to recycle them.

Views are invited on the application of these and any other instruments which could promote recycling.

5.4. A level playing field for recycling

Another main challenge facing Community waste policy is to move towards a level playing field across the EU for recycling guaranteeing a high level of environmental protection with recycling being supported by an efficient internal market.

To reach this objective it is necessary to adopt a limited number of measures at Community level for filling the waste recycling standards gap. These measures must guarantee that when recycling is performed in the EU (a) there are no unacceptable emissions to the environment and (b) a level of quality of recycling is reached.

These objectives could be to a large extent reached through the following measures:

- Extension of the IPPC directive to the whole waste sector: This directive already covers a limited number of waste recycling operations. Best available technique reference documents (BREFs) are currently being developed for these. The extension of this directive would initiate a bottom-up process by which BREFs would be developed for all waste management operations and the permits of recycling installations would be updated by permitting authorities to include emission limit values and other appropriate permit conditions based on best available technology. In this way one would move towards the harmonisation of environmental standards at the level of waste management installations.
- Determination of quality standards for recycling in Annexe IIA of the directive 75/442/EC on waste. This would complement the technical requirements set at facility level through extension of the IPPC directive. The quality requirements would condition whether a given treatment operation is classified as disposal or recovery. For example, a process that actually recycles only a minor part of the waste would not be classified as recovery.

Additionally, a limited number of processes could require the setting in legislation of EU-wide emission limit values. The BREFs would be appropriate documents for informing decisions on emission limit values for the corresponding processes as laid down in Article 18 of the IPPC directive. Furthermore, in cases where legislation is being developed for specific waste flows, requirements on the appropriate treatment of the waste could be included.

Comments and suggestions are welcome, in particular on whether the scope of the IPPC directive should be extended and in what way quality standards for recycling operations in Annex IIA of the waste framework directive could be set.

5.5. Accompanying measures

In addition to the options outlined above, which would constitute the main building blocks of the strategy, a number of accompanying measures can be foreseen. These fall into three broad categories:

- improving the legal framework;
- promoting research and development, as well as technology demonstration, and technology development;
- measures to promote demand for recycled materials.

5.5.1. *Improving the legal framework on waste management*

5.5.1.1 Definitions of recovery and disposal operations

Section 3.2.4 has indicated that there is a need to assess the existing definitions of recovery and disposal operations contained in the annexes to the WFD. These definitions are general in nature and leave a relatively substantial leeway for interpretation and this can have unwanted consequences for the recovery of waste in the Community. This exercise should cover all of the definitions including those concerning pre-treatment, reclamation, energy recovery and recycling of waste.

As regards changing the definition of energy recovery the Commission is of the opinion that this would have to be done in the framework of an amendment of Council Directive 75/442/EEC on waste, as amended. At this stage and taking into account the Court's interpretation, the Commission is reflecting on the need for any such proposals. The Commission also considers it could be useful to develop common guidelines concerning the application of Article 7(4) fifth indent of the waste shipment Regulation.⁷²

In addition, Community legislation does not contain a generally applicable definition of recycling. The waste framework directive remains silent on this point: it defines recovery as "any of the operations provided for in Annex II B" of this directive. A number of these operations use the word recycling, but the latter is never itself defined in the directive. It has therefore fallen to individual directives to define the meaning of recycling. Inevitably, the definitions contained in the above mentioned directives are not identical – the main difference relates to the explicit reference to organic recycling in some directives but not in others.

While this situation has not given rise to significant practical problems so far, a case currently pending before the European Court of Justice⁷³ suggests that the definition of recycling can have important practical implications. A generally applicable definition of recycling in Community legislation could therefore be useful in order to promote legal certainty and coherence among different legal acts in this area. The logical place to do so

⁷² This provision reads as follows: "if the ratio of the recoverable and non-recoverable waste, the estimated value of the materials to be finally recovered or the cost of recovery and the cost of the disposal of the non-recoverable fraction do not justify the recovery under economic and environmental conditions".

⁷³ See Opinion of Advocate General Alber delivered on 4 July 2002 in Case C-444/00 *The Queen v. Environment Agency and others*, esp. paragraphs 102ff.

would seem to be the waste framework directive. This would also provide an opportunity to address emerging processes in the field of organic recycling.

The Commission has already launched a study to provide the necessary technical information to develop possible options to revise annexes II A and II B of the waste framework directive, including the use of the definitions contained in these annexes to specify quality criteria for recycling. The study will be presented in interim form to a workshop gathering experts from Member States and from stakeholder organisations. The workshop will discuss how the Thematic Strategy should address the issues related to the definitions of recovery and disposal operations building on recent jurisprudence developed by the European Court of Justice. These discussions should also address the usefulness of a generally applicable definition of recycling and of developing common guidelines for the application of Article 7(4) fifth indent of Regulation (EEC) 259/93 as a means to fight against sham recovery.

Additionally, comments and suggestions are in particular welcome concerning the usefulness of developing common guidelines for the application of Article 7(4) fifth indent of Regulation (EEC) 259/93, as a means to fight against sham recovery.

5.5.1.2 Definitions of waste

The **definition of waste** contained in article 1(a) of the WFD is the keystone of waste legislation. This definition has been the subject of considerable discussion and the European Court of Justice has provided valuable guidance on the interpretation of this definition. However, debate about definition of waste is likely to continue. Moreover, article 8(2)(iv) of the 6EAP calls for a "clarification of the distinction between waste and non-waste."

The definition of waste is a legal construction which it may well be possible to improve. However, the criticisms levelled against the current definition are often of a general nature. For example, it is sometimes claimed that recyclable materials should be excluded from the definition because the economic costs of complying with waste legislation and the negative image linked to the term "waste" undermine the creation of a competitive recycling sector. However, these allegations are rarely supported by an assessment of the actual economic cost of compliance.

Moreover, compliance costs need to be weighed against the benefits of the additional control under the waste regime. These control requirements prevent abuse, e.g. in cases of contamination of otherwise non-hazardous and commercially valuable secondary waste materials. The current definition aims at ensuring a high level of protection of the environment, i.e. it is based on the consideration that when a material is discarded it might be used or treated in a way that could harm the environment and must therefore be considered as waste. Thus, potential solutions proposed for the improvement of the definition of waste would have to ensure that the objective of a high level of protection of the environment is not undermined. In particular, if certain waste flows were to be considered as a product at a given stage, this could only be the case when the material does not display particular risks for the environment that are related to the waste nature of the material.

Additionally, it is probable that because of the subjective nature of the concept of waste, any improved definition would still contain at least some degree of ambiguity. One way to mitigate the ambiguity of the current definition of waste could be to add to the general definition objective criteria that determine when a specific material or object becomes waste. Similarly, objective criteria could be developed to indicate when a given waste should no more be considered as waste unless the material itself is again discarded; the latter could be the case for example if there is no market for the recovered material. This transition between waste and non-waste is also linked to the definition of recovery operations, discussed in the preceding section, since the point at which the recovery operation is deemed to be complete is one of the factors that determine whether the material is still subject to “discarding”. However, such an approach would have to be limited to key products and waste flows to avoid a potential inflation of technical provisions defining wastes.

Because of the inherent uncertainty embedded in the definition of waste, it also appears desirable to limit the economic costs related to implementation of waste legislation as much as possible in all cases when this is appropriate from an environmental and economic perspective. This could be achieved by systematically exploiting such possibilities offered by the existing legal framework. This concerns in particular the possibility to derogate from the permit requirement foreseen in Article 11 of the waste framework directive and in Article 3 of the hazardous waste directive. So far, the Commission has received only one notification from Member States that this Article is being used for non-hazardous waste. As regards applying permit exemptions to the recovery of hazardous waste, only one notification has been received and approved by the Commission⁷⁴. Similarly, little use seems to be made of Article 9 of the waste shipment regulation, which provides a specific regime entailing a substantial reduction of delays for shipments destined for recovery in so-called “pre-consented facilities”.

Finally, common guidelines on the application of the definition of waste could assist Member States in applying the definition of waste case by case and mitigate any market distortions that would be related to non harmonious application of the definition in different Member States.

The Commission is ready to hold a debate on the definition of waste. This needs to take into account that amending the waste definition would have far reaching consequences and it is probable that any new definition would also contain a certain degree of uncertainty. Thus, discussion on the virtues and drawbacks of the current and alternative definitions should also cover possibilities to ease the application of the definition and reduce compliance costs. This could include (a) the development of objective criteria to establish when certain products become waste or to establish that recovery of certain wastes has been completed, (b) systematic application of exemption possibilities offered by the current legal framework, and (c) the elaboration of common guidelines for the application of the definition by Member States on a case by case basis. Finally, any proposal for improvement should include clear evidence that the current definition entails unjustified implementation costs or otherwise has negative consequences as well

⁷⁴ Commission Decision of 13 November 2002 on Italian rules waiving permitting requirements for undertakings and establishments recovering hazardous waste under Article 3 of directive 91/689/EEC on hazardous waste, OJ L 315, 19.11.2002, p.16.

as a clear demonstration that a high level of protection of the environment is ensured through the alternative proposal.

5.5.2. R&D and technology demonstration

Technology is an important enabling factor for better waste management. In relation to recycling, advances in certain areas, such as automated sorting techniques, could reduce the cost and increase the effectiveness of recycling for certain waste streams, e.g. mixed plastics. Moreover, there is still significant innovation in recycling processes in certain sectors for wastes that are less readily recycled, e.g. concerning chemical recycling of plastics or recycling of tyres. Furthermore, where existing recycling processes have negative impacts on the environment new cleaner processes have to be developed to replace them. Similar efforts are necessary when new products and new processes are developed, both to ensure the recyclability of the new wastes generated and to develop appropriate processes for their recycling. The Forum on the competitiveness of the recycling industry has underlined some R&D actions which should be supported and promoted.

However, other factors are generally much more important in determining the effectiveness of a recycling scheme. This includes a clear legal and economic framework.⁷⁵ Logistics is also an important element. For example, the degree to which certain waste fractions (paper, plastics, biodegradable waste) can be recycled or composted depends to a large extent on their homogeneity and purity. This is in turn largely influenced by the effectiveness of separate collection systems.

In relation to waste prevention, technologies aimed at making more efficient use of resources are necessary to significantly reduce the amounts of waste produced. New clean technologies would allow more recycling of waste in situ, reducing the consumption of water, chemicals, energy and other materials. In addition, appropriate economic incentives, notably through price signals, will tend to provide the most powerful incitement to economic operators to modify their resource use patterns which would also encourage efforts in R&D.

According to recent work by the OECD⁷⁶ that was supported by the Commission over the last decade, modern biotechnology could play a role for achieving waste prevention and recovery. This could include possibilities for cleaner products and processes, thus reducing the generation of wastes, and facilitating the elimination and/or recycling of such wastes.

⁷⁵ The importance of legal certainty to promote investment in recycling capacity was emphasised in the evidence provided by the waste management industry to a parliamentary enquiry concerning the disposal of refrigerators in the UK. See House of Commons, 2002: *Environment, Food and Rural Affairs Committee, Disposal of Refrigerators - Fourth Report*, HC 673, London: The Stationary Office, esp. Minutes of Evidence, 26 March 2002 (Evidence from Peter Jones, Biffa). It also emerged as an important element in the evidence provided to the another UK parliamentary enquiry into the management of hazardous waste. See House of Commons, 2002: *Environment, Food and Rural Affairs Committee, Hazardous Waste – Eight Report*, HC 919, London: The Stationary Office, esp. p. 10, paragraph 16, and p. 13, paragraph 29.

⁷⁶ See OECD following reports by the OECD: *Biotechnology for a clean environment*, 1994; *Biotechnology for clean industrial products and processes: towards industrial sustainability*, 1998; *The application of biotechnology to industrial sustainability*, 2001.

Further research concerning waste prevention, collection and recycling technologies on certain clearly identified issues, such as the environmental impacts of waste management (transport, recycling, recovery and disposal) can be useful, but a dedicated initiative to promote research and development in this field does not seem warranted. Full use should be made of existing programmes, mainly the LIFE-Environment programme and the 6th Framework Programme (FP6) on Research and Development. These are largely complementary, with the later focusing on the technological research and development, while LIFE supports technology demonstration projects. Many projects addressing waste collection and recycling have been and are currently funded within the FP and LIFE-Environment programme. It will therefore be important to identify themes for future research within the relevant thematic priorities of FP6 and to ensure that the LIFE guidelines reflect the priorities for the recycling strategy as this develops.

5.5.3. Demand-side measures

Demand for recycled materials is affected by many factors, from consumer perceptions to product specifications, public procurement rules and corporate purchasing patterns. The generally decreasing trend in the price of many primary raw materials has also slowed down the uptake of recycled materials. However, the use of recycled materials is one factor among others which affect the life-cycle performance of products. Proposals to introduce demand-side measures should therefore be based on a life-cycle perspective. Moreover, many of the measures mentioned in this paragraph are already being analysed in the context of the “toolkit” provided by Integrated Product Policy (IPP). The Commission therefore intends to continue to analyse these measures in the context of IPP, rather than launching a parallel discussion in the context of this thematic strategy.

A measure that is often mentioned in this context is the requirement for minimum recycled contents. While this would undoubtedly stimulate demand, the implementation of this measure would be difficult to enforce and verify because it is often very difficult to distinguish between recycled and virgin material in the final product. Moreover, there are questions about compatibility of such requirements with WTO rules as this might oblige third countries to use recycled material although such material might not be easily available there. Finally, minimum content requirements would involve detailed and potentially complex regulatory requirements. Often, there may be technical reasons against such a requirement in specific applications and the legislator may not have all the necessary information to assess whether this is the most effective solution from an environmental point of view.

For these reasons, it may be more suitable to stimulate the supply-side, inter alia by providing financing for separate collection, and allowing market forces to determine where the resulting materials can most effectively be used.

5.5.4 Education and training

People play a key role for the implementation of waste prevention and waste recycling policies. Education and training are important factors determining their understanding of the issues related to waste prevention and recycling. Awareness campaigns developed by national, local and regional authorities have already been addressed in this Communication. However, integration of environmental concerns in general and waste management aspects in education and training programmes would be important elements to promote the implementation of policies in the area of waste prevention and recycling.

The Commission would welcome the views of Member States and stakeholders on the advantages of information exchange at European level concerning national education and training programmes in the area of waste prevention and recycling. The Commission therefore welcomes input from all stakeholders with a view to carrying out an assessment of the possible role the Community could play to contribute to the development of these initiatives.

5.6. Conclusion and proposed way forward

This chapter has analysed possible lines of action for the future thematic strategy on the prevention and recycling of waste, which are structured around four “building blocks”. In the field of waste prevention, the main questions about which the Commission seeks comment from stakeholders are:

- how to best identify the areas where prevention can be achieved and assess the magnitude of the potentials for waste prevention;
- the identification of the measures, whether economic instruments or other, for achieving waste prevention targets, and the level of support of the respective legislators for such measures;
- whether measures to promote prevention can be seen independently of action in relation to the use of resources and IPP, or whether the latter provide the appropriate framework for action to achieve this objective.

The answers to these questions largely determine the extent to which different instruments can be used. The Commission therefore sees the upcoming consultation process concerning this thematic strategy as an occasion to achieve a better understanding of the potential for progress in relation to waste prevention including the building of an understanding of how IPP may contribute to waste prevention and an assessment of other instruments that could become integral part of the Thematic Strategy.

For recycling, the main question that arises concerns the best instruments to provide appropriate economic incentives. In addition, if the latter cannot be put into place, additional regulatory measures would need to be considered. Moreover, the Commission does not exclude a limited number of specific legislative initiatives to promote recycling where this is the most effective approach for environmental, economic or technical reasons. Such initiatives could complement existing legislation with an approach focussing on waste materials rather than on end-of-life products. The Commission in particular invites comments on:

- the scope for using economic instruments, including fiscal measures, to achieve recycling objectives;
- where legislative initiatives are contemplated, the scope for providing greater flexibility in order to achieve recycling targets in the most cost-effective way. This includes the potential role of tradable certificate systems;
- the potential for further development of the producer responsibility principle, taking into account that this principle is not suitable for all waste streams.

Several of the measures described in this chapter would only be workable if there was a clear identification of waste flows, materials or end of life products which recycling would generate high environmental benefits. A detailed list of such wastes has not been established to date. A study is currently underway which will inter alia aim at identifying recycling potentials. Nevertheless, on the basis of existing studies, at this stage a preliminary list of criteria to identify potential waste streams requiring additional measures could already be established for further discussion and elaboration in the consultation process. Such criteria could include amounts, rate of growth, hazardousness, GHG contribution, etc.

6. ENVIRONMENT AND HEALTH

The environmental benefits associated with recycling are also expected to deliver benefits for human health. For example, a recent study about the recycling of packaging waste showed that the main environmental benefit from recycling of one type of plastic bottles is the avoided emissions of aerosols and particulate matter, both of which are important contributors to the health impact of air pollution.

However, like other industrial activities, recycling also has an impact on the environment and human health, for example due to transport of waste during collection, emissions to air and water of the recycling process and the generation of residual waste – in general, a fraction of the waste being recycled can not be further recovered and is therefore landfilled or incinerated. When assessing the benefits of recycling, it is important to look at net benefits, i.e. total avoided impacts minus additional impacts due to recycling. The latter can in certain cases be significant and can imply the need for statutory environmental standards for the recycling process itself. Moreover, whether recycling delivers significant benefits for human health depends on a number of factors and can only be established on a case-by-case basis. In some cases, the health benefits may be marginal.

Finally, the use of hazardous substances in products which are subsequently recycled, e.g. into construction products (combustion ashes, hazardous waste injected in cement kilns, etc.) could lead to accumulation of dangerous substances, such as Persistent Organic Pollutants (POPs) and heavy metals, in the human environment. Current knowledge about this phenomenon needs to be improved. Appropriate standards on the health and safety of products are already in place in many cases, such as in the context of the construction products directive⁷⁷ and the directive of food contact materials.⁷⁸ These standards should not discriminate against recycled materials, which should be subject to the same requirements imposed on primary raw materials. Qualitative waste prevention is also important in this context, notably through the implementation of the future REACH system (see section 5.2.2.).

⁷⁷ Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products, OJ L 40, 11.2.1989, p.12.

⁷⁸ Council Directive of 21 December 1988 on the approximation of the laws of the Member States relating to materials and articles intended to come into contact with foodstuffs, OJ L 40, 11.2.1989, p.38, which is complemented by specific directives concerning a number of materials, such as plastics, paper, ceramics, etc.

7. ENLARGEMENT

The enlargement of the EU will increase the diversity of waste management practices in the Community as well as the size of the waste recovery market. Acceding and Candidate countries will in future account for an important part of this market.

Implementation of the *acquis* is a key driver for the development of new waste management strategies and policies by Acceding and Candidate countries. Households and businesses will increasingly be sorting their waste and recycling will increase for packaging and other waste flows regulated by Community legislation such as end-of-life vehicles and waste electric and electronic equipment. This will in turn drive cultural changes in attitudes towards waste and the environment in general in Acceding and Candidate countries like in today's Member States. Furthermore, while emerging new consumption patterns are likely to lead to increases in the current low level of generation of municipal waste, implementation of the *acquis* will benefit the environment of Acceding and Candidate countries as environmental impacts of waste treatment will reduce significantly in particular thanks to implementation of the IPPC, landfill and incineration directives.

The diversity of the environmental requirements that are applied to recycling operations in the Community will also increase. Concerns of Member States and Candidate Countries concerning risks of standards dumping (see section 3.2.4) have materialised in agreements reached in the accession negotiations concerning a number of temporary restrictions of shipments of waste to Acceding and Candidate countries. The creation of a level playing field as envisioned in this Communication will ensure an appropriate framework for the development of the recycling industry in all Member States and Acceding and Candidate Countries.

Furthermore, the development of such harmonised environmental requirements for recycling will avoid divergence of national policies which would lead to islands of high or low environmental protection with lower protection of the environment in the EU taken globally.

8. INTERNATIONAL CO-OPERATION CONCERNING RECYCLING

There are two main fora for co-operation at international level concerning waste recovery and recycling:

- Within the OECD the Working Group on Waste Prevention and Recycling (WGWPR) addresses issues on transboundary shipments of waste and on the economics of waste. The WGWPR is also a forum for the exchange of information on good practices. Currently, this working group is preparing a draft OECD recommendation on the environmentally sound management (ESM) of waste. This recommendation would encourage OECD member countries to develop ESM programmes including the implementation of certain internationally agreed guidelines and the development of programmes designed to help recycling businesses to implement so-called *core performance elements*. Environmental Management Systems are an important part of the latter.

- At global level, the Basel Convention has developed a number of guidelines for the environmentally sound management of a number of wastes and is developing more of such these guidelines. Additionally, the Convention has developed a Strategic Plan which implementation will include co-operation projects aiming at helping developing countries to implement environmentally sound management of waste.

9 EXTENDED IMPACT ASSESSMENT

On 5 June 2002, the Commission published a Communication from the Commission on impact assessment⁷⁹, which introduces a new impact assessment process. This process aims at improving the quality of Commission proposals and at improving and simplifying the regulatory environment.

The Thematic Strategy on the prevention and recycling of waste will be subject to an extended impact assessment.

Within the framework of the consultation on this Communication stakeholders are given the opportunity to communicate in writing their positions and concerns on environmental, economic, financial and social aspects related to this Communication. In particular, the Commission invites interested parties to comment on the selected policy options outlined in section 5 of this Communication.

10. FUTURE DEVELOPMENT OF THE STRATEGY

This Communication describes strategic options to develop the Community's policy, in relation to waste prevention and recycling. It builds on current achievements and seeks to identify actions which maximise the environmental benefits in a cost effective and flexible manner.

On the basis of the analyses developed in this Communication and the outcome of the consultation process, the Commission will propose in 2004 a comprehensive Community Thematic Strategy on the prevention and recycling of waste. Some of the measures discussed in this Communication may proceed before the full strategy is adopted, due to their link to other policy measures.

This document should be seen as the starting point of a consultation process which will continue until the Commission adopts proposals both for the overall framework of the thematic strategy and for the individual measures through which the latter will be implemented. Its objective is to launch a debate among the Community's Institutions and all interested stakeholders concerning the future orientations of policy in these fields.

⁷⁹ Communication from the Commission COM(2002)279 of 5.6.2002 on impact assessment.

Stakeholders are invited to provide comments on this Communication, in particular on the building blocks identified in section 5, and to make more general comments or suggestions concerning issues relevant to waste prevention and recycling. Comments can be submitted to the following address, preferably by email in a widely used format (MS Word, Adobe Acrobat PDF, HTML, etc.) until 30 November 2003:

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Annex I: EC waste legislation

Introduction

EC waste legislation can be divided into three main categories:

- horizontal legislation;
- legislation on waste treatment operations;
- legislation on specific waste streams.

Each category serves a specific role: horizontal legislation establishes the overall framework for the management of waste, including definitions and general principles. The objective of this legislation is to set the overall requirements that apply to all waste management operations, e.g. permitting of waste treatment facilities, and to provide the "common vocabulary" necessary to allow a uniform implementation of waste legislation across the Community. However, due to its very general nature, this horizontal legislation cannot take into account the specificity of all waste management operations nor of all waste materials.

It is therefore complemented by more detailed legislation in two areas:

1. legislation concerning waste treatment – including disposal – operations, such as the landfill and incineration directives;
2. legislation to regulate the management of specific waste streams. This legislation has been motivated by one or more of the following considerations:
 - the growing volumes or complexity of some waste streams, e.g. packaging, end-of-life vehicles and waste electrical and electronic products;
 - the need to subject them to specific controls due to their hazardousness, e.g. certain types of batteries, PCBs;
 - the fact that their uncontrolled use can have harmful effects on human health and the environment, e.g. the uncontrolled spreading of sewage sludge on agricultural land.

In several cases, Community waste legislation is partly motivated by the need to ensure the effective functioning of the Internal Market as different requirements adopted at national level could lead to barriers to trade or distort competition. This is for example the case for product-related requirements, such as restrictions on the contents of dangerous substances in certain products (mercury in batteries) and recycling targets for certain end-of-life products (packaging).

This annex describes the main provisions of each category of EC waste legislation. The objective is not to be comprehensive, but rather to provide an overview of the main elements.

Horizontal legislation

Horizontal legislation establishes the overall framework for the management of waste. Council directive 75/442/EEC of 15 July 1975 on waste⁸⁰ (the "waste framework directive" or WFD) includes the main definitions and principles concerning waste management. It was comprehensively revised in 1991⁸¹ and again in 1996 to update the disposal and recovery operations listed in annexes II A and II B.⁸²

In essence, the WFD requires Member States to give priority to waste prevention and to encourage re-use and recovery of waste. Member States must also ensure that waste is recovered and disposed of without endangering human health and without using processes or methods which could harm the environment. The directive also requires Member States to draw-up waste management plans and to establish a system for the authorisation of waste management installations. The WFD defines waste as "any substance or object in the categories set out in Annex I which the holder discards or intends or is required to discard." Annex I of the WFD lists 16 categories of waste.⁸³

Council directive 91/689/EEC of 12 December 1991 on hazardous waste,⁸⁴ as amended, complements the waste framework directive for hazardous waste. Annex III of the directive lists 14 properties of waste which render them hazardous within the meaning of the directive.⁸⁵ The directive also contains substantive requirements concerning, for example, the permitting of installations handling hazardous waste. In general, the hazardous waste directive does not significantly augment the substantive requirements of the waste framework directive as regards permitting and registration of waste management installations. However, it contains additional requirements concerning, for example, limitations of mixing of hazardous waste, record keeping and the shipment of waste at national level, which must be accompanied by a tracking form.

The WFD and the directive on hazardous waste are the basis for the list of wastes and of hazardous wastes.⁸⁶ This list is applicable for the purposes of, for example, the permit requirements of the waste framework directive.

The Community has also adopted legislation concerning the cross-border shipment of waste. The main legal instrument in this field is Council regulation (EEC) No 259/93 of 1 February 1993 on the supervision and control of shipments of waste within, into and out of the European Community,⁸⁷ as amended. This regulation implements the Community's

⁸⁰ Council directive 75/442/EEC of 15 July 1975 on waste, OJ L 194, 25.7.1975, p.39.

⁸¹ Council directive 91/156/EEC of 18 March 1991 amending directive 75/442/EEC on waste (OJ L 78, 26.3.1991, p. 32).

⁸² Commission decision 96/350/EC of 24 May 1996 adapting Annexes IIA and IIB to Council directive 75/442/EEC on waste (OJ L 135, 6.6.1996, p. 32).

⁸³ Such as "Production or consumption residues not otherwise specified below" (Q1), "Materials spilled, lost or having undergone other mishap, including any materials, equipment, etc., contaminated as a result of the mishap" (Q4), "Residues of industrial processes (e.g. slags, still bottoms, etc.)" (Q8) and "Any materials, substances or products which are not contained in the above categories" (Q16).

⁸⁴ Council directive 91/689/EEC of 12 December 1991 on hazardous waste, OJ L 377, 31.12.1991, p. 20.

⁸⁵ Such as explosive (H1), flammable (H3-B), carcinogenic (H7), teratogenic (H10) and ecotoxic (H14).

⁸⁶ Commission Decision of 3 May 2000 (OJ L 226, 5.9.2000, p. 3) as last amended by Council Decision 2001/573/EC, superseded the previously existing lists.

⁸⁷ Council Regulation (EEC) No 259/93 of 1 February 1993 on the supervision and control of shipments of waste within, into and out of the European Community, OJ L 30, 6.2.1993, p. 1.

international obligations arising from the Basel Convention⁸⁸ and the OECD Decision⁸⁹ which apply to shipments of waste. The regulation incorporates the internationally agreed principle that waste should be treated in an Environmentally Sound Manner (ESM) and bans shipments of hazardous waste from EU countries to non-OECD countries. Furthermore, it lays down the procedures and requirements concerning the all transboundary shipment of wastes destined for recovery and for disposal. In essence, for shipments within the EU area, the requirements are intended to apply the proximity and self-sufficiency principles to waste destined for disposal, while allowing a more liberal regime for wastes destined for recovery.

The Basel Convention, OECD Decision and the waste shipment regulation are the origin of a second system of lists of waste that are specifically used for the control and supervision of transboundary shipments of waste.

Waste treatment operations

The second category of the legal framework on waste concerns waste treatment operations, including disposal. Directive 1999/31/EC of 26 April 1999 on the landfill of waste⁹⁰ ("the landfill directive") sets out a number of administrative requirements, including permit conditions, technical requirements and environmental standards applying to landfills accepting various categories of waste (inert, non-hazardous and hazardous waste). Moreover, the directive contains a number of targets concerning the reduction of biodegradable waste disposed of in landfills and bans the landfilling certain types of waste, such as liquid wastes, infectious waste and most tyres. Member States are obliged to define a strategy to achieve these objectives at the latest by 16 July 2003. The landfill directive also requires all costs relating to the establishment, operation and closure of a landfill are internalised into the price charged by the operator.

Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste⁹¹ ("the incineration directive") replaces three older directives⁹² and thus consolidates the Community's legal requirements concerning the incineration and co-incineration of waste of non-hazardous and hazardous waste. The directive establishes the permitting conditions for incineration plants, including under abnormal operating conditions, as well as limit values in relation to, for example, emissions to air and discharges to water. The directive includes requirements concerning the delivery and reception of waste and concerning the management of incineration residues, including the requirement that when appropriate the residues be recycled. Finally, it also includes requirements on control, monitoring and measurement.

⁸⁸ Basel Convention on the control of trans-boundary movements of hazardous wastes and their disposal, adopted by the Conference of the Plenipotentiaries on 22 March 1989.

⁸⁹ OECD Council Decision C(92)39/FINAL on the control of the trans-boundary movements of wastes destined for recovery operation. This Decision has been revised to harmonise it with the Basel convention by OECD Council Decision C(2001) 107/FINAL. The Commission is preparing proposals for adaptation of regulation (CEE) 259/93 to these changes.

⁹⁰ Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste, OJ L 182, 16.7.1999, p.1.

⁹¹ Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste, OJ L 332, 28.12.2000, p.91.

⁹² Council directive 94/67/EC of 16 December 1994 on the incineration of hazardous waste (OJ L 365, 31.12.1994, p.34), Council directive 89/369/EEC of 8 June 1989 on the prevention of air pollution from new municipal waste incineration plants (OJ L 163, 14.6.1989; p. 32) and Council directive 89/429/EEC of 21 June 1989 on the reduction of air pollution from existing municipal waste incineration plants (OJ L 203, 15.7.1989, p. 50)

In addition, a number of waste treatment operations fall within the scope of Council directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control⁹³ ("the IPPC directive"). These are mainly hazardous waste recovery operations, the incineration of waste, with or without energy recovery, and certain waste disposal operations, including landfilling of waste.

As part of the implementation of the IPPC directive, the Commission is developing a number of Best Available Technique Reference (BREF) documents. In practice, permits issued to waste treatment installations falling within the scope of the IPPC directive have to be based on Best Available Techniques (BAT) as described in the corresponding BREF document (or other recognised publications), although competent authorities can derogate from BAT to a certain extent because of local conditions. One BREF document will cover mainly recovery of hazardous waste, preparation for energy recovery and disposal of waste. Another BREF document will be dedicated to waste incineration.

As a general rule, recovery and, in particular, recycling of non-hazardous waste and many types of hazardous waste and the related preparatory operations are not included in the scope of the IPPC directive and will therefore not be covered by BREF documents. Although some of these operations are covered by other BREFs, e.g. use of recovered paper in paper production⁹⁴ or of metal scrap in metal production,⁹⁵ waste-related aspects tend to be covered only partially or with limited depth.

The IPPC directive lists among the basic obligations of the operator that waste production is avoided in accordance with Council directive 75/442/EEC of 15 July 1975 on waste. Moreover, the use of low-waste technology and the use of less hazardous substances are listed among the considerations that should be borne in mind when determining Best Available Techniques (BAT) in accordance with the IPPC directive. This means the latter will be an important instrument to promote waste prevention in the industrial sector, although it is not yet possible to estimate the significance of this impact due to the early stage of implementation of the directive.

The landfill, incineration and IPPC directives are currently at various stages of implementation. These directives all make a distinction between "existing" and "new" installations. The former are generally granted a transition period to implement the requirements of the applicable directive, while the latter have to comply immediately with the relevant requirements of the applicable directive. For example, for the purposes of the landfill directive, any landfill in operation or for which a permit has been granted before 16 July 2001 is considered an "existing" landfill, while any landfill authorised after this date is considered a new landfill. Existing non-hazardous waste landfills have until 16 July 2009 to comply with the requirements of the landfill directive. Similarly, the incineration directive foresees a transitional period for existing incinerators until 28 December 2005, while the IPPC directive grants a transitional period for existing installations until 30 October 2007.

⁹³ Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control, OJ L 257, 10.10.1996, p.26.

⁹⁴ See the BREF document for pulp and paper manufacture at <http://eippcb.jrc.es>

⁹⁵ See the BREF document on ferrous metals processing at ftp://ftp.jrc.es/pub/eippcb/doc/fmp_bref_1201.pdf and that for non-ferrous metals processing at <http://eippcb.jrc.es>.

Specific waste streams

It would be beyond the scope of this document to exhaustively list and describe all Community legal instruments dealing with specific waste streams, even though most of them have at least a potential impact on recycling activities. Where an individual legal instrument is relevant to a specific point covered in this document, it will be discussed in the corresponding section. This section is therefore limited to the most important legal instruments and focuses on their provisions that directly affect recycling.

European Parliament and Council directive 94/62/EC of 20 December 1994 on packaging and packaging waste⁹⁶ is perhaps the best known directive concerning a specific waste stream. It is certainly the one for which most practical experience exists. The directive sets quantitative targets for the recovery and recycling of various packaging materials. These targets are currently being revised, with a view to their substantial increase. The Commission initiated this review⁹⁷ on the basis of studies of the environmental and economic costs and benefits of recycling, which aimed at identifying optimum recycling rates. This has led the Commission to propose differentiated recycling targets for each of the materials covered by the directive, taking into account the different environmental and economic costs/benefits of each material.

Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of-life vehicles⁹⁸ ("the ELV directive") is currently being implemented by Member States. The directive also includes a number of targets for recycling. Article 7(2)(a) provides for a "re-use and recovery" target of 85% and a "re-use and recycling" target of 80%, both of which should be achieved by 1 January 2006. Article 7(2)(b) provides that these targets shall be increased to 95% re-use and recovery and 85% re-use and recycling by 1 January 2015. This directive is the first piece of Community legislation making producer responsibility mandatory.

The directive on Waste Electrical and Electronic Equipment (WEEE) adopted in January 2003⁹⁹ contains a number of targets concerning the recovery of WEEE – these are described in Article 6 and must be met by 31 December 2006. The recycling targets range from 50% to 80% depending on the type of equipment and recovery rates are also set for the different types of equipment. This directive also makes producer responsibility mandatory.

Council directive¹⁰⁰ 75/439/EC of 16 June 1975 on the disposal of waste oils as amended by 87/101/EEC contains a requirement that where technical, economic and organisational constraints so allow, Member States shall take the measures to give priority to the processing of waste oils by regeneration.

⁹⁶ European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste, OJ L 365, 31.12.1994, p. 10.

⁹⁷ 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 of 07.12.2001, OJ C 103, 30.4.2002, p.17.

⁹⁸ Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of-life vehicles, OJ L 269, 21.10.2000, p. 34.

⁹⁹ Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE), OJ L 37, 13.2.2003, p.24.

¹⁰⁰ Council Directive 75/439/EEC of 16 June 1975 on the disposal of waste oils, OJ L 194, 25.7.1995, p. 23.

Community legislation regulating End-Of-Life (EOL) products and waste streams have also addressed waste prevention. Directive 94/62/EC on packaging and packaging waste¹⁰¹ is one of the few Community legislative instruments that explicitly addresses quantitative prevention. One of the essential requirements contained in this directive states that “packaging shall be so manufactured that the packaging volume and weight be limited to the minimum adequate amount to maintain the necessary level of safety, hygiene and acceptance for the packed product and for the consumer.”

Qualitative prevention is an important objective of a number of directives on EOL products. These include directive 91/157/EC on batteries and accumulators containing certain dangerous substances,¹⁰² directive 2000/53/EC on end-of-life vehicles¹⁰³ and the directive on the Restriction of certain Hazardous Substances (RoHS) in electrical and electronic equipment.¹⁰⁴ Their impact is not limited to end-of-life products alone, since restrictions on the use of hazardous substances in the relevant products will also feed through into less hazardous production waste.

¹⁰¹ European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste, OJ L 365, 21.12.1994, p.10.

¹⁰² Council Directive 91/157/EEC of 18 March 1991 on batteries and accumulators containing certain dangerous substances, OJ L 78, 26.3.1991, p.38.

¹⁰³ Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of-life vehicles, OJ L 269, 21.10.2000, p.34.

¹⁰⁴ Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, OJ L 37, 13.2.2003, p. 19.

Annex II: trends in waste generation and management

Overall assessment

The objective of this annex is to describe the current state of our knowledge about waste generation levels and trends, at the level of the EU and of its Member States. Available data are summarised both for waste generation as a whole and for major waste streams.

Any discussion about trends in waste generation and management needs to take into account the shortcomings that characterise statistics in this field. In this context, a distinction needs to be made between the statistics describing the situation at national level and those describing the situation in the EU as a whole.

Most EU Member States collect statistics about waste generation. Some Member States have collected comprehensive statistics for some time. In Denmark, the ISAG (Information System for Waste and Recycling) system was first implemented in 1993. The eighth report, containing data for the year 2000 together with projections for waste generation and management up to 2020, was published in 2002.

Other Member States have made significant efforts in recent years to improve the quality of statistics available at national level. For example, the United Kingdom launched its first national waste production survey in 1999, which provided a first reliable assessment of waste generation by industry and commerce in the United Kingdom. This is complemented by regular surveys of Municipal Waste Management.¹⁰⁵ Similarly, the *Millennium Report* published by the Irish Environmental Protection Agency states that “[c]onsiderably more is known about waste management in Ireland now than was known in 1996. The scarcity of reliable, complete and up-to-date data on waste was identified as a key problem at that time. Two comprehensive surveys have since been conducted by the EPA, with national level information now available for 1995 and 1998. The waste information deficit has, therefore, largely been addressed.”¹⁰⁶

Notwithstanding these improvements, the quality and scope of the data available at national level is variable and it is recognised that there is considerable room for improvement. Moreover, data is often reported with significant time-lags. For example, the most recent data reported in the latest compendium of environmental statistics for Germany are for 1998.¹⁰⁷

Statistical data at Community level suffers from a number of shortcomings, including incomplete coverage and lack of harmonisation. These problems are widely recognised. For example, a report published by the EEA in 1999 states that “[d]etailed analysis of developments in waste generation, waste management and waste minimisation is hampered by the lack of comparable definitions and statistical information across Europe. Even for municipal waste and household waste, which are normally thought of as areas with good statistics, confusion prevails.”¹⁰⁸ The latest environmental assessment report published by the

¹⁰⁵ See Environment Agency for England and Wales, 2002: *Strategic Waste Management Information – Waste Statistics for England and Wales 1998-99*, Bristol: Environment Agency for England and Wales.

¹⁰⁶ Irish EPA, 2000: *Ireland's Environment – A Millennium Report*, Dublin: Irish Environmental Protection Agency, p. 55.

¹⁰⁷ Umweltbundesamt and Statistisches Bundesamt, 2002: *Environmental Data, Germany 2002*, Berlin: Umweltbundesamt and Wiesbaden: Statistisches Bundesamt, p. 21.

¹⁰⁸ EEA, 1999: *Baseline projections of selected waste streams - Development of a methodology*, Technical report No 28, Copenhagen: European Environment Agency, p. 6.

EEA also states that “[d]ata limitations prevent a comprehensive assessment of most of the waste streams in Europe.”¹⁰⁹ A recent publication from the OECD similarly states that “available data on waste generation and management are limited.”¹¹⁰ The lack of harmonised statistics in the field of waste management was also highlighted in the Commission’s recent report on the ‘open list’ of environment-related headline indicators, which the available data on recycling rates for various materials is incomplete or not sufficiently up to date.¹¹¹

The Waste Statistics Regulation¹¹² is intended to close these gaps in our knowledge of waste generation and will provide a legal basis for a complete statistical data collection on waste generation and treatment in the Community. In the Commission’s five-year statistical programme, implementation of the Regulation is regarded as a priority task within the European Statistical System.

The Regulation comprises three technical annexes in which the data collection is described. The annex on waste generation will provide a table on waste generation for about 40 different waste category-groups. Data will also be classified according to origin by households and circa 20 economic activities using the NACE-classification¹¹³. The annex on waste treatment will provide tables on waste treatment per waste category and per treatment method for the main treatment methods. The third annex comprises the transposition table between the European list of waste, as established by Commission Decision 2000/532/EC, and the statistical waste classification.

When fully applied, the Regulation will provide a comprehensive picture of waste generation and waste treatment for the whole economy in the Community. Data collection will take place every second year, starting with the reference year 2004. The first set of statistics will be made available to the Commission in 2006.

Consequently, a satisfactory knowledge of waste generation levels at EU level will be available in 2006 at the earliest. However, trends cannot be estimated on the basis of data for a single year. Therefore, a first assessment of trends in waste generation across the EU will only be possible in 2008, when the second set of statistics collected in the context of the Regulation will become available.

Given the above mentioned limitations, existing statistics on waste generation should be treated with care, especially when analysing developments across the EU. Existing statistics can at most be used to infer trends for waste generation as a whole. Despite these statistical limitations there is little doubt that the amount of waste generated throughout the Community has increased significantly over the last decades.¹¹⁴

¹⁰⁹ EEA, 2002: *Environmental signals 2002 – Benchmarking the millennium*, Copenhagen: European Environment Agency, p. 102.

¹¹⁰ OECD, 2001: *OECD Environmental Outlook*, Paris: Organisation for Economic Co-operation and Development, p. 235, note 1.

¹¹¹ Report from the Commission to the Council- Analysis of the ‘open list’ of environment-related headline indicators, COM(2002) 524 final of 20.09.2002.

¹¹² Regulation (EEC) N° 2150/2002 of the European parliament and of the Council of 25 November 2002 on waste statistics, OJ L 332, 9.12.2002, p.1.

¹¹³ Commission regulation (EC) No 29/2002 of 19 December 2001 amending Council regulation (EEC) No 3037/90 on the statistical classification of economic activities in the European Community, OJ L 6, 10.1.2002, p.3.

¹¹⁴ EEA, 2002 (see note 109 *supra*), Figure 12.3, indicates that total waste generation has been more or less stable during the 1990s. This is largely due to the impact of reduced waste generation in Central and Eastern European Countries linked to economic restructuring during the 1990s.

This trend is reflected in the national statistics for waste generation of many EU Member States. Some examples are provided below:¹¹⁵

- it is estimated that waste generation in Denmark increased by 17% over the period 1994-2000;¹¹⁶
- the Irish Environmental Protection Agency (EPA) reports that almost 2.3 million tonnes of household and commercial waste were generated in Ireland in 2000. This represents an increase of over sixty per cent in five years in the generation of “household and commercial waste.”¹¹⁷
- total waste generation in the Netherlands increased from 50,180 kTonnes in 1990 to 58,750 kTonnes in 2000, an increase of 17%. Total waste generation in the Netherlands increased by 25% between 1980 and 2001;¹¹⁸

Similar trends have been observed in other industrialised countries. For example, waste generation in Norway increased about 13% between 1996 and 2000.¹¹⁹

The overall trend in Central and Eastern European Countries (CEECs) during the 1990s suggests decreasing overall waste generation, mainly due to economic restructuring which accompanied the transition to a market economy, including the phasing out of obsolete industrial capacity. As a result, “[t]he average amount of generated waste in the CEECs per capita fell from 8.7 tonnes in 1995 to 5.2 tonnes in 1999, a decrease of approximately 40%.”¹²⁰ However, accelerated economic growth in the future will probably imply a return to increased waste generation.¹²¹

Projections calculated at national level also indicate significant increases in future waste generation for several EU Member States. For example, the Danish Environmental Protection Agency estimates that total waste generation in Denmark will increase by about 27% between 2000 and 2020.¹²²

¹¹⁵ National statistics often use different definitions and coverage’s. Comparisons between countries should therefore be handled with care. However, national statistics do provide a good indication of trends at national level.

¹¹⁶ Bach, H., Christensen, N. & Kristensen, P. (Eds.) 2002: *The State of the Environment in Denmark, 2001*, NERI Technical Report No. 409, Roskilde: National Environmental Research Institute, p. 102. See also Danish Government, 2002: *Denmark’s National Strategy for Sustainable Development “A Shared Future – Balanced Development”, Indicator Report*, Copenhagen: Danish Environmental Protection Agency, p. 47.

¹¹⁷ Irish EPA, 2002: *Environment in Focus 2002 – Key Environmental Indicators for Ireland*, Dublin: Environmental Protection Agency.

¹¹⁸ RIVM, 2001: *Environmental Data Compendium 2001*, Bilthoven: Rijksinstituut voor Volksgezondheid en Milieu, table C1.9, and RIVM, 2002: *Milieubalans 2002*, Bilthoven: Rijksinstituut voor Volksgezondheid en Milieu, annex 3.

¹¹⁹ *Bad news for CO₂ and waste in Norway*, Environment Daily N° 1311, 18 October 2002.

¹²⁰ REC, 2001: *Waste Management Policies in Central and Eastern European Countries: Current Policies and Trends*, Budapest: The Regional Environmental Centre for Central and Eastern Europe, p. 38.

¹²¹ EEA, 2002: *Implications of EEA/EU enlargement for state-of-the-environment reporting in the EU and EEA Member States*, Technical report No 82, Copenhagen: European Environment Agency, p. 4.

¹²² Danish EPA, 2002: *Waste Statistics 2000*, Environmental Review No. 1/2002, Copenhagen: Danish Environmental Protection Agency, p. 50.

Major waste streams

It is generally agreed that five major waste streams account for the overwhelming majority of waste generation.¹²³ These include manufacturing waste, Mining and Quarrying Waste (MQW), Construction and Demolition Waste (C&DW), Municipal Solid Waste (MSW). Agricultural and forestry waste is estimated to be one of the largest waste streams, although little information is available about volumes or composition. Together, these waste streams account for about 90% of waste generated across the EU.

The availability of statistics about these waste streams is unsatisfactory. Although the EEA has recently reported some progress towards decoupling waste generation from economic growth,¹²⁴ a number of important waste streams continue to grow. Economic growth, social-demographic patterns and consumption patterns are all drivers for increasing waste generation. The OECD projects significant future growth for a number of major waste streams, including MSW, Construction and Demolition Waste (C&DW) and industrial waste.

Municipal Solid Waste (MSW) often receives the most attention from policy-makers, partly due to the fact that collection and treatment of MSW is generally a responsibility of public authorities. However, MSW is neither the largest waste stream nor the most problematic one from an environmental point of view. For example, only a minor part of waste from households (the bulk of MSW) is hazardous and this accounts for about 1 % of the total hazardous waste quantities¹²⁵; whereas¹²⁶ The EEA estimates that MSW accounts for about one sixth of total waste generated in the EU. MSW generation is currently estimated at an average of about 550 kg per capita on average across the EU. This should be compared to the EU average for 1985, which was approximately 300 kg per capita. The Organisation for Economic Co-operation and Development (OECD) estimates that MSW generation in the OECD region will increase by 43% from 1995 to 2020, reaching 640 kg per capita at the end of this period.¹²⁷

Industrial waste refers to waste produced by manufacturing industry – section D of the NACE classification of economic activities. Harmonised data on waste generation in this sector is incomplete and assessing waste generation levels and trends in this sector, except at high levels of aggregation, is highly problematic. For example, Eurostat notes that data for industrial waste “includes estimates, non-validated data, partial data and are based on different definitions of sectors or on coverages which may vary from one year to another.”¹²⁸

¹²³ Radioactive waste is not discussed in this Communication, as its management poses different challenges than other waste types and it is covered by specific legislation.

¹²⁴ EEA, 2002: *Environmental Signals 2002 – Benchmarking the millennium*, Environmental assessment report N. 9, Copenhagen: European Environment Agency, chapter 12, pp. 100-105.

¹²⁵ EEA, 2002: *Hazardous waste generation in EEA member countries*, Topic report N. 14/2001, Copenhagen: European Environment Agency, p. 22.

¹²⁶ EEA, 2002: *Hazardous waste generation in EEA member countries*, Topic report N. 14/2001, Copenhagen: European Environment Agency, p. 22.

¹²⁷ See OECD, 2002: *OECD Environmental Strategy for the First Decade of the 21st Century*, Paris: Organisation for Economic Co-operation and Development, p. 236.

¹²⁸ Eurostat, 2002: *Sourcebook of environmentally-relevant data on industry – Data 1990-1999*, Luxembourg: Office for Official Publications of the European Communities, p. 44.

Available data indicates that manufacturing industry contributes between one fifth and one quarter of total waste generation. A background paper prepared for the OECD estimates that it will grow faster than total waste generation and therefore account for a slightly larger share of total waste generation in 2020 than it did in 1997 (24% vs. 22%).¹²⁹

Mining and quarrying waste accounts for between a sixth and a third of total waste generation according to EEA and OECD data. However, as for other sectors, the contribution of this sector in different EU Member States is also subject to variations, depending for example on the importance and type of mining activities. It appears that this waste stream is relatively more important in accession countries than in current EU Member States.

Construction and demolition waste (C&DW) covers a wide range of materials. The total amount of C&DW per capita changes considerably from country to country and it seems to be related to economic and cultural aspects in different countries as well as to different existing definitions. According to Symonds, C&DW amounted around 180 million tones in the EU each year and that five Member States accounted for 80% of the total amount of C&DW in the EU, which seems to be consistent with their contribution to the total construction market C&DW is over 480 kg per person per year and only about 28% is recycled or re-used across the EU-15. A high proportion of it is concrete, bricks and tiles, which is well suited to being crushed and recycled as a substitute for newly quarried aggregates in certain lower grade applications. The nature of C&DW is directly linked to the building techniques that were used when the buildings and other structures that are now demolished were built. Thus, as an increasing variety of materials are used in buildings, the complexity of managing waste from demolition activities will increase.

Agricultural waste comprises firstly slurry, manure, straw, silage, silage effluent, vegetable and cereal residues, etc. and, secondly, waste such as scrap machinery, pesticides or waste oils, etc. According to the EEA no overall estimations are available for total agricultural waste in the EU.

Hazardous waste

A recent report by the EEA concluded that “the trend [in hazardous waste generation] is not very clear due to the fact that the amounts of hazardous waste in some countries fluctuate from year to year. Furthermore, some countries do not have access to new data, which makes it difficult to establish reliable trends in relation to the generation of hazardous waste.”¹³⁰

Reported hazardous waste generation during the 1990s has been affected by changing definition of hazardous waste. For example, hazardous waste generation in the United Kingdom more than doubled from 1996/7 to 1997/8 following the implementation of the Hazardous Waste List.¹³¹ Similarly, the Austrian Federal Waste Management Plan 2001 states that “the significant increase in the volume of hazardous waste [...] is not due to the additional production of hazardous waste but rather to changes in the definition of hazard-

¹²⁹ Stutz, J. et al., 2001: “Waste trends and outlook – Background document for the OECD Environmental Outlook for chapter 20: Waste”, Paris: Organisation for Economic Co-operation and Development, p. 26.

¹³⁰ EEA, 2002: *Hazardous waste generation in EEA member countries*, Topic report N. 14/2001, Copenhagen: European Environment Agency, p. 20.

¹³¹ Council Decision 94/904/EC of 22 December 1994 establishing a list of hazardous waste pursuant to Article 1 (4) of Council directive 91/689/EEC on hazardous waste, OJ L 356, 31.12.1994, p.14. This was subsequently replaced by Commission Decision 2000/532/EC of 3 May 2000, as amended OJ L 226, 6.9.2000, p.3. The latter applies since 1 January 2002.

relevant properties of waste as a result of the Ordinance on the classification of hazardous waste and hazardous household waste (Waste Classification Ordinance of 1997).”¹³² The OECD also observes that “[n]o trend in hazardous waste generation can be provided because of the constantly changing definitions of hazardous waste within the OECD Member countries.”¹³³

According to the EEA, manufacturing industry is the major contributor to hazardous waste generation in several Member States, accounting for more than 75% of total hazardous waste generation.¹³⁴ It is not possible to establish a precise classification by industrial sector on the basis of available statistics. However, data reported by the EEA indicates that chemicals and metalworking are the industrial branches which generate the most hazardous waste.¹³⁵

Conclusions

In summary, it can be concluded that both our historical experience and future projections indicate that, in the absence of additional policy intervention, total waste generation has and will continue to increase for the foreseeable future. However, currently available statistics do not allow a more detailed analysis of waste generation levels or trends. For some waste streams, notably industrial waste and hazardous waste, it is difficult to make a reliable assessment even of trends. This is a significant obstacle for policymaking and needs to be remedied as a matter of urgency.

¹³² BMU, 2001: *Federal Waste Management Plan 2001*, Vienna: Federal Ministry of Agriculture and Forestry, Environment and Water Management, p. 12.

¹³³ Stutz *et al.*, *op. cit.* (note 129 *supra*), p. 19.

¹³⁴ EEA, 2001b: p. 26.

¹³⁵ *Ibid.*, p. 27.

Annex III

Abreviation	Meaning
6EAP	6th Environmental Action Programme
BAT	Best Available Techniques
C&DW	Construction & Demolition Waste
CBA	Cost-Benefit Analysis
CEECs	Central and Eastern European Countries
D	Disposal
EEA	European Environment Agency
EECCA	Easter European Caucasian and Central Asia Countries
ELVs	End of Life Vehicles
EMAS	Eco-Management and Audit Scheme
EOL	End of Life
EPA	Environmental Protection Agency
EPER	European Pollutant Emissions Register
ESM	Environmentally Sound Management
FP6	6th Framework Programme
GHG	Green House Gas
IPPC	Integrated Pollution Prevention and Control
ISAG	Information System for Waste and Recycling
MQW	Mining and Quarrying Waste
MSW	Municipal Solid Waste
OECD	Organisation for Economic Co-operation and Development
PAYT	Pay As You Throw
PCBs	Polychlorinated Biphenyls
PCTs	Polychlorinated Terphenyls
PET	Polyethylene Tere-Phtalate
PM ₁₀	Particulate Matter
POPs	Persistent Organic Pollutants
PRTR	Pollutant Release and Transfer Registers
R	Recovery
RoHS	Restriction Of Hazardous Substances
UNECE	United Nations Economic Commission for Europe
WEEE	Waste Electrical and Electronic Equipment
WFD	Waste Framework Directive
WGPR	Working Group on Waste Prevention and Recycling