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# **Waste Prevention Guide**

**Basic Information & EU Situation**

**(draft)**



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- Ecological Recycling Society (ERS) – Greece [www.ecorec.gr](http://www.ecorec.gr)

### **Participating Organisations:**

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- CRE.THI.DEV Creative Thinking Development – Ελλάδα, Σόλωνος 8, Αττική [www.crethidev.gr](http://www.crethidev.gr)
- Up To date Training Ltd – Cyprus [www.uptodatecy.com](http://www.uptodatecy.com)
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- Reuse and Recycling European Union Social Enterprises – Belgium [www.rreuse.org](http://www.rreuse.org)

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# Waste Prevention Guide

## Basic Information & EU Situation

### 1. Waste Prevention

#### 1.1 Introduction

Basic principles of waste management are to

- reduce environmental and health impacts and
- to save resources

Waste prevention is one priority matter of waste management policies

##### **Definition and Objectives**

According to European waste legislation, waste prevention means measures aiming at the reduction of the quantity and the harmfulness for the environment of diverse waste streams.

More explicit the objectives of waste prevention are:

- Emission reduction
- Reduction of hazardous substances in material streams and of their dissipation
- Improvement of resource efficiency.

##### **Priority waste types**

Consequently waste streams to be addressed by waste prevention are:

- Waste streams with big mass flows
- Hazardous waste streams
- Waste streams containing scarce substances

##### **Design Principles**

When designing waste prevention initiatives following guiding principles should be considered:

- Sustainability
- Eco-efficiency and eco-sufficiency
- Precautionary principle
- principle of cooperation and participation
- Polluter-pays-principle
- Producer responsibility
- Life cycle and system thinking
- Principles of true costs, efficiency and minimal costs

## **Waste Prevention Techniques**

In general waste prevention can be achieved either:

- by reducing the demand to be met (immaterialisation)
- by using less or less harmful material for meeting the demand (dematerialisation)

Usually a waste prevention techniques is related to a certain process, to a certain product, service or product service system or to a certain consumption behaviour.

- Process related waste prevention comprises those techniques which reduce waste arisings during production by
  - establishing internal cycles for auxiliary materials and production wastes
  - substituting hazardous materials
  - introducing more efficient technologies
- Product related waste prevention comprises techniques which
  - allow a repeated use of products or parts of the product
  - extend product life and/or make products easier to repair or
  - change the design of a product in a way that it contains less material or less harmful material
- Service oriented waste prevention either replaces products by services for meeting the demand, or complements products with a service system in order to maintain the products in an efficient way.
- Consumption related waste prevention comprise those techniques which effect the life style or the consumption behaviour.

## **Barriers**

In the past years quite a number of waste prevention projects have been initiated, either by different levels of administration or by the industry itself. Nevertheless, waste prevention has not yet become an implicit principle, when designing products or production processes. The reason is that there are a number of barriers which have to be overcome first. These barriers may be categorized as:

- Socio-economic barriers for the consumers
- Socio-economic barriers for the producers
- Economic barriers
- Market barriers
- Legal barriers
- Technical barriers

## **Political Instruments to foster waste prevention**

In order to overcome those barriers waste prevention may be supported and/or implemented by following types of instruments:

- Information and motivation programs
- Economic instruments
- Bans, obligations, standards
- Voluntary Agreements

- Public procurement

In the Waste Framework Directive (98/2008 / EC) is proposed by the EU Member States to prepare waste prevention programs. These programmes shall contain objectives, measures and targets on what to achieve by these measures. Also a list of, primarily economic measures is given, from which Member States may select.

### The Vision – A fully integrated material flow economy

In order to activate its full potential waste prevention contributes to efficiency improvements in all parts of the economy and helps to form a fully integrated material flow economy as depicted in figure 1.

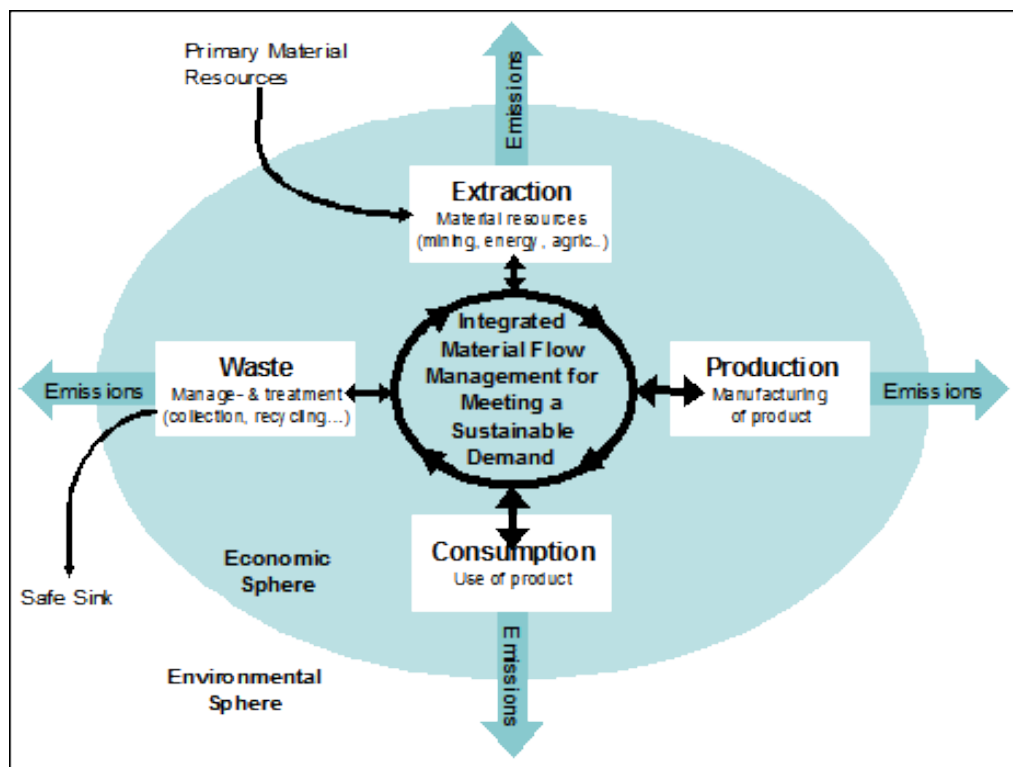


Figure 1: Scheme of a closed circuit material flow economy

## 1.2 Principles

### Sustainability

*'Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs'* (WCED 1987 Brundlandtreport)

*'Sustainable Consumption and Production (SCP) is a holistic approach to minimizing negative environmental impacts from the production-consumption systems in society. SCP aims to maximize the efficiency and effectiveness of products, services, and investments so that the needs of society are met without jeopardizing the ability of future generations to meet their needs'.* (Norwegian Ministry of the Environment, Oslo Symposium 1994).

### **Eco-efficiency**

The needs shall be met at minimal resource consumption and minimal environmental impact.

### **Eco-sufficiency**

Also the needs (the lifestyle and the consumer demand) shall be addressed in order to achieve a sustainable system. Only “sustainable” needs shall be met.

### **Precautionary principle**

The precautionary principle is to apply when there is scientifically justifiable reason for concern that considerable risks for the environment and/or human health might be involved.

### **Principle of cooperation and participation**

These principles ask for a fair involvement of all interested and affected social forces in the decision making process.

### **Polluter-pays-principle**

The person, who is responsible for a certain environmental stress, must cover the costs for preventing and removing this stress and attached environmental damage.

### **Producer responsibility**

The producer of a product shall cover the environmental costs caused by this product during production, utilisation, reuse and final disposal. This principle shall give an incentive for developing environmentally sound product concepts.

### **Life cycle and system thinking**

Waste prevention may be applied to every phase of a product's or service's life cycle. The effects usually are not restricted to the phase of application. Rather the whole life cycle influenced. Thus when designing a waste prevention programme it is necessary to consider not only the targeted phase of a product's or service's life cycle but the whole system providing a service. In many cases it is also advisable to look at immaterial aspects like information level, motivation, life-style, market concerns and financing.

### **Principles of true cost accounting, efficiency and minimal costs**

When applying the principle of true cost accounting all macro economic costs are taken into account. Non-monetary-costs like cost of environmental impact, health effects, costs of consuming natural resources are considered as well as micro economic costs and all macro economic benefits (as negative costs). In accordance with the efficiency principle, a waste prevention measure is to undertake when its macro economic benefits exceed its macro economic costs. According to principle of minimal costs, those measures are to be implemented which lead to a system which meets the sustainable demand at minimum costs, considering all macro economic costs and benefits.



## 1.3 Process Oriented Waste Prevention

- Input/output analyses, material flow analyses, ecological and economic evaluations as well as risk analyses can help to identify technical and organisational options to improve a certain process or to reduce the number of processes required to achieve a product.
- Internal cycles for auxiliary materials and production wastes are introduced, hazardous substances are replaced and more efficient, innovative technologies are applied.
- Innovative Technologies which may contribute to more efficient processes and thus to waste prevention comprise:
  - Industrial biotechnology and new catalysts
  - Improved separation processes
  - New materials (like nanotechnology and multi-functional materials)
  - Better process control

## 1.4 Product Oriented Waste Prevention

Eco-design principles are applied to achieve products which are causing smaller amounts of waste and less hazardous waste. These design principles are:

- Life cycle thinking (all phases of the product's life are considered and possibly optimised)
- Thinking in systems and multi dimensions (also resource availability, noise, taste, odours, hazards etc. are considered)
- Thinking in services first (do not start with designing a coffee machine but think of how to prepare good coffee (Melnitzky 2004))

The objective is to design and manufacture a product which excels in

- longevity
- repair ability
- reusability
- low material consumption
- low consumption of operation auxiliaries
- low contents of hazardous substances

Products which show the potential for meeting the requested demand while consuming little (rare) material are:

- Information and communication technologies
- Reusable products
- Renewable materials and bioplastics

## 1.5 Services

Examples for services replacing or complementing products with waste prevention potential are:

- Lending systems (e.g. for tools or paint)

- Leasing, including maintenance e.g. for cars, apartments or computers
- Car sharing
- Home-healthcare with the objective to reduce the consumption of medicaments
- Home delivery of bio food
- Repair-, maintenance-, reuse-centres
- Performance contracting (e.g. copy machines or energy)

The services sector plays also an important role when harmonising the production sector with the actual demand of the consumers.

## 1.6 Consumer Oriented Waste Prevention

Consumption patterns which can contribute to waste prevention are:

- High value consumption, that is meeting the demand by eco-efficient products and services
- Utilisation of left-over and secondary usage of goods and products
- Correct dosage of operation materials, correct operation and maintenance
- Purchase only of goods which are really needed
- Utilisation of low material packaging or reusable packaging
- Purchase of reusable goods
- Increased demand for immaterial services as in culture, sports, education and wellness

A programme for changing the consumption behaviour towards low waste generation should consist of following 4 elements:

- Enable (to provide the information and tools to consumers to enable them changing their behaviour)
- Encourage (provide incentives for replacing inefficient by efficient behaviour)
- Engage (consumers in communal processes)
- Lead by example (I will, if you will) (Jackson 2005)

## 1.7 Barriers Opposing Waste Prevention

### Socio-economic barriers for the consumers

- Problems connected with waste are not big enough to bother
  - Lack of willingness to invest money, time and energy
  - There is no real interest
  - There is no vision for improvement
  - There is lack of information on
- Environmental damage and other problems caused by waste
- Possibilities to make a change
- Waste prevention techniques, processes, products and services

### **Socio-economic barriers for the producers**

- Lack of expert capacity and financial resources
- Lack of trust in the quality of used reusable products
- Lack of standards for reusable product

### **Economic barriers**

- Due to low waste disposal costs there is lack of incentive for waste prevention
- The required rate of return for waste prevention projects is much higher as the rate of return expectation with investments in the core business of the enterprise
- Investments are necessary first, potential profit comes later and is attached to a certain risk level
- Development time for eco-designed products is longer as for products which it competes with
- The person who is required to invest in waste prevention is not the person who would gain the benefits
- Environmental costs and benefits are not internalised, thus from a micro economic point of view they do not count

### **Market barriers used products**

- Different information levels with potential buyers and sellers
- Lack of incentive to disseminate experience of early buyers
- Costs for getting the information and for concluding a non-standard contract
- Market power (Johnstone 2005)

### **Legal barriers**

Waste prevention may stay in conflict with other objective pursued by public administration. Thus legal restraints might impose a barrier on implementing waste prevention measures.

### **Technical barriers**

Different technical requirements may limit waste prevention. Among these are:

- Lack of space for establishing a material cycle within a plant
- The waste prevention technology reduces product quality or increases emissions
- The waste prevention technology is not yet mature

## **1.8 Instruments**

### **Information and motivation programmes**

Information programmes which aim at changing the life styles comprise:

- Information about availability of natural resources
  - current consumption patterns and their consequences for the environment
  - meeting the demand by immaterial services
- actions to question lifestyles with excessive resource use

- discussions on those factors which really contribute to an improved quality of life
- education of children to responsible consumers

Information programmes which aim at changing consumption patterns inform about:

- Eco-efficient products
- Efficient utilisation of products
- The replacement of products by services

Information programmes targeted towards the production and services sector inform about:

- Waste prevention techniques and technologies
- Effects of products and material flows
- Legal frame conditions and funding
- Efficient behaviour.

### **Economic instruments**

Taxes and fees aim:

- At internalising external costs and
- at establishing the polluter-pays-principle

Subsidies and tax exemptions shall

- provide incentives for producing macro economic benefits and
- help to overcome market introduction barriers

### **Bans, obligations, standards**

Standards, bans and obligations need to be applied when other instruments can not work efficiently. Obligations shall

- induce environmentally friendly behaviour,
- make the responsible person responsible (polluter-pays-principle) and
- secure a level playing field for all market participants

Bans are required when hazardous substances need to be eliminated.

### **Voluntary agreements**

Voluntary agreements usually are proposed by the industry or parts of it and commit the industry to achieve a certain target or to observe certain standards. This instrument is more market oriented than obligations and more flexible. However, the specified targets are not legally binding and free-riders may abuse the system.

### **Public procurement**

In many countries the public sectors constitutes a considerable share of the market. Beneath this direct market power of the public sector, there is an additional effect of environmental sound public procurement: The state is acting as a good example for the average citizen. Furthermore, the public sector can be the decisive force for overcoming all barriers when preferring eco-designed products or efficient services.

## 1.9 Method of Selecting a Robust Waste Prevention Strategy

Waste prevention measures are targeted towards a singly process, one, several or all phases of a product/service life cycle (see figure 2). A measure can be the introduction of an efficient process, product, service, or consumer behaviour while applying waste prevention instruments. In most cases better results will be achieved by a package of mutually supportive waste prevention measures, which is by a waste prevention strategy. In most cases this strategy shall be effective for a number of years. Thus for selecting the “best” strategy it is necessary to take into account uncertainties of future developments.

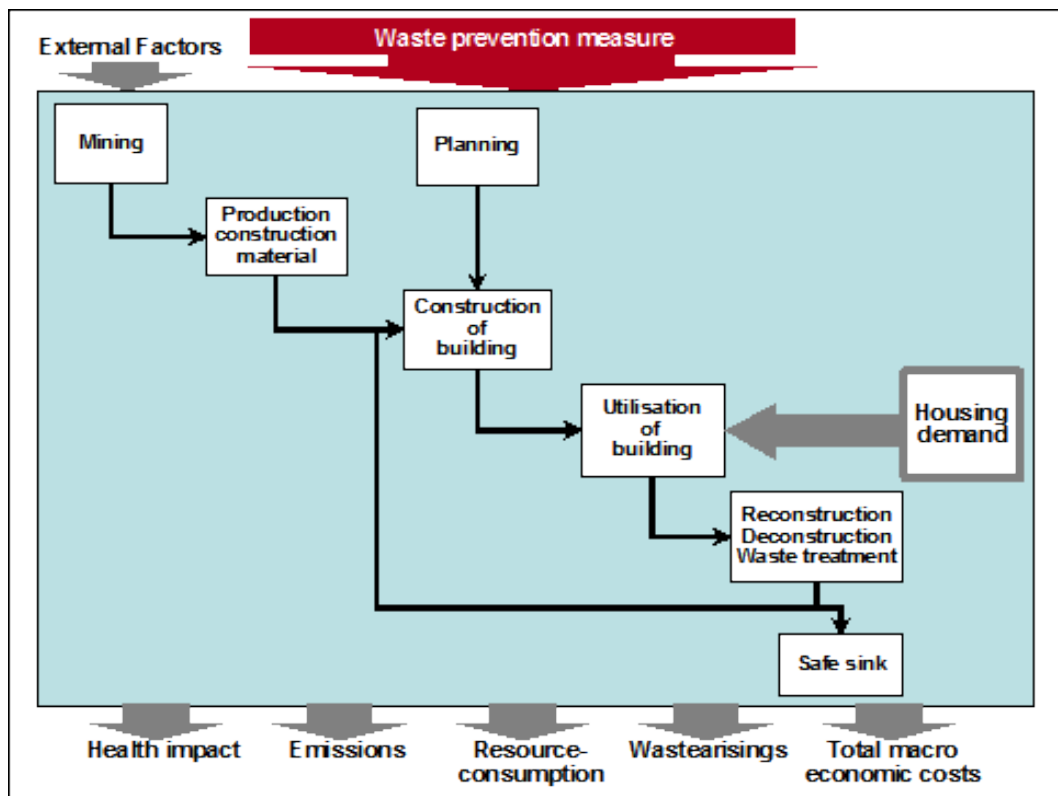


Figure 2: Life cycle of a building and effect of waste prevention measure

Based on Life Cycle Assessment, Material Flow Analysis and Integrated Resource Planning following procedure for selecting a “robust” waste prevention strategy can be used under participation of decision makers, interested and affected parties and experts (see figure 3):

- At the beginning of the planning process the task and the problems to be solved are defined. A first analysis identifies the core problem
- In the next step the objectives are defined. For each objective at least one criterion on which to measure the achievement of the objective is defined
- Then the system which shall be affected is described by defining its main processes and main material flows
- The system is calibrated by inserting the material balance of the base year

- When the waste prevention strategy shall be effective for several years, parameter which effect the future developments of the system are considered either as frame data (with a fixed development path), scenarios (with two distinct development paths) or as part of the waste prevention strategies to be compared
- Then an appropriate method and appropriate computing tools are selected for performing the impact analysis. This is a simulation of the effects of the proposed waste prevention strategies on the future development of the system within the 2 defined scenarios
- That waste preventions strategy is selected and recommended which best meets the objectives and their criteria in both scenarios
- After having decided for a certain waste prevention strategy, its implementation is planned. Later on the actual effects are monitored and the strategy results are evaluated

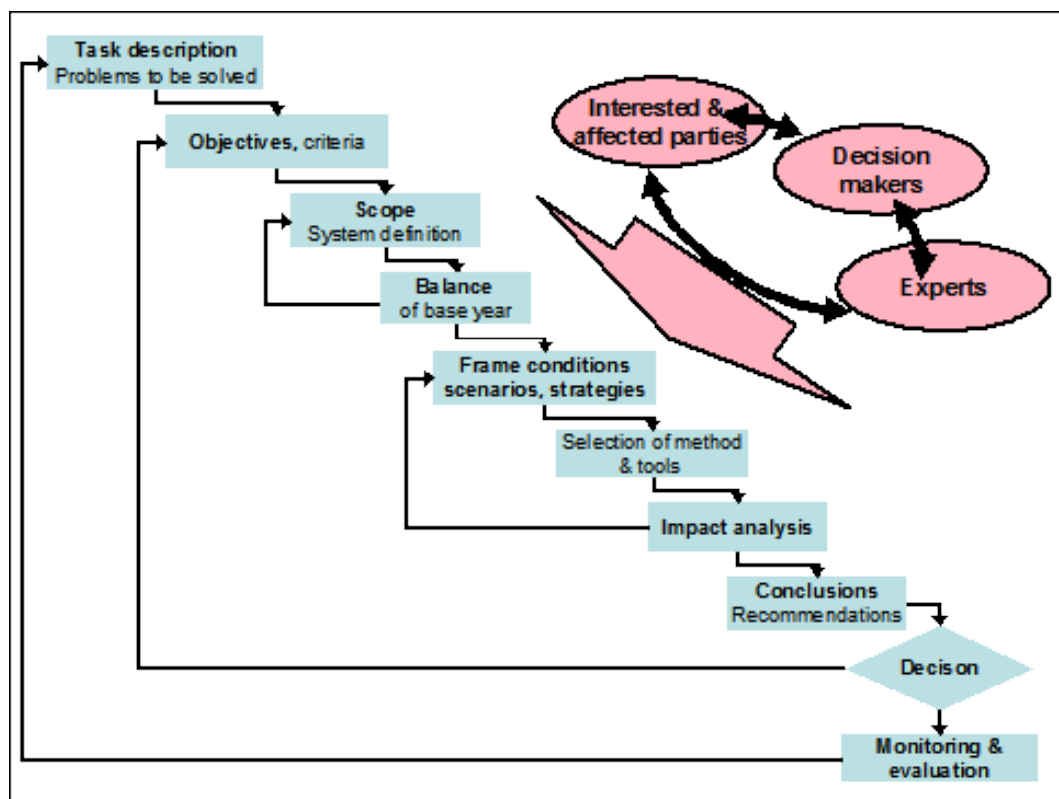


Figure 3: Procedure for selecting a robust waste prevention strategy

## 2. Waste prevention programmes in Europe

### 2.1 General

The revised [EU Waste Framework Directive \(2008/98/EC\)](#) requires that by 12 December 2013 Member States establish national waste prevention programmes. According to Article 30 (2) of the WFD, the European Environmental Agency (EEA) is invited to include in its annual report a review of progress in the completion and implementation of waste prevention programmes.

The purpose of this chapter is to exchange information on waste prevention programmes. English abstracts of national and regional waste prevention programmes are presented in the platform. This chapter includes existing waste prevention programmes which are already developed in accordance with Article 29 in the Waste Framework Directive. New and updated abstracts will be added as soon as the waste prevention programmes are published in the countries/regions.

Waste prevention is defined in Article 3 (12) (2008/98/EC) as: "prevention" means measures taken before a substance, material or product has become waste, that reduce:

1. the quantity of waste, including through the re-use of products or the extension of the life span of products;
2. the adverse impacts of the generated waste on the environment and human health;  
or
3. the content of harmful substances in materials and products;

According to Article 29 (2008/98/EC) the waste prevention programmes have to be evaluated at least every sixth year. They shall be integrated either into the waste management plans or into other environmental policy programmes, as appropriate, or shall function as separate programmes. The programmes shall set out the waste prevention objectives. Member States shall describe the existing prevention measures and evaluate the usefulness of the examples of measures indicated in Annex IV to the revised Waste Framework Directive or other appropriate measures. The aim of such objectives and measures shall be to break the link between economic growth and the environmental impacts associated with the generation of waste.

## 2.2 Quick entry to core topics

### 2.2.1 Explanatory note of core topics

The abstract is an abstract of the waste prevention programme. Therefore the abstract has been written using the document of the national waste prevention programme ONLY. Other relevant sources are placed under "other comments" i.e. ongoing activities.

#### **Type of programme**

Waste prevention programmes shall be integrated either into the waste management plans or into other environmental policy programmes, as appropriate, or shall function as separate programmes according to Article 29 (1) (2008/98/EC).

### **Waste prevention objectives**

List of waste prevention objectives. The programmes have to set out the waste prevention objectives according to Article 29 (2).

The term objectives are perceived as overall goals for the waste prevention programmes

### **Sectors covered**

Describe the sectors covered. The sectors are:

- Agriculture
- Mining, raw material processing
- Construction/infrastructure
- Manufacturing
- Sale, retail, transport
- Households
- Private Service Activities/Hospitals
- Public services

### **Waste types covered**

Describe the waste types specific mentioned in the programme

- Food/organic
- C&D waste
- Hazardous waste
- Household/municipal waste
- Paper
- Packaging
- WEEE/batteries
- Manufacturing waste
- Bulky waste
- Other

### **Quantitative targets**

List of quantitative targets. The programmes may determine quantitative targets according to Article 29 (3).

The term targets are perceived as a detailed performance requirement, that arises from the waste prevention objectives and that needs to be set and met in order to achieve those objectives.

### **Measures on quantitative prevention**

Describe planned measures on quantitative prevention



## Measures on qualitative prevention

Describe planned measures on qualitative prevention.

Qualitative prevention is defined as: Reducing the hazardous content of waste, rather than impacting the total volume of waste, is considered as qualitative waste prevention and contributes to reducing human and environmental exposure to hazardous materials ( EU Commission 2012: Preparing a Waste Prevention Programme - Guidance document).

## Prevention measure covered according to 98/2008 Annex IV (1-16)

The planned measures in the waste prevention programmes are categorized according to the examples of measures indicated in Annex IV of the Waste Framework Directive (2008/98/EC).

## Indicators proposed and monitoring

Indicators proposed in the waste prevention programmes are described. According to the Article 29(3), Member States shall determine appropriate specific qualitative or quantitative benchmarks for waste prevention measures adopted, in order to monitor and assess their progress.

## Evaluation and monitoring of programme

Description of evaluation of the programme in addition to the requirement for evaluation every 6 years (WDF article 30).

## Involvement of stake holders

Description of involvement of stakeholders in addition to a public consultation, which is obligatory.

## 2.2.2 Type of programme

Waste prevention programmes shall be integrated either into the waste management plans or into other environmental policy programmes, as appropriate, or shall function as separate programmes according to Article 29 (1) (2008/98/EC).

	Austria	Belgium (Brussels)	England	Finland	Germany	Hungary	Ireland	Italy	Latvia	Lithuania	Luxembourg	Malta	The Netherlands	Norway	Poland	Portugal	Scotland	Slovakia	Spain	Sweden	Wales		
Separate programme			■		■		■	■		■			■			■		■	■	■	■	■	
Part of waste management plan	■	■		■		■			■		■	■		■	■								
Part of other envir. policy programmes																	■						

## 2.2.3 Waste prevention objectives

List of waste prevention objectives. The programmes have to set out the waste prevention targets according to Article 29 (2).

### **Austria - waste prevention objectives**

Based on the waste framework directive and the Austrian waste management plan, the following targets are defined for the waste prevention programme (p. 225):

- Decoupling of economic growth from lifecycle environmental impacts of Austrian waste and their upstream material flows
- Reduction of emissions
- Minimization of pollutants' dissipation
- Reduction of pollutants
- Resource conservation, focussing on raw materials and energy carriers

### **Belgium (Brussels) - waste prevention objectives**

- Minimise food, paper and organic waste, superfluous packaging and unnecessary purchasing
- Pursue an ambitious sustainable purchasing policy
- Promote reuse practices
- Promote waste prevention and sustainable consumption in offices, shops, hotels, restaurants, cafes, schools
- Aid businesses to reduce and better manage their waste
- Development of an integrated 'eco-construction' approach

### **England - waste prevention objectives**

The objectives (p. 13) of the programme are to:

- encourage businesses to contribute to a more sustainable economy by building waste reduction into design, offering alternative business models and delivering new and improved products and services;
- encourage a culture of valuing resources by making it easier for people and businesses to find out how to reduce their waste, to use products for longer, repair broken items, and enable reuse of items by others;
- help businesses recognise and act upon potential savings through better resource efficiency and preventing waste, to realise opportunities for growth;
- support action by central and local government, businesses and civil society to capitalise on these opportunities.;

The aim of the programme is to improve the environment and protect human health by supporting a resource efficient economy, reducing the quantity and impact of waste produced whilst promoting sustainable economic growth (p. 13).

### **Finland - waste prevention objectives**

- Improvement of material efficiency in the main product categories
- Improvement of material efficiency in industry and mineral extraction
- Extension of the useful life of buildings
- Private consumption will focus on eco-efficient products and services, while the generation of household waste will be reduced
- The use of certain hazardous chemicals will be reduced and be replaced with less hazardous alternatives

### **Germany - waste prevention objectives**

Chapter 3.3 of the German WPP describes that according to Sec.33 para. 3 no. 1 of the Closed Substance Cycle Management Act (Kreislaufwirtschaftsgesetz, KrWG) the programme has to define waste prevention objectives. The general objective is to decouple environmental impacts on humans and the environment from economic growth. It aims at the quantitative and qualitative prevention of waste if this leads to a reduction of negative impacts on humans and the environment (pages 19 and 22).

In addition the programme describes operative goals (reduction of waste generation, reduction of environmentally harmful impacts, reduction and substitution of hazardous substances) and specific sub-goals (reduction of waste generation in relation to GDP, number of employees and population; information and sensitisation of different target groups; in-plant closed substance cycles, low-waste product design; extending life span of products; support of reuse of products; increasing use intensity of products; pages 20/21).

### **Hungary - waste prevention objectives**

The overall objective of the WPP is to introduce measures that:

- promote the decoupling of resource use from an economic growth that is needs based and reasonable;
- reduce material use and waste generation,
- contribute to the realisation of a more efficient resource management;
- promote the application of solutions that have the lowest impact on the environment during their life-cycle;
- promote job creation (p. 249).

### **Ireland - waste prevention objectives**

The general objectives are to break the link between economic growth and the environmental impacts:

- increase awareness of the environmental impact of excess consumption and waste;
- reduce the use of material, water and energy resources in order to reduce waste generation;
- increase the diversion of biodegradable municipal waste from landfill;

- reduce the use of hazardous substances and the generation of hazardous waste
- take the principles of resource efficiency and waste prevention into account in the design and implementation of all projects under the National Waste Prevention Programme's operational heading;
- bring about measurable improvements in resource efficiency and waste generation at organisational and sectoral levels;
- generate case studies to actively demonstrate the opportunities and cost savings possible from resource efficiency and waste prevention;
- promote the important role of resource efficiency in the green economy and green growth opportunities; and
- disseminate the principles of resource efficiency and waste prevention throughout the public and private sectors to encourage uptake of best practice in relation to internal practices and influence on the public and clients.

### **Italy - waste prevention objectives**

The programme sets objectives aimed at decoupling economic growth from the environmental impacts generated by waste p 7.

### **Latvia - waste prevention objectives**

The objectives of the programme are the following (p. 85):

- to break the link between economic growth and waste generation and the associated impacts on the environment;
- to reduce the volumes of waste, promoting product re-use or extended use;
- to reduce the hazardous quantities used in the production of materials and products.

### **Lithuania - waste prevention objectives**

The aim of the programme is to provide an analysis of the current state of waste prevention, including identification of priority waste streams, objectives, tasks and measures for their implementation. As a result, in accordance with the waste hierarchy, the highest priority has to be given to waste prevention, promoting sustainable consumption and a responsible use of materials and resources (p. 1).

Waste prevention objectives:

- avoid the generation of waste;
- reduce the amount of generated and not recovered waste;
- reduce the amount of harmful substances in materials and products;
- re-use of or extend the life span of products (p. 6).

Objectives of the Waste Prevention Programme for 2014-2020:

1. To achieve, in a growing economy a slower increase of waste generation from manufacturing, construction and other sectors and that the amount of waste generated does not exceed the average of the EU Member States;
2. To achieve, in a growing economy a slower increase of municipal waste generation including packaging, WEEE and biodegradable waste and that the amount of municipal waste does not exceed the average of the EU Member States. (p. 6)).

**To achieve Waste Prevention Programme objective No. 1 (see 7):**

- 1.1 Promote prevention in the manufacturing and other sectors;
- 1.2 Increase the efficiency of materials and resources;
- 1.3 Improve training in waste prevention for businesses, farmers, agricultural companies and authorities).

**To achieve Waste Prevention Programme objective No. 2 (see 7):**

- 2.1. Improve waste management legislation establishing requirements relating to the municipal waste prevention and re-use;
- 2.2. Promote sustainable consumption;
- 2.3. Promote the re-use of products and preparing for re-use operations;
- 2.4. Increase public awareness and improve municipal staff training on waste prevention).

**Luxembourg - waste prevention objectives**

The aim is to guide consumers towards products greater longevity or multiple use (p 29).

**Malta - waste prevention objectives**

On the basis of the waste management statistics as well as the consultations held, the priority areas established for the Maltese waste prevention programme are (p. 181):

1. Heightening the awareness on the need to reduce waste arisings through appropriate behavioural changes which either minimize the amount of purchases that generate waste through smarter shopping practices or through extending the life cycle of goods and to avoid their untimely conversion into waste.
2. Reduction of MSW arisings:
  - a. organic fraction
  - b. recyclables fraction
  - c. promoting re-use and repair initiatives

**The Netherlands - waste prevention objectives**

A shift towards a circular economy handling natural resources as efficiently as possible and ensuring the lowest possible environmental impact.

A circular economy entails (p. 8/9):

- Optimal use of resources
- No waste, no emissions
- Sustainable resource use

Three forms of practical actions are proposed (p. 10):

- Better design (less material usage, less harmful substances, more recycled material, longer life)
- Less waste in the production phase (less material/material loss, less harmful substances, closed material cycles)
- Conscious consuming (increased awareness on prevention by informing and encouraging deliberate choices, less waste and more reuse)

### **Norway - waste prevention objectives**

Relative decoupling of economic growth and waste generation (p. 33).

### **Poland - waste prevention objectives**

One of the main objectives of the National Waste Management Plan 2014 (KPGO 2014): Maintaining of the trend of decoupling waste generation from economic growth of the country, expressed by GDP.

### **Portugal - waste prevention objectives**

In broader terms, the aim is also to create conditions for articulation with the National Waste Management (PNGR) and the implementation of the Framework Directive in Portugal "waste" Directive no. 2008/98/EC, in particular its Article 29 and to act progressively on products consumed to reduce:

1. The intensity of natural resources used (material: by waste prevention, reuse, recycling, energy: for via conservation and energy recovery) with consequent benefits in natural resource management, management of space, deflecting waste on landfill, and moreover, reduction of emission of greenhouse gases - GHGs (CO<sub>2</sub>, CH<sub>4</sub>), associated waste management.
2. The presence of hazardous substances (products, materials and waste) (7651).

### **Scotland - waste prevention objectives**

The objectives of the programme are to prevent waste, increase resource efficiency and enable a shift towards a more circular economy (p. 11) This overall aim will be supported by following objectives (p.11):

- helping businesses use resources more efficiently;
- stimulating innovation and business opportunities in the reuse, refurbishment and remanufacturing sectors;

- promoting sustainable product design;
- improving Producer Responsibility and reducing the impacts of packaging;
- improving access to information on materials and their significance to the economy or to businesses;
- stimulating a culture of resource efficiency, influencing behaviour through awareness raising, education and skills development;

### **Slovakia - waste prevention objectives**

The main objective of the programme is a shift from material recovery, declared as a priority in the Waste Management Programme of the Slovak Republic in 2010, towards waste prevention. This means that in 2018 the waste management of the Slovak Republic will be in line with the waste hierarchy as is referred in the paragraph 3 of the amendment to the law on waste (p. 32).

Unlike the Waste Management Programme, which sets out the quantitative and qualitative objectives in the area of recycling and recovery of selected waste streams, the Waste Prevention Programme is not only an instrument for planning objectives and defining measures. The Waste Prevention Programme is rather a process of continuous assessment of effectiveness of measures taken (p. 31).

There are several specific objectives (formulated in a very general manner with concrete measures to meet each objectives) set for specific waste types:

- Mixed municipal waste: Continuing the trend of annual reduction of mixed municipal waste (p. 37).
- Biodegradable municipal waste (BMW): Reducing the amount of generated BMW and reducing the proportion of BMW in mixed municipal waste (p. 40).
- Paper waste: Reducing the amount of generated paper waste and reducing the proportion of paper in mixed municipal waste (p. 43).
- Packaging waste: Reducing the amount of generated packaging waste (p. 44).
- C&D: Reducing the amount of disposed C&D waste (p. 45).
- Hazardous waste: Continuing the ongoing trend of reducing the amount of generated hazardous waste (p. 46).
- Waste from the extractive industry: Reducing amount of waste generated from the extractive industry (p. 46).

### **Spain - waste prevention objectives**

The main objective of the programme is to reduce 10 % of the amount of waste produced in 2010 by 2020 (in tonnes) and to contribute to reducing marine litter from terrestrial sources (p. 25).

The programme has four strategic outlines: reduce the quantity of waste, reuse and extend products' life, reduce the hazardousness, and reduce the environmental impacts, as well as impacts on human health (p. 25).

The implementation of creditable environmental management systems in public administration and business should be a priority to adopt more adequate prevention measures (p. 25-26).

## Sweden - waste prevention objectives

The aim of the programme is to guide and inspire Swedish stakeholders so that environmental goals are achieved, less waste is generated and products are designed not to contain hazardous substances, irrespective of how much the economy grows (p 8).

## Wales - waste prevention objectives

The primary objective of the programme is to de-couple economic growth from the environmental impacts of waste generation (p. 3).

This overall aim will be supported by following objectives:

- Helping householders and businesses to reduce the quantity of waste through reuse or the extension of the life span of products (p. iv).
- Reduction in content of harmful substances in materials and products (p. iv).
- Stimulation of a culture change towards a resource efficient society, influencing behaviour through awareness raising, education and skills development (p.16/17).
- Helping businesses use resources more efficiently by promoting eco- design and exchange of resources.
- Promotion of new and alternative business models to improve Producer Responsibility and sustainable procurement (p.37).

## 2.2.4 Sectors covered

	Austria	Belgium (Brussels)	England	Finland	Germany	Hungary	Ireland	Italy	Latvia	Lithuania	Luxembourg	Malta	The Netherlands	Norway	Poland	Portugal	Scotland	Slovakia	Spain	Sweden	Wales	
Agriculture																						
Mining, raw material processing																						
Construction/infrastructure																						
Manufacturing																						
Sale, retail, transport																						
Households																						
Private Service activities/Hospitality																						
Public services																						

## 2.2.5 Waste types covered



	Austria	Belgium (Brussels)	England	Finland	Germany	Hungary	Ireland	Italy	Latvia	Lithuania	Luxembourg	Malta	The Netherlands	Norway	Poland	Portugal	Scotland	Slovakia	Spain	Sweden	Wales	
Food/organic																						
C&D waste																						
Hazardous waste																						
Household/municipal waste																						
Paper																						
Packaging waste																						
WEEE/batteries																						
Manufacturing waste																						
Bulky waste																						
Other (*)																						

## 2.2.6 Quantitative targets

List of quantitative targets. The programmes have to set out the waste prevention targets according to Article 29 (2).

### Austria - quantitative targets

No

### Belgium (Brussels) - quantitative targets

The plan integrates waste prevention targets to be achieved by 2013 and 2020. Only the 2020 targets will be exposed here:

#### Households

- Reduce food waste by 5 kg/inhab/yr
- Reduce paper waste by 7 kg/inhab/yr
- Reduce household packaging waste by 10 kg/inhab/yr
- Reduce the consumption of gadgets by at least 2 kg/inhab/yr and reduce waste from disposable nappies by 1kg/inhab/yr
- Reduce garden waste by 12kg/inhab/yr
- Selectively collect and return 6 kg/inhab/yr of reusable items to the market

#### Business

- Reduce paper waste by 30 kg/worker/yr
- Reduce food waste by 6 kg/worker/yr
- Reduce packaging waste by 1 kg/worker/yr

#### Schools

- Reduce paper waste by 2.5kg/student/yr

- Reduce packaging waste, and in particular drinking carton waste, by 1kg/student/yr
- Reduce food wastage by 3 kg/student/yr

### Re-use

Flanders, Belgium, has set an employment target of 3000 Full Time Equivalent (FTE) jobs alongside a re-use target of 5 kg re-used material per capita to be achieved by 2015 . As a result the re-use sector in Flanders provides over 5000 jobs and discussions about revising this target upwards are underway.

### England - quantitative targets

The WPP for England does not have any quantitative targets, but some initiatives within the programme do have their own targets aimed specifically at different materials/sectors, such as the Courtauld Agreement which aims to reduce household food and drink waste, reduce grocery ingredient, product and packaging waste in the supply chain and improve packaging design.

For example, the Greening Government commitment includes the following target:

- By 2015, to deliver a reduction in the amount of waste generated by 25 % from a 2009/10 baseline (p. 18).

The Courtauld Commitment targets are:

- Special target for food waste: Reduction corresponding to the Courtauld Commitment: 5 % by 2015 from a 2012 baseline (p. 22).
- Special target for paper and board waste: Reduce traditional grocery ingredient, product and packaging waste in the grocery supply chain by 3 % by 2015, from a 2012 baseline (p. 23).

### Finland - quantitative targets

Stabilise the amount of municipal waste at the level of the early years of this century (2.3-2.5 million tonnes annually) and ensure that the trend will be downwards by the year 2016.

### Germany - quantitative targets

The WPP does not contain quantitative targets for the overall programme and explicitly describes that the amount of generated waste is difficult to link to a national waste prevention programme.

### Hungary - quantitative targets

No

### Ireland - quantitative targets

All projects undertaken in the National Waste Prevention Programme have built-in metrics. Indicators are quantitative where possible and qualitative where appropriate.

### **Italy - quantitative targets**

The programme sets the following targets to be achieved by 2020, based on 2010 levels (p 7):

- α. 5 % reduction in the ratio: generated MSW/GDP; as a monitoring measure, the tendency of MSW/household consumption will be considered as well.
- β. 10 % reduction in the ratio: generated special hazardous waste/GDP.
- χ. 5 % reduction in the ratio: generated special non-hazardous waste/GDP.

Special waste include according to art. 184, paragraph 3 of Italian legislative decree 152/2006:

- a. waste from agriculture and agro-industry,
- b. waste resulting from demolition, construction, and from excavation activities;
- c. waste from industrial processes;
- d. manufacturing waste;
- e. waste from commercial activities;
- f. waste resulting from the activities of recovery and disposal of waste, sludge from treatment of water and
- g. waste arising from sanitary activities.

The programme stipulates that these targets could be changed into targets for single streams of waste types.

### **Latvia - quantitative targets**

Targets related to the indicators presented on page 87. Targets are:

- Not more than 400 kg per capita of MSW generated by 2020
- Not more than 650 000 tonnes of total MSW generated by 2020
- Not more than 50 000 tonnes of total hazardous waste generated by 2020

Other targets (p.87) are:

- 50 % of MSW recycled by 2020
- 75 % of hazardous waste recycled by 2020
- 75 % of manufacturing waste recycled by 2020
- Not more than 50 % of MSW landfilled by 2020
- Not more than 25 % of hazardous waste landfilled by 2020
- Not more than 25 % of manufacturing waste landfilled by 2020

### **Lithuania - quantitative targets**

The Waste Prevention Programme does not contain specific quantitative targets.

### **Luxembourg - quantitative targets**

To illustrate the methods used to fulfil the objectives of the waste prevention and management laws in Luxembourg, and response to the planning requirements imposed by the European Waste Directives.

### **Malta - quantitative targets**

The Maltese waste prevention programme describes specific targets especially in the field of food waste prevention:

- Increase the number of committed food reducers by 10% per annum (p. 188)
- Promote food waste reduction in at least 30 interventions of radio, television and newspapers (p. 188)
- Distribute food purchasing tips to at least half of the aggregated number of schools, medium to large employers, supermarkets and local food stores (p. 189)
- Aim to lower food waste from 22% to at least 15% over a period of five years (in percentage of the amount of purchased food ending up being wasted and directed to the solid waste stream) (p. 189)

### **The Netherlands - quantitative targets**

- The National Waste Management Plan states that the **total waste** generation in 2015 may not be greater than 68 Mton, and in 2021 may not be greater than 73 Mton (p.12).
- **Food Waste:** The Dutch goal is a decrease of 20% in food losses in 2015 compared to 2009. To achieve this objective, waste should decrease by between 276 and 522 kilotons (between 17 and 31 kilo per capita) (p.13).
- **Textile Waste:** By the end of 2015, the amount of textile waste discarded in residual waste is reduced by fifty percent compared to 2011.

### **Norway - quantitative targets**

No

### **Poland - quantitative targets**

No

### **Portugal - quantitative targets**

The program analyses the implications of four types of scenarios

- α. the 'optimistic' scenario
- β. the 'moderate' scenario
- χ. the 'PERSU II' (Strategic Plan for the Management of Municipal Solid Waste) scenario
- δ. the 'business-as-usual' scenario

The 'moderate' scenario is mentioned to be the most realistic, and it is regarded as a driving force of the program. This scenario envisions a 10% reduction in the per capita generated waste levels of 2007 by 2016, therefore the reduction is considered as an overall quantitative target.

### **Scotland - quantitative targets**

The target is to reduce waste arising by 7 % by 2017 against the 2011 baseline of 13.2 million tonnes. Longer term vision is to achieve a 15 % reduction by 2025 (p. 6).

### **Slovakia - quantitative targets**

The only quantitative targets are specified under the specific objective related to the BMW:

- Decreasing the amount of landfilled BMW to the level of 40 % of the amount in 1995 (944.000 t) (p. 41).
- Decreasing the amount of BMW waste sent to landfill by involving communities and households to increase composting as follows: 54 % of the municipalities with more than 1500 inhabitants to be involved in the community composting, and 47 % of households to participate in home composting (p. 42).

The deadline for the first mentioned target is continually until the end of the programme (year 2018). The deadline for the second mentioned target is 2018.

### **Spain - quantitative targets**

The main objective of the programme is to reduce 10 % of the amount of waste produced in 2010 by 2020 (in tonnes), (p. 25 & 37).

Re-use:

On February 20<sup>th</sup> 2015, Spain approved its new [Royal Decree 110/2015](#), on waste electrical and electronic equipment (WEEE), transposing into national law the EU WEEE Directive 2012/19, introducing the first national preparation for re-use target in Europe:

- ⤴ From January 1st 2017 to August 14th 2018 for large appliances (2%) and IT equipment (3%)
- ⤴ From August 15th 2018 for large appliances (3%) and IT equipment (4%)

As regards data on prevention, preparation for the re-use, recycling and recovery of WEEE (p. 127 of RD 110/2015):

1. On the collection of WEEE: amount in weight of the WEEE sent to classifying facilities, within the autonomous community of origin and in other destination communities (destination must be identified).

2. On the collection and sorting of WEEE: amount by weight of WEEE sent to preparation for re-use facilities, within the autonomous community of origin and other destination communities. Identification of the destination.

## **Sweden - quantitative targets**

The programme includes eight targets:

1. The amount of waste shall be reduced continuously compared to 2010 (p 25).
2. The content of hazardous substances in materials and products shall be reduced (p 25).
3. The food waste in the entire food chain shall decrease compared to 2010. The EPA has been mandated by the government to develop a numerical target for reduced food waste until January 2014 (p 33).
4. Textile waste from households shall decrease compared to 2010. The EPA has been mandated by the government to develop a numerical target for textile and textile waste until January 2014 (p 46).
5. The proportion of second-hand goods in total sales of textiles shall increase compared to 2014 (p 46).
6. The knowledge on use and content of hazardous substances in textiles has increased in the textile sector compared to 2014 (p 46).
7. In 2020 waste generation per m<sup>2</sup> built is decreased compared to 2014 (p 56).
8. By 2020, pre-processors and recyclers of WEEE have access to useful information on the composition of products and the content of hazardous substances compared to 2014 (p 66).

## **Wales - quantitative targets**

Overarching target is a significant reduction in waste (27 %) by 2025 and by 2050 a reduction of waste generation by 65 % compared to 2007 (p.2). Specific targets are:

### Household waste:

- Reduction of 1.2 per cent every year to 2050 based on 2006/7 baseline.
- This equates to 18 869 tonnes per annum of household waste (p.14).

### Industrial waste:

- Reduction of 1.4 per cent every year to 2050 based on 2006/7 baseline. (p.25).

### Commercial waste:

- Reduction of 1.2 per cent every year to 2050 based on 2006/7 baseline. (p.25).

### Construction and demolition waste:

- Reduction of 1.4 per cent every year to 2050 of waste treated off-site based on 2006/7 baseline (p. 44).

## **2.2.7 Prevention measures covered according to 98/2008 Annex IV (1-16)**

Measures in the waste prevention programmes are categorized according to the examples of measures indicated in Annex IV of the Waste Framework Directive (2008/98/EC).

### **Austria - Prevention measures covered according to 98/2008 Annex IV (1-16)**

The Austrian waste prevention programme gives a comprehensive overview about waste prevention measures and their implementation in Austria (pp. 226ff). The specific bundles of measures focus inter alia on the following topics:

1. Standardisation of the instrument “building pass”, indicating the use and location of raw materials and pollutants, and collection of core building pass data in the central building and apartment register (p. 230).
2. Pilot projects for selective demolition and reuse of construction materials (p. 230).
4. Prolonging the use phase of buildings, pilot projects for low-waste buildings (p. 230).
5. Development of teaching materials for low-waste construction (230).
6. Evaluation of the instrument “waste management concept” for strengthening the integrating waste prevention during the permitting process (232).
8. Best practice fact sheets for waste prevention in the production industries and training on waste prevention techniques; (p. 232).
10. Support for environmental management systems (p. 232).
12. Fact sheets and information campaigns for waste prevention in households, support for municipal waste advisors (p. 233).
- 12, 13. Development of quality standards and guidelines for NGOs dealing with un-used food, development of quality standards for second hand product (p. 235).
15. Strengthening of waste prevention in procurement guidelines (p. 236).
16. Support for re-use networks, development of networking platforms for the re-use and waste sector (p. 236).

### **Belgium (Brussels) - Prevention measures covered according to 98/2008 Annex IV (1-16)**

2. Commission the necessary studies to identify materials and techniques that inhibit disassembly, reuse and recycling or construction materials in order to propose alternatives (p. 36).
8. In the framework of the ‘ecodynamic company’ label, organise meetings for exchanges of good practices, so companies can learn from each other (p. 36). Develop awareness raising campaigns for SMEs on proper management and prevention of hazardous waste.
12. BE will develop a communication strategy to provide recurring campaigns of varying scope on household waste prevention (p. 10).
14. To encourage voluntary commitment of businesses (shops, hotels, restaurants and cafes), an ‘eco-dynamic company’ label will be developed. This label should take into account the environmental management of the business, but also the ‘products sold’ to consumers (p. 30).

16. Study the management of bulky waste collected door-to-door and at waste reception centres, in order to evaluate by material types which are the reusable waste fractions and identify priorities for action (p. 20).

### **England - Prevention measures covered according to 98/2008 Annex IV (1-16)**

Measures identified in the Waste Prevention Programme are listed below by measure:

#### 1, Planning measures/economic instruments:

- Implementation of the EU Ecodesign Directives and the EU Ecolabel scheme (p. 20).
- Development of an Industrial Strategy which sets out long-term approach to supporting business, giving confidence in growth and investment (p. 17).
- Development of local waste prevention plans by the public sector (p. 33).
- Work with the industry to explore how Individual Producer Responsibility can be implemented (p. 17).

#### 2, Research & Development:

- Supporting the business led Circular Economy Task Force, which looks at ways into capturing materials for remanufacturing and reuse.
- Promote work by the Technology Strategy Board and Knowledge Transfer Networks to support action on resource efficiency, products and innovation (p. 21).
- Investing £900,000 in Action Based Research pilots which test innovations in resource efficient products and business models, as well as supply chain innovations (p.21).
- Undertake research to fully understand opportunities and challenges of waste prevention activities (p. 22).
- Continuing to support the Product Sustainability Forum, which identifies the highest priority products to address to reduce environmental impacts associated with grocery consumption (p. 22).

#### 3, Indicators:

- Developing a suite of metrics to help monitor progress on waste prevention, enabling consistent measurement of, for example, financial, environmental and social impacts, and levels of engagement. (p. 6/21).
- Undertake work to establish a more robust baseline of waste arisings (p. 22).
- Development of the electronic duty of care system to obtain a more comprehensive picture of business waste (p. 22).

#### 4, Promotion of eco-design:

- Supporting the Technology Strategy Board in innovation in design (p. 19).
- Implementation of the EU Ecodesign Directives and the EU Ecolabel scheme (p. 20).
- Initiative "Great Recovery Project" supporting a shift toward design which is mindful of the whole system or life cycle of products, including investments in 'new design and business partnerships that re-think products, components and systems that "close the loop" (p. 27).
- Development of the Sustainable Electricals Action Plan (p. 18).

#### 5, Information on Best Available Techniques by industry:



- Bringing together investors and developers at networking events to share knowledge and expertise in business planning to enable projects to be more 'investment ready' (p. 20).
- Support the Product Sustainability Forum, which identifies the highest priority products to address to reduce environmental impacts associated with grocery consumption (p. 22).

#### 6, Training of competent authorities:

- Support training to local authorities to offer advice to local businesses and civil society groups to reduce waste (p.21).

#### 7, Prevent waste production at installations:

- Development of local waste prevention plans (p. 33).
- Provide clarification on the application of the definition of waste to help businesses realise reuse and repair opportunities (p. 17).

#### 8, Awareness campaigns, or provision of support to businesses:

- Deliver a two-year community partnership fund to take forward innovative waste prevention actions (p. 19).
- Improve information available to banks to enable them to promote business benefits of investment in resource efficiency (p. 20).
- Set up a business bank for small to medium-sized businesses, which will support access to finance for businesses (p. 20).
- Continuing the waste prevention loan fund, which supports action on prevention and reuse (p. 20).
- The Green Investment Bank invests in commercial and environmental UK projects (p. 20).
- Support training of local authority officers to advise businesses on waste prevention (p. 21).
- Work with businesses and social enterprises in asset management, repair and reuse sectors to increase capacity, quality of outputs and commercial sustainability (p. 21).
- Develop a framework of actions that realise the full benefits of corporate responsibility for businesses (p. 21).

#### 8, Availability of different toolkits for the business sector:

- Business Resource Efficiency Toolkit (helps identify ways for businesses to become more resource efficient and profitable), (p. 29).
- Facilities Management Procurement tool (provides information on how to ask for waste prevention measures when procuring services), (p. 29).
- ReThink Waste online tool (helps manufacturers reduce waste, improve resource efficiency and save money), (p. 29).
- Designing Out Waste Tool (helps improve materials resource efficiency in construction projects), (pg. 29).

#### 9, Use of voluntary agreements:

- Continuation of driving waste reduction within central government via the Greening Government Commitment (p. 18).
- Support of the Hospitality and Food Services Voluntary Agreement (p.18).

- Support of the Courtauld Commitment (p. 19).
- Support of the Sustainable Clothing Action Plan (p. 19).
- Development of the Sustainable Electricals Action Plan (p. 18).

#### 10, Promotion of environmental management systems:

- Continuation of driving waste reduction within central government via the Greening Government Commitment (pg. 18).
- Develop a framework of actions that realise the full benefits of corporate responsibility for businesses (pg. 21).
- Encouraging the public sector to become local leaders (action L1) which includes achieving standards such as ISO 14001 to demonstrate commitment to reducing material use and coherence of waste prevention policies across organisations (p.33).

#### 11, Economic instruments:

- Mandating a five pence charge on single use plastic carrier bags (p. 17).

#### 12, Awareness campaigns and information provided to consumers:

- Promoting resource efficiency and waste prevention in schools and higher education (p. 19).
- Development of a postcode locator to enable householders to find their nearest reuse and repair services (p. 21).
- Provision of guidance and communication materials which local authorities and others can use to promote action in their local areas (p. 21).

#### 13, Ecolabels:

- Work in partnership with the industry to increase consumer confidence in quality of second-hand goods on the development of a standard or similar mechanism for the reuse sector (p. 18).
- Implementation of the EU Ecolabel scheme which will bring waste prevention requirements into product standards (p. 20).

#### 14, Agreements with industry:

- Support of the Hospitality and Food Services Voluntary Agreement (p.18).
- Support of the Courtauld Commitment (p. 19).
- Support of the Sustainable Clothing Action Plan (p. 19).
- Development of the Sustainable Electricals Action Plan (p. 18).

#### 15, Procurement:

- Including waste prevention and reuse criteria into Government Buying Standards (p. 6, 17).
- Encourage authorities to engage in pre-procurement market engagement with a diverse range of suppliers and use outcome based tender requirements which support low waste solutions (p. 18).
- Implementation of the Public Services Act (2012) which requires commissioners of public services to consider how services benefit local people (p. 17).
- Work with the British Standards Institute to encourage inclusion of waste prevention requirements and principles in standards development (p. 21).

#### 16, Promotion of reuse and repair activities:

- Research pilots on trials of take back schemes for resale and leasing/hiring schemes (p. 21).
- Develop a standard or similar mechanism for reuse (p. 6, 18, 23).
- Pilot a government-wide "swap shop" (p. 18).
- Work with local authority collection facilities to increase opportunities for WEEE reuse (p. 17).
- Undertake further research into the opportunities and challenges in the repair sector (p. 22).

#### **Finland - Prevention measures covered according to 98/2008 Annex IV (1-16)**

1. Day-care centres and educational institutions draw up operating plan regarding sustainable production and consumption (p15).
2. Support pilot construction projects that promote innovation in sustainable construction and waste prevention. Make research on hazardous substances more efficient from the point of view of waste. Assess possible waste-related risks resulting from nanotechnology and biotechnology (p14).
3. Draw up practical indicators measuring material efficiency and production and consumption and explaining trends in waste volumes (p29).
4. Promote the incorporation of material efficiency criteria in product standards, implementation provisions covering the ecological development of energy-using products, and eco-labels (p11). Promote material efficiency in new construction using the environmental classification system for building (p14). When designing and constructing buildings and supervising building, emphasis should be put on building convertibility, durability of structures, prevention of water and module damage and the updatibility of building automation (p14). Reduce the use of certain hazardous substances and replace them with less hazardous alternatives (p19).
5. Gradually incorporate information on material efficiency and specific waste volumes in the sectoral BREFF documents of the EU (p13).
6. Include the harmful impacts caused by the chemicals during their waste phase when drawing up the guidelines for environmental permit authorities (p19).
8. Make better use of the expertise and active involvement of NGOs to enhance information campaign. Private sector may provide their staff with advice (p15).
9. Conclude sectoral agreements on a trial basis and set targets on material-efficiency (p12).
10. Constructors set targets for the eco-efficiency of building's life cycle in their quality and environmental systems, and in the terms and conditions for tenders (p14).
12. Broaden the consumers' right to get information about the durability of products (p11). Funding made available to the service centre for material efficiency established in 2007 (p12). Provide advisory services by municipalities on waste prevention (p14). Provide national advisory support services and information material on material efficiency (p14). Make better use of the expertise and active involvement of actors such as non-governmental organisations, school, educational institutions, libraries, retail chains to enhance information distributions to consumers (p15).

12,13 Revise minimum requirement on labelling and warranties found in consumer protection legislation (p11).

13. Companies add information and other key data on eco-efficiency to product labels as part of their customer service (p15).

15. Incorporate minimum requirements concerning product durability updatability, repair-ability and other material efficiency features in public procurement (p12).

16. Promote reuse of reusable, repairable and updatable products and building components in a collaborative effort involving municipalities, producer corporations, companies, the third sector and employment authorities (p12). Promote systematic building maintenance and material-efficient building renovation (p13). Examine the need for/chances of/benefits of providing a more extensive household deduction in connection with a) maintenance and repair services aimed at extending the useful life of household appliances, furniture and other consumer durables and b) purchases of renovation design services (p15). Municipalities promote small businesses on repair services via offering low-cost premises and publicity (p15).

Annex A of the programme gives an overview of ongoing prevention measures structured according to annex IV of the WFD, not all of them are included in the programme itself, .e.g the Irish tax on plastic bags or the development of a WEEE reuse protocol.

### **Germany - Prevention measures covered according to 98/2008 Annex IV (1-16)**

The German WPP differentiates between measures that are suggested for implementation, those that should be checked for further analysis and additional flanking measures by the German government to support the WPP. The measures for implementation e.g. by the federal states, local authorities and other public and private stakeholders, are suggested in the following:

12. Information and sensitisation campaigns aiming at different stakeholders with a special focus on the European Waste Reduction Week as an umbrella for on-going and future activities (page 28). Focal points shall be the diffusion of product service systems (e.g. car sharing) and campaigns that focus on the prevention of waste in consumer purchase decisions, e.g. the campaign on food waste prevention called “too good for the bin” (page 31).

4. The German government will support and participate in research to develop measurable criteria for the use of resources in design requirements for products (page 28).

16. Reuse shall be supported by awareness raising campaigns and information on all spatial levels and especially by the support for quality labels and standards.

2. Strengthening of waste prevention aspects in existing R&D programmes, especially with regard to monitoring and indicators (page 28).

3. The WPP describes that it will be necessary to develop indicators on material flows and their environmental assessment associated with the production, use and end-of-life phase of products (page 29).

6./7. The WPP describes the need to update regulations for waste prevention requirements in industrial plants, e.g. with regard to regulations on emissions. Also the responsible authorities shall be trained in considering waste prevention in permitting procedures (page 29).

10. The WPP aims to develop incentives to install environmental management systems especially in small and medium sized enterprises. For these companies it will be necessary to adapt the very complex systems like ISO or EMAS to their specific needs and to waste prevention aspects, e.g. like in the “EMAS easy” methodology (page 30).

15. With regard to GPP a decision has been taken that the competence centre for sustainable procurement at the Ministry for the Economy (BMWFi) will develop practical guidelines to integrate resource efficiency and waste prevention aspects into public procurement regulations (page 31).

11. The WPP describes how polluter-pays principle based waste fees help to increase awareness for cost saving potentials and waste-light consumption patterns. In Germany the local authorities are responsible for the development of public waste fee regulations (page 32).

13. The WPP suggests to include additional product groups into existing label schemes like the “Blauer Engel” – a very well know environmental label in Germany that already comprises resource efficiency criteria (page 32).

### **Hungary - Prevention measures covered according to 98/2008 Annex IV (1-16)**

1. Drafting a specific regulation for construction and demolition waste (p. 253).

2. Creation of a coordinating body for the prevention of construction and demolition waste that would among others support research and development in the field (p. 253).

2, 4. Supporting research and development, eco-innovation and eco-design (p. 261).

4. The transformation of the construction materials’ classification system (including the permitting of materials intended for reuse), (p. 254); Increasing the lifetime of buildings that have lost their functions and the redefinition of the functions (p. 252-254).

5. Knowledge transfer on waste prevention (p. 265).

5, 8. Encouraging the more pronounced incorporation of prevention into vocational training and corporate policies (p. 265).

5, 8. Encouraging the development of networking among the relevant experts (p. 265).

12. Providing information to the public on the current situation of waste prevention and on the related opportunities (p. 265).

12. Encouraging the more pronounced incorporation of prevention into public education and into the everyday life of citizens (p. 265).

12, 16. Communication campaign on reuse (p. 257).

15. In case of green public procurement determination of an obligatory percentage for the incorporation of reused materials at construction (p. 253-254); Drafting a regulation on green public procurement and the gradual tightening of its elements in order to meet the criteria of the EU GPP Toolkit (p. 258).

16. Establishment of technical working groups for analysing the general framework of reuse; Elaboration of the accreditation system for reuse centres; Establishment of reuse centres; Provision

of financial sources for the development of the reuse network; Establishing conditions for the social-based distribution of products suitable for reuse; Coordination of the reuse network (p. 254-257).

### **Ireland - Prevention measures covered according to 98/2008 Annex IV (1-16)**

The Irish National Waste Prevention Programme has developed a number of prevention initiatives targeting (p. 12 ff.):

- Business (Green Business, Green Hospitality, SMILE, Cleaner Greener production Programme, Local Authority Prevention Network)
- Households (Green Home Programme, StopFoodWaste)
- Hospitals (Green Healthcare Project)
- Retail (Green Retail Programme, StopFoodWaste)
- Packaging (Packaging Waste Prevention Programme)
- Local authorities (Local Authority Prevention Network, Stop Food Waste)
- Communities (Local Authority Prevention Network, Stop Food Waste, Green Home, Greening Communities)

1, 3, 6, 8, 12 The Local Authority Prevention Network (LAPN) aims to develop capacity in prevention in all local authorities to assist commercial and community initiatives. A key output from the programme is a fully searchable online catalogue (<http://repository.localprevention.ie>) drawing together all waste prevention/Resource Efficiency tools, techniques, materials, templates, case studies, etc., developed over time by LAPD/LAPN and an associated toolkit to assist any local authority looking to implement waste prevention initiatives in their area. (p. 13)

4, 5, 7, 8, 9, 14 The Green Business Initiative is aimed primarily at the business community in Ireland, with an emphasis on small and medium sized enterprises (SMEs). It provides tools and methodologies to help organisations to make financial savings by looking at their resource use, and also to help the environment.

7, 8, 9,10, 13 The Green Hospitality Award is a programme that has already generated in excess of €18 million in saving for 220 participating businesses, by providing an EMS based award scheme, benchmarking tools and audits. Over 110 hotels have gained awards. Four hotels have reached Platinum level, indicating world best practice.

5, 6, 12 The EPA's Stop Food Waste programme provides advice and tips on how to reduce food waste in the home by better buying, savvy storage and canny cooking and then on how to compost any food waste that cannot be prevented. The programme also provides benchmarks and guidance for businesses wishing to reduce their food waste and collates best practice case studies. Some guides to stopping food waste can be Downloaded on the EPA website:

<http://www.epa.ie/downloads/pubs/waste/stopfoodwaste/>

12 An initiative called Green Home is now being funded by the National Waste Prevention Programme to spread waste prevention to houses and communities.

1, 15 Prevention and managing hazardous waste is an important priority for all NWPP projects. A range of specific projects are underway in relation to implementation of the revised National Hazardous Waste Management Plan.

4, 6, 8 The Packaging Waste Prevention Programme aims to assist Irish businesses with positive and practical ways to reduce packaging and to promote those achievements to a wider audience.

16, The SMILE project is an industrial symbiosis project designed to facilitate the exchange of resources between businesses to reduce raw material costs and disposal of waste. Currently, over 500 businesses are members of SMILE.

Additional information can be found in the most recent Annual report on measures within the programme (<http://www.epa.ie/downloads/pubs/waste/prevention/name,32667,en.html>)

### **Italy - Prevention measures covered according to 98/2008 Annex IV (1-16)**

2. Waste prevention and minimisation research projects are being developed, co-financed by the EU within the LIFE+ programme; these are connected to the promotion of research (p 18-19).

4. Design EEE with a longer lifespan or easier to repair and/or reusable (p 27).

9. Signed agreements among Communities, government bodies in charge of waste management, large-scale distribution companies, volunteer organisations and charities for the redistribution of excess food products generated in the distribution phase of the supply chain; and quantity of redistributed excess food products p 20-21.

11. The Ministry of Environment issued a task force to define the next economic instruments with which the waste management will have to be organised (p 18).

12. With the aim of improving the information related to waste prevention, a website will be created. It will be an institutional site dedicated to waste prevention for all the different stakeholders, including business, citizens, schools and local governments, among other interested parties already active in the field of waste prevention (p 17).

15. Green public procurement: there is a National Action Plan for Green Public Procurement (GPP) which has been adopted in 2008 and updated in 2013. This has the objective of achieving in 2014 no less than 50 % of green procurement in respect to the total procurements of any category of contracts and supplies (p 15).

16. The promotion of waste prevention is recognised in a regulation, which establishes that the Ministry of Environment should adopt one or more decrees to define the operational modes to constitute and sustain accredited reuse/repair centres and networks. By the time the programme was written, these decrees were being elaborated by the Ministry of Environment (p16).

### **Latvia - Prevention measures covered according to 98/2008 Annex IV (1-16)**

1. Include a waste prevention programme and waste prevention measures into national planning and development documents (p. 116).

1. Evaluation of the potential of biodegradable waste to be used for energy production (p. 116).

1. Evaluate the differentiation of the natural resources tax rates for different groups of materials in order to promote efficient use of resources (p. 116).

2. Prioritise research in the areas of innovative production technologies (resource efficient production) and innovative recycling and recovery of waste (p. 116).
2. Research and development of the implementation of cleaner and less wasteful products and services, promoting efficient use of resources, and aiming at attracting the Norwegian Financial Mechanism funding for a new aid program for “green” industry (p.118).
2. Support higher education institutions in the studies on waste prevention and resource recovery from waste (p. 119).
3. In the Environmental Impact Assessment regulation the environmental impacts of possible alternatives to raw materials for the various production processes are evaluated (p. 119).
3. According to the laws and regulations on pollution, the waste facility operators must use the best available techniques that provide the least possible waste (p. 120).
3. Latvia intends to continue the application of the above two regulatory requirements (p. 119).
4. Development and application by the Cabinet of Ministers of regulations for the restriction of certain hazardous chemicals in electrical and electronic equipment (p. 120).
4. Promotion of eco-design issues in specialist higher education institutions, as well as vocational education curricula (p. 120).
5. Promote environmentally friendly technologies in the production of materials; promote resource conservation and prudent use of natural resources, and the substitution of virgin with recycled materials in the production processes (p. 121).
5. The establishment of sustainable production methods and training to work with the latest technologies (p. 121).
5. Initiate measures to promote environmentally friendly organic farming (p. 121).
6. Ensure the training of the staff of the State Environmental Services on waste prevention issues. Include training programmes for waste prevention measures in medical institutions (hospitals, surgeries, health centres, rehabilitation centres, and veterinary care practice jobs) (p. 121).
7. There is a requirement to include waste prevention in permits for Polluting Activities of category A or B or C according to existing legislation (CM 30.11.2010. Nr. 1082 of “Procedure for A, B and C categories of polluting activities”). Latvia intends to continue the application of these regulatory requirements (p. 122).
8. Continue the application of existing measures concerning the prevention of waste and criteria for the rational use of waste (p. 122).
8. Education of producers about environmentally friendly materials and efficient material inputs to production (p. 122).
8. Promoting eco-design issues in specialist higher education institutions, as well as vocational education curricula (p. 122).
9. Perspectives to evaluate the need to enter into such agreements, in case waste prevention cannot be achieved by the measures referred in Annex 5 of the Latvian WPP (p. 122).
10. Promotion of the European Union's Eco-Management and Audit Scheme (EMAS) (p. 123).



11. From 2008 there have been differentiated Natural Resource Taxation rates for plastic bags. Ordinary plastic bags are charged with a higher tax rate than others, such as bio-plastics and oxy-separating plastic, which are priced with significantly lower tax rates (p. 123).
11. The Latvian government will evaluate the effectiveness of the implemented measure and the subsequent application development tools (p. 123).
12. Support information activities to promote sustainable consumption and resource efficiency (p. 124).
13. Promote and support the application and use of eco-labelling (p. 126).
14. Perspectives to evaluate the need to enter into such agreements, in case waste prevention cannot be achieved by the measures referred in Annex 5 of the Latvian WPP (p. 126).
15. The Latvian Ministry of Environment has published information reports with recommendations to promote green public procurement for the state and municipal institutions, as well as the construction sector. Latvia intends to continue with these recommendations and promote the application of the recommendations (p. 126).
16. Examine the possibility of organising a system for collection of used textiles from households and textile by-products from textile businesses for reuse and recycling (p. 126).
16. Support businesses (especially SMEs) in re-use and/or preparation for re-use/repair operations (p. 127).
16. Municipalities to issue orders for the management of waste paper, waste electrical and electronic equipment and waste batteries and accumulators by local government institutions (p. 127).
16. Assess whether it is possible for state and local authorities to promote the re-use of old electrical and electronic equipment or to use some of their parts as spare parts and encourage such behavior as much as possible (p. 127).
16. Public education, calling on the individual responsibility to choose more environmentally friendly products and promoting sustainable consumption, which would reduce the consumption of goods, as well as to promote citizens' involvement in the re-use of products (p. 127).

#### **Lithuania - Prevention measures covered according to 98/2008 Annex IV (1-16)**

- 2., 1., 9. Initiate arrangements for the efficient use of resources and materials use and waste prevention with industry associations and develop voluntary waste prevention plans for individual industrial sectors.
2. Provide financial assistance to low-waste, innovative and efficient technologies, enabling more economical use of natural resources and avoiding waste.
4. Provide financial support for ecological design projects, including research, training and demonstration projects in the eco-industry product design and life-cycle analysis topics.
4. Develop eco-products (packaging and electrical and electronic equipment) design guides.

- 5., 6. Provide training for industry, agricultural companies, the Environmental Protection Agency and the regional environmental protection departments of the farmers, informing them of waste prevention opportunities and benefits, efficient use of natural resources, and the requirements for permits.
7. Make recommendations for a thorough examination of the priority waste streams concerning prevention measures for companies, institutions and organizations.
7. Make a feasibility study to assess the waste prevention measures and their effectiveness in Lithuanian industry, submit the findings for further waste prevention measures.
8. Initiate requirements for waste prevention included in the contract "Lithuanian Product of the Year" 'and' Environmental Achievements of assessment criteria and the prize, and (or) nominations for outstanding achievement in the field of waste prevention setting up a competition on Environmental Achievements.
- 9., 14. Initiate agreements with the trade sector in order to protect and develop the existing reuse systems of packaging to reduce waste generation.
10. Provide financial support to the industry and the construction sector in adapting to environmental management systems.
12. Organize a public awareness campaigns (practical advice on how to reduce food waste; promote the use of rechargeable batteries; waste prevention options on packaging; initiate competitions like "Green School" organization, to promote waste prevention and the promotion of sustainable way of living among pre-school and school age children.
13. With the help of shopping centres organize environmental eco-label promotional campaigns .
16. Support for waste prevention and preparation for re-use projects.

### **Luxembourg - Prevention measures covered according to 98/2008 Annex IV (1-16)**

1. The Waste Management Plan mentions SuperDrecksKëscht fir Betriber as an instrument used to set waste prevention measures in enterprises [L'action Super DrecksKëscht fir Betriber – page 334].
5. The counselling provided to enterprises through SuperDrecksKëscht fir Betriber is regarded in the WM Plan as a mean to provide information on waste prevention techniques with a view to facilitate the implementation of best available techniques [L'action Super DrecksKëscht fir Betriber – page 334].
- And*
8. To provide decision making support to business (L'action Super DrecksKëscht fir Betriber – page 334).
9. The use of voluntary agreements and sectoral negotiations in order that the relevant businesses or industrial sectors set their own waste prevention plans is encouraged [Une structure de coordination opérationnelle – page 89].
12. The use of awareness campaigns and information provision to the general public is mentioned several times, in relation to different types of waste streams (p 162).

16. The reuse and repair of appropriate discarded WEEE is promoted through the use of educational campaigns and the establishment of repair and reuse-centres (p 162).

### **Malta - Prevention measures covered according to 98/2008 Annex IV (1-16)**

4. Strengthening the producer's responsibility in minimising, through redesign, of packaging material in order to lower packaging related waste as well as to heighten awareness on which packaging may be recovered or otherwise (p. 185).

8. Working with businesses such that they will also become waste champions both operationally as well as by instilling a change in behaviour amongst their employees. Businesses will be provided with a manual of practical tips to implement at the workplace. They will also be encouraged to join the Waste Prevention campaign and to display this on their website and possibly all their communication material (p.184).

8. Unwanted mailings: Current operators are encouraged to examine the opportunities that exist, or may be created, to enable them to develop a virtual distribution platform for those who may wish to make a tangible environmental choice of receiving material in electronic rather than in physical format (p. 196).

8. Encourage catalogue and directory companies and magazine publishers to move away from letterbox to letterbox distribution in favour of online distribution (p. 196).

8. C&D waste: Discussions between MEPA, the KTP, MDA, FOBC and other relevant stakeholders should be undertaken, particularly when local plans are being revised, in order to factor in the need to limit unnecessary construction and demolition waste. This with a view to promoting the value of the limestone resource at excavation stage and to harness the potential of technology to make this process more resource efficient rather than simply generating more C&D waste (p. 199).

9. Strategic alliances will be sought with supermarkets in order to determine whether they are receptive to the presence of authorised personnel to be available on the premises to advise customers on their consumption patterns and to promote the wiser purchase of food. Government will also engage with the medium to large employers in order to use their employees as selected audiences for food waste reduction programmes. To this effect Government will ensure that there are a sufficient number of trained food champions to promote sustainable consumption in the community (p. 188).

12. Educational initiatives will be developed in order to provide a rolling programme of training for public administration employees, with a view towards enabling them to practice waste minimisation both at their place of work but also when at home (p. 183).

12. Working with schools will be supported so as to ensure that future generations are educated with a sustainability mindset. As far as possible, educational initiatives will try and permeate the homes with a view towards guiding people on better shopping habits (p. 183).

12. An online directory of waste management facilities and a list of enterprises whose products contribute towards minimising waste will be developed in a manner which may facilitate the identification of such enterprises by product, geographic location or any similar identifying criterion (p.184).

12. Create a greater awareness on the amount of food that a human being actually requires. This will be done by roadshows at local council level with a view to access members of the family who are free during the day and who are likely to be involved in the day to day shopping requirements. Moreover, such a presence will also be encouraged at public events with a view to reaching out to a wider audience (p. 187).

12. Work with a television producing company in order to develop a reality show aimed at rewarding food reducers (p. 188).

12. Home economists will be asked to provide guidelines for better education of households in their purchasing and consumption habits as well as leftover management (p. 187).

12. Television programmes which feature cooking spots shall be contacted with a view to dedicating certain cooking spots to cooking with leftovers. Food champions will also be asked to recount their personal experiences in order to demonstrate the tangible nature of changes in behaviour (p. 188).

15. Government will organise waste audits in all government Ministries across the whole of the public administration to determine the existing gaps and address them accordingly (p. 191).

15. Government will undertake a baseline study to establish to what extent waste related activities have contributed towards Government's Green Public Procurement. This will enable the identification of those products and materials, traditionally procured from the open market, which can be identified as representing the best possible for securing a shift towards tangibly demonstrating that waste can indeed be a resource. (p. 193).

16. Outreach activities to support community reuse initiatives involving the transfer of goods which are no longer required by one person and which may be reused by another. This prolongs the life of the object and prevents it entering the waste stream at an earlier stage (p.185).

### **The Netherlands - Prevention measures covered according to 98/2008 Annex IV (1-16)**

1. Include the prevention programme in the National Waste Management Plan (p.12).

1. Formulation of a strategy to influence consumer behaviour (p.12).

1. Development of a framework contract for a packaging sustainability agenda (p.18).

2. Perform an analysis of the environmental impact of plastic wrappers for magazines and alternatives (p.12).

2. Material efficiency in European methodology for ecodesign; further research within the EU Ecodesign Directive to accelerate European decision-making on the widened application of the Directive (p.12).

2. Textiles: Technological improvements; reducing use of chemicals, making the circuit more environmentally friendly and extending service life (p.17).

4. Supporting SME apply ecodesign; develop business tools for proper application of ecodesign for product improvement, e.g. the positioning of ecodesign in environmental management systems (p.12).

5. Encouraging eco application in the Netherlands; consultation with stakeholders to determine how circular design can be used in business (p.12).

- 5. Knowledge platform ecodesign; enable the access of businesses to knowledge on a more permanent basis (p.12).
- 7. Minimizing waste production in industry; various methods for process optimization (p.15).
- 7. More attention towards the reduction of the amount of waste through implementation of environmental performance calculation (p.16).
- 7. Implementation of Roadmap measures such as lighter products, limiting melt losses and improving separation techniques (p.17).
- 9. Reduce the use of plastic bags on the basis of voluntary arrangements (p.12).
- 10. Environmental companies; proper environmental management in companies, so that the number of companies with ISO 14001 certification will continue to grow (p.15).
- 11. Diftar (differentiated tariffs) for households and businesses (p.19).
- 11. "Accelerated depreciation of environmental investments" (VAMIL) and "Environmental investments" (MIA) (p.19).
- 11. Tax incentives for the sustainable use of raw materials (p.19).
- 12. Deployment of (new) media to highlight the usefulness and necessity of waste prevention to citizens (p.12).
- 12. Less waste in the consumption phase; information about potentials for longer use (p.16).
- 12. Reducing and optimizing residual waste by promoting transparency, raising awareness, eliminating confusion about "best before" dates (p.17).
- 13. Label commodities; information about the composition of the product (p.12).
- 14. Arrangements with the retail sector for an increase in the supply of sustainable products (p.16).
- 16. Promote methods for sustainable construction, more standardization, reuse of construction materials (p.16).
- 16. Less textile waste and more reuse by encouraging separate collection and increased reuse of textiles (p.17).
- 16. Reusing electrical appliances; examination of the development of an assessment system for 'sustainable collectors' (p.18).
- 16. Repair, distribution and sale of products; reinforcement of the infrastructure for reuse for optimal capture of goods and increase in performance (p.16).

### **Norway - Prevention measures covered according to 98/2008 Annex IV (1-16)**

- 3. Development of indicators for food waste by the environmental and statistical authorities (p.37).
- 4. The Ministry will support more strict international regulations for the use of chemicals in textiles (p. 35).
- 4. The Ministry will assess if the producer responsibility schemes to a greater degree are able to support waste prevention of packaging and WEEE.

5. Guidelines for a green public procurement of construction and estate operations (p. 35).
9. The Government will initiate mandatory collaboration with stakeholders in the food chain in order to prevent food waste (p.38). A great part of the sector has already shown an initiative to reduce the food waste through the programme "ForMat" (p.38).
12. Use of awareness campaigns and information provision directed at the general public about reuse, green products and the negative effects on the environment of large scale consumption (p.36).
12. Webpage ([www.erdetfarlig.no](http://www.erdetfarlig.no)) developed to give the users information about green products (p.34).
14. The Ministry will initiate a dialogue on increased collaboration between the producers/importers, the voluntary collectors and the municipalities about textile waste prevention (p.35).
15. Promotion of guidelines for a green public procurement of construction, plants and estate operations (p. 35).
  16. The promotion of the reuse and/or repair of appropriately discarded products at recycling centres (gjenvinningsstasjonerne) (p. 36).

#### **Poland - Prevention measures covered according to 98/2008 Annex IV (1-16)**

1. Raising the fees for waste disposal (particularly of mixed municipal waste, biodegradable waste and the waste previously untreated) (p. 56, p. 80).
2. Coordination and support for scientific research (technologies with a reduced rate of waste generation, products with less environmental impact during their use and after its completion) (p.64).
4. Development of clean technologies (p. 56, p. 80).
4. Supporting the introduction (implementation) of low-waste production technologies and ensuring the use of all possible components of the raw materials used (p. 56, p. 80).
4. Inclusion of criterion for eco-design in the development process of new products (p. 36).
4. Service life extension, reducing packaging weight and increasing the share of reusable packaging (p.37)
10. Promotion of environmental management (p. 56, p. 80).
12. Intensive environmental education to promote waste prevention (p. 56, p. 80).
13. The use of eco-labelling on the packaging that allows consumers to identify products that meet ecological criteria, including performance criteria and restrictions on the use of hazardous substances in packaging materials, thereby providing consumers with information on waste prevention at the time of purchase of the product (p. 37).

### **Portugal - Prevention measures covered according to 98/2008 Annex IV (1-16)**

1. The programme encourages the use of technical, organizational, regulatory, economic, and communication action mechanisms to promote the efficient use of resources (p 7678).
4. Promotion of the minimalist design for packaging or reusable/biodegradable packaging (p 7676).
6. Ensure the capacity to implement the program at the municipal level and provide training on best practices in Public Service Administration (p 7673).
8. Develop awareness campaigns to ensure the commitment of the economic agents towards waste prevention ( p 7673).
9. Promotion of voluntary initiatives (including product labelling) (p 7677).
12. Use of awareness campaigns and information provision directed at the general public. ( p 7673).
16. The promotion of the reuse and repair of products that permit this action (p 7677).

### **Scotland - Prevention measures covered according to 98/2008 Annex IV (1-16)**

5. Establishment of the “Resource Efficient Scotland Programme” to facilitate access to practical information for businesses and organisations to use resources more efficiently and improving competitiveness (including development of data and tools, early adopter network, development of a new pledge system) (p. 13).
- 5., 8. Resource Utilisation Assessments for businesses with the greatest potential environmental impacts (p. 14).
2. Investigation of different actors to better understand the movements of materials through the economy (including critical materials) (p.19).
2. Gathering evidence on the opportunities for Scotland from a deep shift towards a more circular economy (p. 16).
9. Ensure that existing voluntary agreements with key business sectors (supermarkets, hospitality, food and drink manufactures) work also for Scotland (p. 13).
- 8., 16. Introduction of a loan fund to support reprocessing and remanufacturing (investment in recycling and reprocessing plastics) (p. 15).
15. Public procurement to stimulate innovation. Evidence gathering to support the smarter use of public procurement in refurbishment and remanufacturing supported by the forthcoming Procurement Reform Bill (incl. sustainable procurement training to over 300 key buyers, best practise guidance, project to improve environmental performance across the Scottish Government Estate) (p. 15).
16. Increase the supply and demand for quality reusable items. Stimulating the development in refurbishment and the repair infrastructure, support pilots of collection systems for reusable items (including recycling centres and kerbside), awareness rising of households and businesses (p. 16).
- 4., 14. Promotion of sustainable product design through supporting the work of the Product Sustainability Forum helping businesses and others work together to improve the environmental performance of products (p. 17).

12. Targeting public engagement to support the programme and supporting teachers to equip school leavers with the relevant skills (p. 20).

12., 16. Promotion of community action to prevent waste through engagement of Scotland's Volunteers and Community Advocate programme. Support for intensive approaches to community engagement, evaluating their impacts and sharing outcomes to future priorities. Including a community-led demonstration project to explore how engagement in a defined area can impact on recycling and waste prevention (p. 20).

9., 11. Require retailers to charge for carrier bags from Oct. 2014 to reduce the number of bags in Scotland (voluntary agreements) (p. 20).

16. Investigating the role of standards and accreditation in ensuring consumer and business confidence in remanufactured products - helping develop new systems where required (p. 16).

2. Investigating the viability of alternative business models for consumer products, which could help replace some purchases with leasing or hiring (p. 16).

9. Zero Waste Scotland will support the further development of actions on producer responsibility, especially concerning packaging.

11. Zero Waste Scotland will evaluate the "Recycle and Reward" pilots of deposit return and reverse vending systems and examine the feasibility of a national deposit-return scheme to reduce litter and improve recycling (p. 19). In addition collection trials for small WEEE, using reverse logistics and collection hubs, to inform future activities will be undertaken.

### **Slovakia - Prevention measures covered according to 98/2008 Annex IV (1-16)**

1. Supporting the approach of quantitative collection – payments according the amount of generated waste (p. 39).

1. Reducing the amount of waste from promotional materials through implementation of the prohibition of delivering materials into mailboxes (Amendment to the Act on advertising) as well as the introduction of the economic responsibility for the collection and handling of advertising materials that become waste (p. 43-44).

1. Establishment of the legal obligation in the C&D sector for use of the various types of materials in such a way that materials could be reused or recycled (p. 45).

4. Promotion of eco-design - part of the study aimed at increasing the efficiency and reducing the harmfulness of packaging material (p. 44).

8. Focusing on promotion campaigns within the chain stores, hotels, restaurants and catering, which are producers of large amounts of food waste (p. 42).

10. Promotion of EMAS and EMS according to ISO 14001 for hazardous waste (p. 46).

12. Developing and implementing an information campaign about the proper storage and use of food (p. 42).

12. Improving public awareness through information and education campaigns, which will be aimed at preventing the generation of waste (municipal waste, paper, packaging waste and BMW). The financing of campaigns will be secured from multiple sources (p. 33).



16. Supporting the establishment of centres for re-using items such as furniture, electrical and electronic equipment, textiles, books, CDs, sports equipment, etc. (p. 39)

16. Supporting the establishment of material reuse centres or bazaars (p. 46).

### **Spain - Prevention measures covered according to 98/2008 Annex IV (1-16)**

1. Put into practice the strategy “more food, less waste” and local programmes to reduce food waste, while promoting proximity markets (p. 28);

1. Review the decree that regulates the generation and management of C&D waste to strengthen the prevention aspects in construction, demolition and rehabilitation projects, the possibility of establishing economic incentives could also be assessed (p. 28);

1. Include ratios of waste generation in the valuation of public procurement contracts, to be able to value waste prevention (p. 28);

1. Review the packaging regulations to strengthen the prevention of over-packaging, the use of reusable packaging and the marketing of easily recyclable packaging (p. 29);

1. Strengthen the effectiveness of hazardous waste minimisation plans by means of the analysis of such plans and the establishment of substitution programmes (p. 30);

1. Review the regulations related to EEE to strengthen the prevention aspects linked to the restriction of harmful substances in these and to foster its eco-design and reuse, foreseeing the possibility of establishing differentiated tariff criteria to finance WEEE management (p. 31).

2. Promote R&D projects oriented to: reduce food waste in the food supply chain (p. 28);

2. Develop selective demolition techniques (p. 28) and develop tools to assess the environmental performance of construction products and its potential reutilisation (p. 28);

2. The eco-design of packaging, the development and use of new materials in order to ease its recyclability (p. 29);

2. Substitute harmful substances in production processes (p. 30);

2. Extend the life of vehicles, tyres and batteries (p. 31).

4. Promote the eco-design for vehicles, to facilitate dismantling and recycling at the end-of-life stage (p. 31)

5. Support businesses with waste prevention, to modify their production processes, logistics and sales in order to reduce food waste (p. 28);

5. Provision of technical support and knowledge dissemination to companies to introduce waste prevention and reutilisation in C&D activities (p. 29);

5. Develop and implement benchmarking tools to make it possible to comparatively assess the different available packaging and help business to make decisions relative to prevent packaging, in addition to other tools that can help to calculate the recyclability of packaging (p. 29);

5. Promote the provision of information for managers to dismount vehicles and facilitate the reuse of their components (p. 31);

5. Promote the technical assistance to the chemical industry and transfer of results from research through Technical Centres and similar institutions (p. 30);
6. Promote the realisation of training programmes for staff responsible of providing authorisations and inspection of the chemical industry, to make sure prevention is included in these actions and is accomplished (p. 30)
8. Promote the establishment of EEE repair stores (p. 32);
- 8., 16. Promote the establishment of repair and second-hand stores for furniture, toys, books and textiles (p. 32).
9. Subscribe voluntary agreements with:
  - associations and social entities to make use of excess food items generated during the production and distribution phases of the supply chain (p. 28);
  - the construction sector to establish good practices within waste prevention (p. 29).
9. Use voluntary agreements to:
  - increase the sales in bulk;
  - use reusable industrial packaging;
  - promote the reduction of the consumption of single-use bags;
  - promote the reduction of the use of single-use packaging in the catering and hotel sector (p. 29);
  - apply the BAT oriented towards the substitution of harmful substances in the chemical industry (p. 30);
  - accelerate the substitution of heavy metals and other toxic substances in vehicles, tyres and batteries (p. 31);
  - promote the eco-design of EEE to facilitate repair and extend life (p. 31);
  - promote information aimed at facilitating the repair and reuse of EEE components and to provide information to citizens about the products' characteristics related to their management as waste (p. 31);
  - strengthen the reuse of EEE components in the professional field (p. 31).
10. Promote the implementation of credible environmental management systems in the chemical industry (p. 30).
12. Develop education and/or awareness campaigns to:
  - promote sustainable consumption of food in households, schools and hotels, promoting also "cooking without wasting" (p. 28)
  - incorporate prevention and particularly reuse in minor construction projects (p. 29)
  - emphasise the role consumers and final users have in the packaging waste reduction and reutilisation (p. 29)
  - promote the use of products equivalent to single-use/disposable items, that can be reused or have a longer life (p. 30)
  - improve the delivery of EEE to reuse centres and enhance their consumption (p. 32)
  - encourage the delivery and resale of furniture, toys, books and textiles at reuse centres (p. 32).

14. Subscribe voluntary agreements to use reusable commercial packaging in the hotel and catering sector (p. 29-30).
15. Include conditions in the public procurement documentation that can promote the reduction of packaging and to the use of reusable or refillable packaging (p. 30);
16. Promote pilot experiences to substitute single-use/disposable items for other products with a longer life (p. 30);
16. Promote the use of rechargeable batteries (p. 31);
16. Promote the reuse of parts or components of vehicles (p. 31);
16. Promote the use of second-hand or repaired tyres, provided that safety and quality can be guaranteed (p. 31);
16. Promote the establishment of used EEE collection networks, second-hand stores and EEE banks, for their reuse (p. 32);
16. Promote the establishment of used furniture, toys, books and textiles collection networks, second-hand stores and banks, for their reuse (p. 32).

[Sweden - Prevention measures covered according to 98/2008 Annex IV \(1-16\)](#)

[2. Participate in campaigns, research projects and networks to increase reuse and contribute to more sustainable textiles \(p 48\).](#)

[3. Develop indicators and statistics on waste prevention \(p 26\).](#)

[4. Within the EU seek to ensure that environmental aspects such as longer life, ability to repair and the content of hazardous substances are considered in the design of new products \(p 68\).](#)

[4. Manufacture, develop, purchase and sell textiles designed for long life and which do not contain hazardous substances and are possible to reuse and recycle \(p 49\).](#)

[5. Disseminate good examples of initiatives to prevent waste to private actors, county councils and municipalities \(p 26\).](#)

[7. Develop guidance on how the general environmental rules and the waste hierarchy should apply when inspecting the management of C&D waste \(p 57\).](#)

[9. Within the scope of the Swedish Government's action plan for a non-toxic everyday environment continue the dialogue with the textile industry stakeholders about how to phase out harmful substances through better knowledge and education. The Swedish EPA takes part in the dialogue \(p. 48\).](#)

[11. Assess and analyse policy instruments in order to reduce the amount of waste and the use of hazardous substances and prevent waste of Food, Textile, C&D and EEE \(p 26\).](#)

[12. Reduce food waste by informing consumers as a part of a three year mission initiated by the Swedish Government directed to the Swedish EPA, the National Food Agency and the Swedish Board of Agriculture \(p 34-35\).](#)

[12. Do a feasibility study to investigate the possibilities of making a scaled 'Leva Livet' project \(lifestyle project which combine well-being and a green way of living\) in cooperation with for example the Swedish Association of Local Authorities and Regions, municipalities and other important stakeholders \(p. 26\).](#)

[14. Through collaboration with other stakeholders disseminate information about the amounts of food waste, causes of food waste, how it can be reduced and the benefits \(environmental and economic\) \(p 34\).](#)

[14. Consider starting a network for operators and authorities working with electrical and electronic products with the purpose to increase knowledge about waste prevention, support innovative efforts and communicate good examples \(p 68\).](#)

[15. Guide on the possibilities of including waste prevention requirements in public procurement \(p 26\).](#)

[15. Monitor and evaluate the implementation of waste prevention requirements in connection with public procurement and purchasing. The evaluation will be followed up with new actions. \(p 26\).](#)

16. [Explore the public attitudes to re-use of electronics \(p 68\).](#)

### **Wales - Prevention measures covered according to 98/2008 Annex IV (1-16)**

1. The Collaborative Change Programme (CCP) offers all local authorities in Wales an opportunity to benefit from additional support to develop and deliver a detailed business plan for their waste collection services (p. 19).

1. Establish site waste management plans within the C & D sector aimed at minimizing and recycling waste and diverting it from landfill (p. 49).

4. The Welsh Government will seek to work with construction product manufacturers to identify ecodesign solutions for issues of production inefficiencies, generation of legacy waste and recyclability (p. 48).

4., 14. The Welsh Government will encourage designers/architects to design for the end-of-life of the building. This will ensure that the materials used in the construction of the development contain a high percentage of recycled content (helping to create a market for recycled materials and products) and that throughout the life of the building the materials can be either reused or recycled. We will work to raise awareness of the importance of designing for end of life (p. 52).

5. The Welsh Government will encourage the transfer of learning and best practice from the civil engineer sector to the construction sector by raising awareness, and promoting the use, of the value engineering methodology and associated tools (p. 49).

5. Welsh Government support for SMEs to reuse surplus materials (p. 52).

6. The Welsh Government will work with industry, process efficiency experts and Natural Resources Wales to better understand the degree to which industry has optimized its processes. Hazardous waste will be included in this work. It will also review the regulator's role in monitoring the performance of permitted industry. This work will form part of a waste evidence plan, which is being developed to support policy development and delivery (p. 32).

8. The Welsh Government is liaising with tourism bodies to develop support for SMEs in the sector and to encourage the adoption of good practice, without the need to measure and report (p. 30).
8. The Welsh Government will seek to increase awareness about 'designing out waste' among clients, designers and architects and encourage them to utilise these principles at the commencement of a construction project (p. 49).
8. Increasing awareness about waste prevention within the construction sector through the development, with partners, of a number of guidance documents, including guidance for manufacturers to ensure their product is handled appropriately to reduce the risk of damage/waste.
9. Working with large signatories of the hospitality and food service sector to the Agreement, where big hits can be achieved. This activity will focus on one-to-one tailored support that will embed the targets within business plans and develop good practice, which can be shared (p. 30).
9. It is intended to continue the activities within the Courtauld Commitment, a voluntary agreement between UK Governments and the British retail grocery and manufacturing sectors, managed by WRAP. In Courtauld Commitment 3 (2013-2015) different targets for households, manufacturing, packaging waste are set (p. 34).
11. Household financial incentives will be explored in the medium term, especially in respect of rewards (p. 18).
11. Welsh Government Carrier Bag Charge (p. 38).
12. Consumer campaigns will focus on the following waste prevention work streams: Food, clothing, shoes, electronic equipment, longer product life times, junk mail, compositing, real nappies, reuse and repair, hazardous household waste (p. 16-17).
13. Promoting the use and understanding of eco-labels (p. 17).
15. The Welsh Government will build on this work to ensure that all public sector organisations in Wales are in a position to introduce resource efficiency and waste prevention clauses into their contracts, and will lead by example in its own procurement activities (p. 33).
16. The Welsh Government has assessed options for increasing reuse, preparing for reuse and repair of household, business and construction and demolition products currently entering the waste system. Detailed options have been developed for electrical items, furniture and clothing (p. 55).

## **2.2.8 Indicators proposed and monitoring**

Indicators proposed in the waste prevention programmes are described. According to the Article 29(3), Member States shall determine appropriate specific qualitative or quantitative benchmarks for waste prevention measures adopted, in order to monitor and assess their progress.

### **Austria - indicators proposed**

Within the waste prevention programme a set of indicators has been developed, differentiating between core indicators and additional indicators (p. 241):

## **Core indicators**

Generation of

- waste from households and similar institutions per capita
- residual waste
- industrial waste
- hazardous waste
- of construction and demolition waste (without excavation)

Amount of

- separately collected packaging waste
- separately collected problematic materials

## **Additional indicators**

- For residual waste: mass of hazardous waste, mass of food (packed, unused, etc.)
- For Re-use: number and turnover of reuse organisations, number of sold second hand products
- For the degree of consumer awareness: surveys on knowledge about different aspects of waste and waste prevention
- For construction and demolition waste: recycling rates, landfilled waste, mass of hazardous waste

## **Belgium (Brussels) - indicators proposed**

BE will work on establishing specific indicators with regard to waste prevention.

## **England - indicators proposed**

The following indicators are considered (p. 14):

### **For household wastes**

- Waste arisings (Mt) per unit household economic activity.

### **For commercial and industrial, and construction and demolition waste:**

- Waste arisings (Mt) per unit Gross Value Added (GVA) in constant price (volume) terms.

Monitoring of individual actions, voluntary agreements and tracking of key indicators (including total amount of waste produced by sectors, amount of waste produced by sectors per unit of GVA (Gross Value Added), carbon impact of waste) to judge the success of the programme as a whole is envisaged in the programme.

By the end of 2014, a suite of metrics to help monitor progress on waste prevention, enabling consistent measurement of, for example, financial, environmental and social impacts, and levels of engagement shall be developed (p. 14).

### **Finland - indicators proposed**

The plan mentions of the need to improve the information base of the sustainable use of natural resources and the assessment of impacts of the prevention of waste prevention. It specifically refers to the creation of a database that can be used to calculate the CO<sub>2</sub> emissions and waste volume generated during materials' and products' life cycles (p29).

### **Germany - indicators proposed**

The programme describes several waste prevention indicators differentiating between indicators referring to direct impacts on waste generation/prevention (e.g. for specific measures or waste streams) and more general indicators like the number of educational measures on waste prevention in a region or the number of people in areas with waste-based fees. The WPP also mentions the waste intensity of specific industrial sectors (waste generation in relation to GDP) and the nationwide resource productivity – both indicators can be calculated based on existing statistics (page 25).

Specific indicators mentioned in the WPP include the share of reused electronic products, the share of reusable packaging, and a number of banned hazardous substances, the number of companies with environmental management systems or permits with specific waste prevention requirements (page 24).

In the end the WPP describes the need for further research on waste prevention indicators and does not define a specific monitoring system.

### **Hungary - indicators proposed**

General indicators (p. 268-269):

- the amount of annually generated municipal waste (t)
- the increase of the amount of separately collected municipal waste compared to the total amount of generated municipal waste (%)

Specific indicators (p.268-269):

- the reuse rate of materials originating from construction and demolition waste (%)
- number of accredited reuse centres;
- the size of population provided by the reuse centres (number of individuals)
- amount of second-hand products transferred to accredited reuse centres;
- the proportion of marketed second-hand products compared to the amount transferred to accredited reuse centres;
- the proportion of 'green' elements compared to all other criteria (%);
- number of companies introducing ISO 14001;
- number of companies introducing EMAS;
- number of students participating in courses on waste prevention;
- number of events related to waste prevention.

## **Ireland - indicators proposed**

Prevention is measured at project level. Indicators used in the National Waste Prevention Programme are (p. 20):

Available data is verified as appropriate and aggregated sectorally or by other means to indicate:

- the amount of resources conserved (tonnes of material, cubic metres of water, kWh of energy) – as measured before and after intervention;
- the quantity of waste prevented (measured as tonnes of waste generated before and after intervention); and
- money saved (the euro difference in waste/water/energy costs before and after intervention or change).

Examples of other indicators include:

- Production of residual waste per capita
- Cost of projects (such as waste prevention and treatment projects and time-scale
- Number of businesses contacted (by the different Waste Prevention Programmes) or participating
- Number of homes or communities contacted (by the different Waste Prevention Programmes) or participating in waste prevention or recycling
- Number of personnel involved in waste industry who have completed prevention courses
- Number of waste prevention officers operating in local authorities

However, quantitative indicators of this nature are only part of the story and cannot measure or represent all of the potential benefits of spending public money on waste prevention projects.

## **Italy - indicators proposed**

One or more indicators are specified for each measure, which are considered for different waste types.

### **Biodegradable Waste:**

- α. Number of decrees or guidelines related to food industry by-products p 19-20.
- β. Number of signed agreements among Communities, government bodies in charge of waste management, large-scale distribution companies, volunteer organisations and charities for the redistribution of excess food products generated in the distribution phase of the supply chain; realisation of guidelines (yes/no) and quantity of redistributed excess food products p 20-21.
- χ. Number of “ethical procurement groups” created, which are groups of consumers who cooperate in order to buy food and other commonly used goods directly from producers at a price that is fair to both parties p 21-22.
- δ. Drafting guidelines (yes/no) for environmental quality certification in the food service sector; and number of applications to this certification over the total amount of operators p 22.



- ε. The number of informative campaigns related to household food waste and elaboration of a handbook for household food waste reduction (yes/no) p 22-23.

#### **Paper Waste:**

- a. Number of distributed stickers for mailboxes indicating “no junk mail” and number of agreements with the marketing industry to dematerialise publicity p 23-24.
- b. Number of agreements with utilities to promote online communication with their clients, and number of utilities that adhere to online services p 24.
- c. Guidelines for public and private offices (yes/no), number of paper orders in offices, and number of public and private offices that adopted the computer protocol p 24.

#### **Packaging Waste:**

- a. Number of signed agreements to promote points of sale of loose/in bulk products, and number of businesses that practice sale of loose/in bulk products p 26.
- b. Number of information campaigns realised to favour the consumption of tap water instead of bottled water, number of programme agreements to favour the use of tap water, and number of installed public water fountains p 26.

#### **WEEE:**

- a. Number of awareness campaigns to orientate consumers towards the selection and acquisition of less impacting EEE, the correct use and discard mechanisms p 27.
- b. Number of products that enter and leave a reuse centre, and number of visits made to a reuse centres p 27-28.

These indicators will be monitored by the Ministry of Environment, through a “technical round table”, which will be constituted by public officers and the stakeholders involved in the accomplishments of the measures established in the programme p 7-8.

#### **Latvia - indicators proposed**

Table 17 on page 87 contains all the quantitative indicators proposed in the Waste Prevention Plan of Latvia. There are 9 indicators in total:

1. MSW waste generated (kg/cap)
2. Total MSW generated (tonnes/year)
3. Total amount of hazardous waste generated (tonnes/year)
4. Total amount of MSW waste recycled (% of the amount generated)
5. Total amount of hazardous waste recycled (% of the amount generated)
6. Total amount of manufacturing waste recycled (% of the amount generated)
7. Total amount of MSW landfilled (% of the amount generated)
8. Total amount of manufacturing waste landfilled (% of the amount generated)
9. Total amount of hazardous waste landfilled (% of the amount generated)

#### **Lithuania - indicators proposed**

Further indicators are:

- Municipal and other specific waste collected and the amount which could be prepared for reuse;
- The amount spent on the domestic market for packaging (tons and kilograms per capita) and the number of packages ready for re-use (tons, in circulation during the year in the domestic market for packaging in percent);
- Collected electrical and electronic equipment waste (in tons and kg per capita), and the amount of it prepared for re-use (in tons per year of WEEE generated in percent);
- Collected biodegradable municipal waste (both in separately collected waste fractions and biodegradable waste that is emitted into the mixed municipal waste stream) (tonnes and kg per capita per year).

### **Luxembourg - indicators proposed**

No

### **Malta - indicators proposed**

The Maltese waste prevention programme does not define specific indicators for the whole waste prevention programme. Nevertheless there are clear measurable objectives for priority areas and a variety of quantitative targets.

### **The Netherlands - indicators proposed**

The progress in the implementation of three quantified objectives of the National Waste Management Plan serves as indicator:

- Overall reduction of waste.
- Reduction of food waste.
- Decrease in the amount of textiles discarded.

Therefore the following types of data will be collected:

- Quantitative data (numbers).
- Qualitative data (the implementation of actions or amendments to regulations).

Practice shows that it is not always possible to monitor all goals and activities. In order to determine what should/should not be monitored and / or translated into specific indicators, four criteria were identified:

- Is information available or not?
- Is the expectation that such information will continue to be available in the future?
- Is the indicator valid for measuring and recording prevention or not?
- Are there any known disturbing factors, and is a proper interpretation possible on the basis of available data? (p.20)

### **Norway - indicators proposed**

No

However, the programme states that the Environmental Agency and Statistic Norway will develop food waste indicators (p. 37) and indicators for other waste streams (p.34).

### **Poland - indicators proposed**

Amount of waste generated (total and particular types of waste) (p. 75-78).

### **Portugal - indicators proposed**

- Amount of generated waste per capita time unit

#### **Quantitative:**

- % Urban Waste Reduction/cap =  $[(\text{kg/cap.day})_{\text{ref. year}} - (\text{kg/cap.day})_{\text{target year}}] / (\text{kg/cap.day})_{\text{ref. year}}$ .

#### **Qualitative:**

- Ex: number of actions implemented, number of communication campaigns developed or other tools for education and communication, number of users of community composting systems, etc'.

### **Scotland - indicators proposed**

#### **Indicators related to waste prevention:**

- Total amount of waste produced by sector (household, commerce, industry and construction and demolition).
- Amount of waste produced by sectors per unit of GVA (p. 12).

#### **Indicators broader than waste prevention:**

- Carbon impact of waste – the whole life impacts of waste including the benefits of prevention and recycling (p. 12).

### **Slovakia - indicators proposed**

The programme proposes the following indicators for waste prevention (p. 24):

- Total waste production
- Waste production per unit of GDP
- Waste production per capita.

Additional indicators will be developed on the basis of needs, to measure the effectiveness of the measures in the field of waste prevention (p. 24).

## **Spain - indicators proposed**

(Reference is made to p. 37)

1. Amount of generated waste/year.
2. Amount of generated waste per economic sector (activity).
3. Amount of generated waste/year./GDP
4. Amount of municipal waste/year.
5. Amount of hazardous waste/year/industrial GDP (GVA.)
6. Amount of C&D waste/year/GDP (GVA).
7. Amount of packaging waste/year.
8. Amount of WEEE/year
9. Amount of ELV/year.
10. Amount of end of life tyres/year.
11. Amount of waste from batteries and accumulators/year.
12. Number and economic value of R&D and innovation projects annually implemented related to waste prevention and sustainable consumption.
13. Number of waste prevention awareness campaigns realised/year
14. Number of voluntary agreements accomplished/year. Affected sectors.
15. Number of operative reuse centres and number of associated employments.
16. Total number of auditing registers from implemented EMAS and other environmental management systems.

To monitor the indicators, the information available from the National Statistics Institute, the Ministry of Economy and Competitiveness, the Ministry of Industry, Commerce and Energy, the Ministry of Agriculture, Food and Environment, the Autonomous Communities and the Local Entities will be used. (p.37)

## **Sweden - indicators proposed**

The indicators and monitoring are described in general terms for all targets. The indicator for amount of total waste will be based on total waste excluding mining waste (p 26). Indicators for the four focus areas (food, textile, C&D and WEEE) will be further developed (p 33, 46, 56 and 66).

The responsibility for the development and monitoring of the indicators are described in the programme.

## **Wales - indicators proposed**

- Total amount of waste produced by sector (household, commerce, industry, construction and demolition), (p. 19, 40, 54).
- Amount of waste produced by sectors (except households) per unit of GVA (p. 40, 54).

In the explanatory below, the various core topics are presented, including a presentation of the questions posed.

## **2.2.9 Full country abstracts on waste prevention programmes**

Full country abstracts on waste prevention programmes you can find at the Platform of the LAWPRET Program. Contact persons in the country you can find at the Apendix II.

### 3. Literature

- European Commission (2005a): COMMUNICATION FROM THE COMMISSION to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Taking sustainable use of resources forward: A Thematic Strategy on the prevention and recycling of waste. COM (2005)666, 21.12.2005.
- European Commission (2005b): Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on waste. COM(2005)667, 21.12.2005.
- Jackson, T. (2005): Motivating Sustainable Consumption - lessons from a review of evidence on consumer behaviour and behavioural change. Sustainable Development Commissions, Stirling, Großbritannien.
- Johnstone, N. (2005): Improving Recycling Markets. OECD Working Group on Waste Prevention and Recycling, Paris. [www.oecd.org/env/waste](http://www.oecd.org/env/waste).
- Melnitzky, St. (2004): Projekt 52: Eco Solutions – Neue Wege zu nachhaltigen Produkten und Dienstleistungen – Betriebliche Schulungen in Form einer Workshop-Reihe und begleitender Beratung. Kronos, Stenum, ARECon, Brainpool OEG, Wien. [www.abfallvermeidungwien.at](http://www.abfallvermeidungwien.at).
- Norwegian Ministry of the Environment (1994): Brundtland, G.H.: Oslo Symposium on Sustainable Consumption. Oslo
- WCED - World Commission on Environment and Development (1987): Our Common Future (Brundtland Report). Oxford University Press.

## 4. Selected links

This section provides links to some of the best information resources on environmental management available via the Internet. Sites listed below provide detailed technical and policy developed guidance on matters ranging from strategic waste prevention to the enforcement of environmental compliance.

- Eionet European Topic Centre on Sustainable Consumption and Production  
<http://scp.eionet.europa.eu/facts/WPP>
- Prepared by the European IPPC Bureau, reference documents called [BREF](#) outline “best available techniques” applicable to individual industrial sectors. The BREF’s guide the relevant authorities, industrial operators, and the public in the determination of BAT-based permit conditions.
- [EnviroWise Programme](#) is a UK government’s programme offering free, independent advice on practical ways to minimise waste and convert turnover into profit. It has published more than 70 best practice guides.
- The Joint Service [Pollution Prevention Technical Library](#) is a user friendly on-line source for information on technologies and management practices that eliminate or reduce pollutants through equipment changes, use of new technologies, or application of best management practices.
- OECD’s reference manual on [Strategic Waste Prevention](#) takes a life cycle approach to waste prevention, integrates a product-oriented perspective, and explores potential links of waste prevention policy to economy-wide material flows.
- US EPA’s [sector notebooks](#) provide an overview of characteristics of more than thirty industrial sectors, the potential environmental impacts of their operations, and applicable pollution prevention opportunities.
- This [US Environmental Protection Agency](#) site gives an excellent overview of the various pollution prevention projects and programs. It includes updated links to a wealth of technical and policy information on pollution prevention.
- [IMPEL](#) is a European mechanism for the exchange of experience in the management of the environmental permitting process and enforcement between various agencies in the EU countries. The site includes many practical reports on best practice in compliance monitoring.
- A [Guidebook of Financial Tools: Paying for Sustainable Environmental Systems](#) provides a good analysis of economic instruments and incentives for financing environmental projects, and includes concrete suggestions to seek financing of projects.
- INFORM’s [Community Waste Prevention Toolkit](#) is a resource to help community leaders and environmental organizations design and implement effective solid waste prevention programs in their towns and cities.
- The [Guide to Implementing Local Environmental Action Programs](#) explores how LEAPs can be launched at the community level; describes how to assess environmental issues and set priorities; and how to implement selected actions and monitor and evaluate results.

- The [Environmental Practice @ Work](#) provides environmental learning programs directly at the workplace. The information is very accessible and the education approach very practical, containing more than 750 screens of information.
- Link to EU Commission's guidance on waste prevention programmes <http://ec.europa.eu/environment/waste/prevention/guidelines.htm>
- Link to EU Commission's waste prevention fact sheets. Annex C. <http://ec.europa.eu/environment/waste/prevention/guidelines.htm>
- Link to ETC/SCP's country fact sheets on waste policies [http://scp.eionet.europa.eu/facts/factsheets\\_waste/2009\\_edition](http://scp.eionet.europa.eu/facts/factsheets_waste/2009_edition)
- Links to best practice <http://ec.europa.eu/environment/waste/prevention/practices.htm>
- [http://http://www.prewaste.eu/index.php?option=com\\_k2&view=itemlist&layout=category&task=category&id=49&Itemid=101](http://http://www.prewaste.eu/index.php?option=com_k2&view=itemlist&layout=category&task=category&id=49&Itemid=101)
- Links to legislation <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32008L0098:EN:NOT>

The section provides useful internet links to organizations active in the area of Sustainable Consumption and Production.

<p><b>EEA</b></p>	<p><a href="http://reports.eea.europa.eu/eea_report_2005_9/en">http://reports.eea.europa.eu/eea_report_2005_9/en</a></p> <p><a href="http://reports.eea.europa.eu/eea_report_2005_11/en">http://reports.eea.europa.eu/eea_report_2005_11/en</a></p> <p><a href="http://reports.eea.europa.eu/Topic_report_No_111999/en/tab_content_RLR">http://reports.eea.europa.eu/Topic_report_No_111999/en/tab_content_RLR</a></p>	<p>EEA report on sustainable use and management of natural resources</p> <p>EEA report on household consumption and the environment</p> <p>EEA Topic report No 11/1999: Making sustainability accountable: Eco-efficiency, resource productivity and innovation</p>
<p><b>DG Environment</b></p>	<p><a href="http://www.europa.eu.int/comm/environment/natres/index.htm">http://www.europa.eu.int/comm/environment/natres/index.htm</a></p>	<p>Commission's web pages on the 'Thematic Strategy on the Sustainable Use of Natural Resources' explaining the background of this Thematic Strategy, what the Commission has done about it and what is planned in the future. There is also information about how you can get involved.</p>
<p><b>European Topic Centre on Resource and Waste Management</b></p>	<p><a href="http://waste.eionet.europa.eu/">http://waste.eionet.europa.eu/</a></p>	<p>The ETC European Topic Centre on Resource and Waste Management (ETC/RWM) has accompanied the EU policy development since 2001. The main</p>



<b>(ETC/RWM)</b>		<p>focus has been on <a href="#">material flows</a>, applying the method of Material Flow Analysis (MFA). Comprehensive MFA <a href="#">data and indicators have been compiled for the EU</a>.</p> <p>The European Environment Agency (EEA) has published <a href="#">key findings and conclusions</a> in various reports</p>
<b>OECD</b>	<a href="http://www.oecd.org/departmen t/0,2688,en_2649_34441_1_1_1_1_1,00.html">http://www.oecd.org/departmen t/0,2688,en_2649_34441_1_1_1_1_1,00.html</a>	<p>OECD work on environmental data and indicators.</p>
<b>UN System of integrated Environmental and Economic Accounting (SEEA)</b>	<a href="http://unstats.un.org/unsd/enva ccounting/default.htm">http://unstats.un.org/unsd/enva ccounting/default.htm</a>	<p>The System of integrated Environmental and Economic Accounting (SEEA) was developed by UNSD as a satellite system of the System of National Accounts (SNA) to analyze environmental and economic concerns in a common and flexible framework.</p> <p>The London Group on Environmental Accounting was created in 1993 to provide a forum for practitioners to share their experience of developing and implementing environmental satellite accounts linked to the economic accounts of the SNA. It is currently participating in the SEEA revision process at the request of the Statistical Commission.</p>
<b>International Society for Industrial Ecology (ISIE)</b>	<a href="http://www.yale.edu/is4ie/">http://www.yale.edu/is4ie/</a>	<p>ISIE is a new society that promotes industrial ecology as a way of finding innovative solutions to complicated environmental problems and facilitates communication among scientists, engineers, policymakers, managers and advocates who are interested in how environmental concerns and economic activities can be better integrated.</p>
<b>Wuppertal Institute</b>	<a href="http://www.wupperinst.org">www.wupperinst.org</a>	<p>An interdisciplinary research institute oriented to solving problems in the area of applied sustainability research. The Wuppertal Institute develops guiding principles and concrete concepts in the</p>

		area of energy, transport, material flows and resource management, climate policy and eco-efficient enterprises as well as creating new and innovative models of wealth.
<b>ConAccount</b>	<a href="http://www.conaccount.net">www.conaccount.net</a>	ConAccount is a network of institutions working on Material Flow Analysis (MFA). The basic objectives of ConAccount are to support the information exchange between the scientists developing MFA and the users of the results, to provide the basis for the development of a coherent framework of MFA methodology, and to promote the use of MFA for statistics and policy.
<b>Factor Four – best practises</b>	<a href="http://www.wupperinst.org/FactorFour/FactorFour_best-practises.html">http://www.wupperinst.org/FactorFour/FactorFour_best-practises.html</a>	A website, maintained by the Wuppertal Institute, providing best practise examples of products and services following the Factor Four principle (including further links to other best practice websites).
<b>World Resources Institute</b>	<a href="http://www.wri.org">http://www.wri.org</a> <a href="http://pubs.wri.org/pubs_content_text.cfm?ContentID=627">http://pubs.wri.org/pubs_content_text.cfm?ContentID=627</a> <a href="http://pubs.wri.org/pubs_content_text.cfm?ContentID=628">http://pubs.wri.org/pubs_content_text.cfm?ContentID=628</a>	WRI is an environmental think tank that goes beyond research to find practical ways to protect the earth and improve people's lives. World Resources Institute provides information, ideas, and solutions to global environmental problems.
<b>UNEP Center for Sustainable Production and Consumption</b>	<a href="http://www.scp-centre.org">http://www.scp-centre.org</a>	The Centre contributes to the Plan of Implementation agreed at the World Summit on Sustainable Development in 2002 to promote sustainable patterns of consumption and production by providing scientific support to activities undertaken by UNEP and other organisations in the field of SCP.
<b>Institute for Interdisciplinary Research and Education (IFF) – Department Social Ecology</b>	<a href="http://www.iff.ac.at/socec/index_en.php">http://www.iff.ac.at/socec/index_en.php</a>	IFF Social Ecology focuses on the relationship between social and natural systems in the context of sustainable development. Inter-disciplinary approach is a central feature of the work, in both research and teaching.

<p><b>National Institute for Environmental Studies Japan (NIES)</b></p>	<p><a href="http://www.nies.go.jp/gaiyo/pdf2002/cycle/cycle-e.html">http://www.nies.go.jp/gaiyo/pdf2002/cycle/cycle-e.html</a></p>	<p>To tackle the growing environmental problems of the 21st century, NIES has restructured itself to respond to public needs with agility, as a flexible and efficient organization, one of which is "Waste Management and Sustainable Material Cycles" dealing with MFA approaches.</p>
<p><b>Ecological Footprint</b></p>	<p><a href="http://www.bestfootforward.com/">http://www.bestfootforward.com/</a>  <a href="http://www.redefiningprogress.org/">http://www.redefiningprogress.org/</a>  <a href="http://www.eea.europa.eu/Highlights/20051123145907">http://www.eea.europa.eu/Highlights/20051123145907</a></p>	<p>Ecological Footprint is an indicator to measure "use of nature," and increase awareness for sustainable development. Ecological Footprint accounts provide a conservative estimate of humanity's pressure on global ecosystems. They represent the biologically productive area required to produce the food and wood people consume, to supply space for infrastructure, and to absorb the greenhouse gas carbon dioxide (CO<sub>2</sub>) emitted from burning fossil fuels. The EEA sponsored national ecological footprint and biocapacity accounts for European countries in 2005.</p>

# APENDIX I

## What is Waste?

### 1. Introduction to waste

Waste includes all items that people no longer have any use for, which they either intend to get rid of or have already discarded. Additionally, wastes are such items which people are required to discard, for example by law because of their hazardous properties. Many items can be considered as waste e.g., household rubbish, sewage sludge, wastes from manufacturing activities, packaging items, discarded cars, old televisions, garden waste, old paint containers etc. Thus all our daily activities can give rise to a large variety of different wastes arising from different sources.

Over 1.8 billion tonnes of waste are generated each year in Europe. This equals to 3.5 tonnes per person. This is mainly made up of waste coming from households, commercial activities (e.g., shops, restaurants, hospitals etc.), industry (e.g. pharmaceutical companies, clothes manufacturers etc.), agriculture (e.g., slurry), construction and demolition projects, mining and quarrying activities and from the generation of energy. With such vast quantities of waste being produced, it is of vital importance that it is managed in such a way that it does not cause any harm to either human health or to the environment.

There are a number of different options available for the treatment and management of waste including [prevention](#), minimisation, re-use, recycling, energy recovery and disposal. Under EU policy, landfilling is seen as the last resort and should only be used when all the other options have been exhausted, i.e., only material that cannot be prevented, re-used, recycled or otherwise treated should be landfilled.

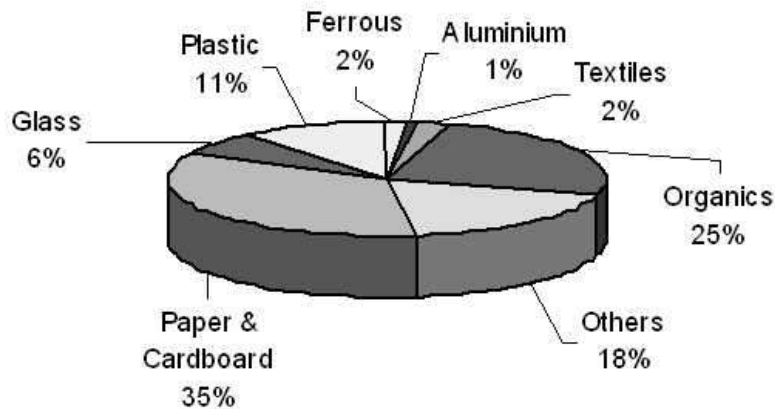
Further details on the different types of wastes which are produced and the various treatment options available can be found by clicking on the following links:

### 2. Waste types

#### 2.1 Municipal Waste (including Household and Commercial)

<b>Source</b>	Municipal waste is generated by households, commercial activities and other sources whose activities are similar to those of households and commercial enterprises. It does not include other waste arising e.g., from mining, industrial or construction and demolition processes.
<b>Content</b>	Municipal waste is made up to residual waste, bulky waste, secondary materials from separate collection (e.g., paper and glass), household hazardous waste, street sweepings and litter collections. It is made up of materials such as paper, cardboard, metals, textiles, organics (food and garden waste) and wood. Figure 1 highlights the typical composition of municipal waste. As can be seen, the

largest fraction is paper and cardboard at 35% of the waste stream, followed by organic material at 25%.



Municipal waste represents approximately 14% of all waste generated.

**Quantity**

**Management Routes**

Municipal waste has traditionally been landfilled and this remains the predominant management option in most countries. However, some countries have taken significant steps away from landfill. Alternatives offered include incineration (increasingly with recovery of energy), composting and recycling of glass, paper, metal, plastics and other materials.

**Environmental Relevance**

There are numerous potential impacts associated with the landfilling of waste including the production of leachate and landfill gas, odours, flies, vermin and the use of land.

**Further information**

- [Report: Household and Municipal Waste: Comparability of data in EEA member countries.](#)
- [Report: Baseline projections of selected waste streams.](#)
- [Report: Environmental Signals 2002.](#)
- [Waste definitions](#)

## 2.2 Industrial waste (including manufacturing)

**Source and content**

Manufacturing industry waste comprises many different waste streams arising from a wide range of industrial processes. Some of the largest waste generating industrial sectors in Western and Central Europe include the production of basic metals, food, beverage and tobacco products, wood and wood products

and paper and paper products.

**Quantity** It has been estimated that over 33 million tonnes of industrial waste was generated in Europe in 1998. Waste from the manufacturing sector continues to rise, despite national and international declarations to reduce waste from manufacturing industry, to introduce cleaner technologies and other waste minimisation initiatives and to work towards manufacturing practices that are sustainable in the long term.

The manufacturing industry has a central role to play in the prevention and reduction of waste as the products that they manufacture today become the wastes of tomorrow. Manufacturers can achieve this by:

- Environmental Relevance**
- considering the impacts of their products throughout its life at the design stage of the product;
  - using manufacturing processes that minimise material and energy usage;
  - eliminating or reducing where possible the use of substances or materials hazardous to health or the environment; and
  - manufacturing products in such a way that they last longer and may be recycled or reused at the end-of-life stage.

EU and government policy across Europe is increasingly driven by the need to influence manufacturing practices in an effort to decrease the environmental impact of products during their manufacture, use and end-of-life.

- Further information**
- [Waste definitions](#)
  - [Waste prevention section](#)

## 2.3 Hazardous waste

**Source** Hazardous waste arises from a wide range of different sources including households, commercial activities and industry.

**Quantity and content** Hazardous waste represents approximately 1% of all waste generated in Europe. Wastes are classified as being hazardous depending on whether they exhibit particular characteristics. Further details can be found by clicking on the following link: *Insert link to definitions section.*

**Management routes** The main disposal route for hazardous waste is landfill, incineration and physical or chemical treatment. On the recovery side, a significant proportion of hazardous waste is recycled or burned as a fuel.

**Environmental relevance** Although hazardous waste represents only approximately 1% of all waste generated in Europe, it can present a potential risk to both human health and

the environment. Hazardous waste is typically the subject of special legislation and requires special management arrangements to ensure that hazardous waste is kept separate from and treated differently to non-hazardous waste.

**Further information**

- [Report: Hazardous waste generation in EEA member countries \(2002\)](#)
- [Report: Dangerous substances in waste](#)
- [Report: Hazardous waste generation in selected European countries \(2000\)](#)
- [Waste definitions](#)

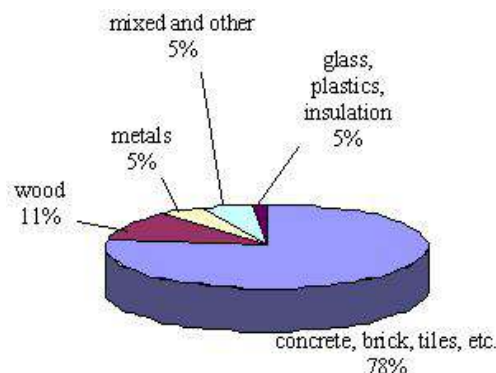
## 2.4 Construction and Demolition Waste

**Source**

Construction and demolition waste is made up of two individual components: *construction* waste and *demolition* waste. It arises from activities such as the construction of buildings and civil infrastructure, total or partial demolition of buildings and civil infrastructure, road planning and maintenance. In some countries even materials from land levelling are regarded as construction and demolition waste.

**Quantity and content**

Construction and demolition waste makes up approximately 25% of all waste generated in the EU with a large proportion arising from the demolition and renovation of old buildings. It is made up of numerous materials including concrete, bricks, wood, glass, metals, plastic, solvents, asbestos and excavated soil, many of which can be recycled in one way or another.



**Management routes**

The main methods used to treat and dispose of construction and demolition waste include landfill, incineration and recycling with some countries obtaining recycling rates as high as 80%.

**Environmental relevance**

Construction activity is seen as a key indicator of growth and prosperity in Western countries. However, construction and demolition waste instead of being a burden on society and the environment, can become a resource to be recycled and reused within the construction industry.

Construction and demolition waste has been identified as a priority waste stream by the European Union. This means that particular attention will be paid to policies and measures to ensure increased recycling of construction and demolition waste. Due to the very large volume of construction and demolition waste produced, it can use up valuable space in landfills. In addition, if not separated at source it can contain small amounts of hazardous waste. However, it also has a high resource value and the technology for the separation and recovery of construction and demolition waste is well established, readily accessible and in general inexpensive. Most importantly, there is a reuse market for aggregates derived from construction and demolition waste in roads, drainage and other construction projects.

**Further information**

- [Report: Review of selected waste streams: Sewage sludge, construction and demolition waste, waste oils, waste from coal-fired power plants and biodegradable municipal waste.](#)
- [Waste definitions](#)

## 2.5 Mining Waste

**Source**

Mining waste arises from prospecting, extraction, treatment and storage of minerals.

**Quantity and content**

Mining and quarrying activities give rise to the single biggest waste stream at 29% of the total quantity of waste generated in EEA countries. It has been shown that approximately 50% of the material extracted during extraction and mining activities in Europe becomes waste. It is made up of topsoil, overburden, waste rock, waste from the processing of the ore body (tailings) which may also include process water, process chemicals and portions of the remaining materials.

**Environmental relevance**

The two major concerns in relation to mining waste are the large volumes that are produced as well as the potential for hazardous substances to be present in the waste stream. Large areas of land are used for depositing mining waste and this activity has the potential to cause environmental pollution if not properly controlled. A number of recent cases of uncontrolled releases of mining waste to surface waters (rivers and lakes) have highlighted the risks of poor mining waste management. In response, the EU has proposed initiatives that are designed to improve mining waste management.



Further information

- [Waste definitions](#)

## 2.6 Waste from electrical and electronic equipment (WEEE)

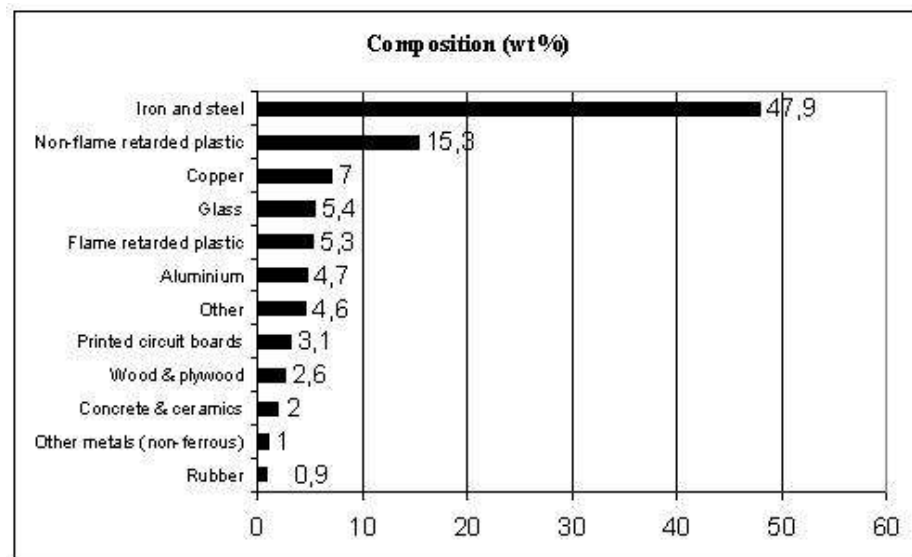
Waste electrical and electronic equipment (commonly referred to as WEEE) consists of end of life products and comprises of a range of electrical and electronic items such as:

**Source** Refrigerators, IT and telecommunication equipment, Freezers, Electrical and electronic tools, Washing machines, Medical equipment Toasters, Monitoring and control instruments, Hairdriers, Automatic dispensers, Televisions, etc.

Thus, sources are all users of electrical and electronic equipment from householders to all kinds of commercial and industrial activities.

WEEE is one of the fastest growing waste streams in the European Union and makes up approximately 4% of municipal waste. An estimate of the composition of WEEE arising is shown in Figure 4. As can be seen, iron and steel are the most common materials found in electrical and electronic equipment and account for almost half of the total weight of WEEE. Plastics are the second largest component by weight representing approximately 21% of WEEE. Non-ferrous metals including precious metals represent approximately 13% of the total weight of WEEE and glass around 5%.

**Quantity and content**



Expected growth rates are between 3 and 5% each year. This means that in five years time, 16-28% more WEEE will be generated and in 12 years the amount is

expected to double. This rapid growth rate is due to the fast pace of technological development, especially in information technology (IT) which have resulted in the more frequent replacement of electrical and electronic equipment by industry.

**Management  
Routes**

At present, a large proportion of WEEE is disposed of in landfills or incineration plants, depending on local or national practices. In some countries and regions, products such as fridges and freezers are separately collected and sent to recycling plants for dismantling and recycling.

WEEE has been identified as a priority waste stream by the European Commission due to its potentially hazardous nature, the consumption of resources in its manufacture and its expected growth rates. In response, the European Commission has prepared legislation in the form of the following two Directives:

- A Directive on Waste Electrical and Electronic Equipment (WEEE); and
- A Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment.

**Environmental  
relevance**

The European Commission is also preparing legislation in the form of the following draft Directive:

- A Directive on the Environmental Impact of Electrical and Electronic Equipment.

The directives propose that manufacturers will become responsible for taking back and recycling electrical and electronic equipment. This will in turn provide industry with incentives to design electrical and electronic equipment in an environmentally more efficient way, taking waste management issues into consideration.

**Further  
information**

- Report: Waste from Electrical and Electronic Equipment (coming soon)
- [Waste definitions](#)

## 2.7 Biodegradable municipal Waste

**Source**

Biodegradable Municipal Waste (BMW) is waste from households and commercial activities that is capable of undergoing biological decomposition. Food waste and garden waste, paper and cardboard are all classified as biodegradable municipal waste.

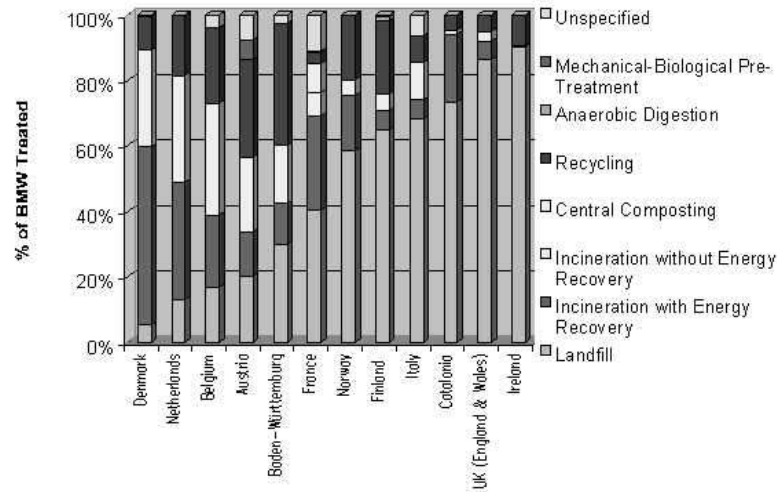
**Quantity**

Approximately 60% of municipal waste is biodegradable. In 1995, approximately 107 million tonnes of biodegradable municipal waste was produced in EU plus Norway of which 66 percent is consigned to landfill.

**Management  
routes**

A range of options are used to treat BMW. Alternatives to landfill include composting, mechanical-biological pre-treatment recycling and incineration (with

and without energy recovery). As can be seen from the figure below, those countries and regions such as Denmark, The Netherlands, Flanders and Austria, which have a low reliance on landfill, employ a mixture of incineration, composting and recycling to treat BMW.



**Environmental relevance**

Potential impacts associated with landfilling of biodegradable municipal waste include the production of leachate and landfill gas, odours, flies and vermin. In response to these concerns, the Landfill Directive (Council Directive 1999/31/EC), amongst other things, places targets for the reduction in the proportion of biodegradable municipal waste that may be consigned to landfill. By 2006 Member States are restricted to landfilling a maximum of 75% of the total amount by weight of BMW produced in 1995. This target increases to 50% in 2009 and 35% in 2016. To meet these targets, Member States are obliged to set up national strategies to reduce the quantity of biodegradable waste going to landfill.

**Further information**

[Report: Biodegradable Municipal Waste Management in Europe](#)  
[Report: Review of selected waste streams: Sewage sludge, construction and demolition waste, waste oils, waste from coal-fired power plants and biodegradable municipal waste](#)  
[Waste definitions](#)

## 2.8 Packaging waste

**Source**

Packaging is defined as any material which is used to contain, protect, handle, deliver and present goods. Items like glass bottles, plastic containers, aluminium cans, food wrappers, timber pallets and drums are all classified as packaging. Packaging waste can arise from a wide range of sources including supermarkets, retail outlets, manufacturing industries, households, hotels, hospitals, restaurants and transport companies.

**Quantity**

Packaging waste represents up to 17% of the municipal waste stream. As it has a relatively short life, it soon becomes a waste that must be treated or disposed off.



**Management routes**

A number of different methods are used to manage packaging waste. These included reuse, recycling (mechanical, chemical and feedstock), composting, thermal treatment and landfill. In 1998, approximately 50 percent of packaging waste was recycled in 12 EU countries with an additional 9% reported as being recovered (i.e, waste to energy). The remaining 41 percent of packaging waste was landfilled.

**Environmental relevance**

Packaging and packaging waste can have a number of impacts on the environment. Some of these impacts can be associated with the extraction of the raw materials used for manufacturing the packaging itself, impacts associated with the manufacturing processes, the collection of packaging waste and its subsequent treatment or disposal. In addition packaging may contain some critical substances e.g., PVC and heavy metals which may pose a risk to the environment.

**Further information**

- [Waste definitions](#)

## 2.9 End-of-Life Vehicles (ELVs) and Tyres

**Source**

End-of-life vehicles are defined as cars that hold up to a maximum of eight passengers in addition to the driver, and trucks and lorries that are used to carry goods up to a maximum mass of 3.5 tonnes. Thus their sources range from households to commercial and industrial uses.

**Quantity, content and management routes**

In the year 2000, 13.4 million cars were scrapped in the EU. This is projected to increase by 21% by 2015 to 17 million. Cars are composed of numerous different materials. Approximately 75% of the weight of a car is made up of steel and aluminium, most of which is recycled. Other materials present

include lead, mercury, cadmium and hexavalent chromium, in addition to other dangerous substances including anti-freeze, brake fluid and oils that, if not properly managed, may cause significant environmental pollution. The remainder is composed of plastic which is recycled, incinerated or landfilled.



<b>Environmental relevance</b>	<p>The EU introduced a directive on end of life vehicles (2000/53/EC) which had an implementation date of April 2002. The Directive's main focus is on waste prevention. It also contains provisions on recycling ELVs, producer responsibility, reduced use of hazardous substances and increased use of recycled materials in vehicle manufacture. Progressive targets are set out for ELV recycling. The Directive introduces provisions for the collection of all ELVs, with a requirement for ELVs to be transferred to authorised treatment facilities.</p>
<b>Further information</b>	<ul style="list-style-type: none"><li>• <a href="#">Report: Baseline projections of selected waste streams (1999)</a></li><li>• <a href="#">Report: Dangerous substances in waste</a></li><li>• <a href="#">Waste definitions</a></li></ul>

## 2.10 Agricultural waste

<b>Source</b>	<p>Agricultural waste is composed of organic wastes (animal excreta in the form of slurries and farmyard manures, spent mushroom compost, soiled water and silage effluent) and waste such as plastic, scrap machinery, fencing, pesticides, waste oils and veterinary medicines.</p>
<b>Quantity</b>	<p>No overall estimates are available on the quantity of agricultural waste produced in the EU. Ireland has estimated that in 1998 over 80% of national waste arising were from agricultural sources.</p>
<b>Management</b>	<p>There are a number of methods used to treat agricultural waste. These</p>

**routes** include spreading the waste on land under strict conditions, anaerobic digestion and composting.

**Environmental relevance** There are a number of potential environmental impacts associated with agricultural waste if it is not properly managed not least of which is the run-off of nutrients to surface waters which can cause over enrichment of the water body. Leaking and improper storage of agricultural waste can also pose a serious threat to the environment should the waste reach surface waters. In addition, farming activities can give rise to emissions of ammonia and methane which can cause acidification and contribute to greenhouse gases emissions.

**Further information**

- [Waste definitions](#)

## 3. Waste treatment

### 3.1 Prevention and Minimisation

### **Waste Prevention and Minimisation**

Prevention means eliminating or reducing the quantity of waste which is produced in the first place, thus reducing the quantity of waste which must be managed. Prevention can take the form of reducing the quantities of materials used in a process or reducing the quantity of harmful materials which may be contained in a product. Prevention can also include the reuse of products.

Prevention is the most desirable waste management option as it eliminates the need for handling, transporting, recycling or disposal of waste. It provides the highest level of environmental protection by optimising the use of resources and by removing a potential source of pollution.

Minimisation includes any process or activity that avoids, reduces or eliminates waste at its source or results in re-use or recycling. It can be difficult to draw a clear distinction between the terms "Prevention" and "Minimisation".

Waste prevention and minimisation measures can be applied at all stages in the life-cycle of a product including the production process, the marketing, distribution, or utilisation stages, up to discarding the product at the end-of life stage.

By examining each stage in the life cycle of a product, it may be possible that the quantities of waste produced at each stage can be reduced. During the design stage of a product, consideration can be given to the types of materials to be used, the quantity of materials and the recyclability of the product once it reaches its end of life. The use of efficient processes in terms of energy and material requirements during the manufacture of a product are other important considerations. Consideration can also be given to minimising the packaging for the product.

## **3.2 Re-use**

**Re-use** Re-use means the use of a product **or components that are not waste** on more than one occasion, either for the same purpose **for which they were conceived** or for a different purpose, without the need for reprocessing. Re-use avoids discarding a material to a waste stream when its initial use has concluded. It is preferable that a product be re-used in the same state e.g., returnable plastic pallets, using an empty glass jar for storing items and using second hand clothes. Reuse is normally preferable to recycling as there isn't the same requirement for the material to have gone through a detailed treatment process thus helping to save on energy and material usage.

**European Commission definition (Waste Framework Directive 2008/98):**

**re-use' means any operation by which products or components that are not waste**



are used again for the same purpose for which they were conceived;

### 3.3 Recycling

Recycling involves the treatment or reprocessing of a discarded waste material to make it suitable for subsequent re-use either for its original form or for other purposes. It includes recycling of organic wastes but excludes energy recovery.

**Recycling** Recycling benefits the environment by reducing the use of virgin materials. Many different materials can be recycled. Waste materials can either be recycled for use in products similar to their original use (e.g., paper recycling) or can be recycled into a product which is different than the original use (e.g., recycling plastic bottles into fleece jackets or using construction and demolition waste as road aggregate).

In the EU up to 13% of municipal waste is recycled.



## APENDIX II

### Contact list for waste prevention experts in the country/region

Country	Expert	Organisation	E-mail
Albania	NN	Agency of Environment and Forestry. Dept. Heavy Metals and Waste	<a href="#">N/A</a>
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Belgium (Flanders)	Jorn Verbeeck	OVAM, Flemish Waste & Materials Department, Dept. Policy Team Europe	<a href="mailto:jorn.verbeeck@ovam.be">jorn.verbeeck@ovam.be</a>
Belgium (Brussels)	Joëlle Van Bambeke	Brussels Environment (IBGE). Dept. Consommation durable et éco-comportement	<a href="mailto:jvanbambeke@environnement.irisnet.be">jvanbambeke@environnement.irisnet.be</a>
Belgium (Wallonia)	Martine Gillet	Direction Générale opérationnelle de l'Agriculture, des Ressources Naturelles et de l'Environnement	<a href="mailto:martine.gillet@spw.wallonie.be">martine.gillet@spw.wallonie.be</a>
Bosnia and Herzegovina	NN	Federal Ministry of Environment and Tourism	<a href="#">N/A</a>
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Croatia	Jasna Kufrin	Croatian Environment Agency. Waste Department	<a href="mailto:Jasna.Kufrin@azo.hr">Jasna.Kufrin@azo.hr</a>
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England	Ibidun Sanusi	DEFRA	<a href="mailto:ibidun.sanusi@defra.gsi.gov.uk">ibidun.sanusi@defra.gsi.gov.uk</a>
England	Isabella Murfin	DEFRA	<a href="mailto:Isabella.murfin@defra.gsi.gov.uk">Isabella.murfin@defra.gsi.gov.uk</a>
England	WPP helpline	DEFRA	<a href="mailto:defra.helpline@defra.gsi.gov.uk">defra.helpline@defra.gsi.gov.uk</a>
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France	Mélanie Calvet	Department for Natural Resource and Risk Economy, Ministry of	<a href="mailto:melanie.calvet@developpement-durable.gouv.fr">melanie.calvet@developpement-durable.gouv.fr</a>

		Ecology, Sustainable Development, Transport and Housing
Germany	Susann Krause	Federal Environment Agency Germany. Dept. Focal Point to the Basel Convention, Hazardous Waste, Municipal Waste Management <a href="mailto:susann.krause@uba.de">susann.krause@uba.de</a>
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Germany	Barbara Friedrich	Federal Environment Agency Germany. Dept. Focal Point to the Basel Convention, Hazardous Waste, Municipal Waste Management <a href="mailto:barbara.friedrich@uba.de">barbara.friedrich@uba.de</a>
Greece	Konstantina Kolokotroni	Cohesion Fund Management & Monitoring Special Service at Ministry of Economy and Finance (MOU S.A.) <a href="mailto:'k.kolokotroni@prv.ypeka.gr'">'k.kolokotroni@prv.ypeka.gr'</a>
Greece	Christina Zervou	Waste Management Department, Ministry of Environment, Energy and Climate Change <a href="mailto:ch.zervou@prv.ypeka.gr">ch.zervou@prv.ypeka.gr</a>
Greece	Vasileios Liogkas	MOU Ministry of Economy and Finance. Technical support unit. Solid waste & wastewater projects for the ministry of the environment <a href="mailto:vliogkas@mou.gr">vliogkas@mou.gr</a>

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Ireland	Odile Le Bolloch	Environmental Protection Agency. Dept. Resource Use Unit, Office of Climate, Licensing & Resource Use	<a href="mailto:o.lebolloch@epa.ie">o.lebolloch@epa.ie</a>
Ireland	Dr. Jonathan Derham	Environmental Protection Agency. Dept. Resource Use Unit, Office of Climate, Licensing & Resource Use	<a href="mailto:j.derham@epa.ie">j.derham@epa.ie</a>
Italy	Federica Incocciati	Divisione VI- Ministero dell'Ambiente e della Tutela del Territorio e del Mare	<a href="mailto:incocciati.federica@minambiente.it">incocciati.federica@minambiente.it</a>
Kosovo under UNSC Resolution 1244/99	Mimoza Hyseni	Kosovo Environmental Protection Agency. Dept. Environmental Monitoring Directory	<a href="mailto:mimoza.hyseni@ks-gov.net">mimoza.hyseni@ks-gov.net</a>
Latvia	Intars Cakars	Latvian Environment, Geology and Meteorology Centre. Dept. Environment and Subsoil Department Environmental Risk Division	<a href="mailto:Intars.Cakars@lvgmc.lv">Intars.Cakars@lvgmc.lv</a>
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		REPUBLIC OF LITHUANIA	
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Poland	Katarzyna Baranowska	Ministry of the Environment. Dept. of Waste Management	<a href="mailto:Katarzyna.baranowska@mos.gov.pl">Katarzyna.baranowska@mos.gov.pl</a>
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