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COMMISSION STAFF WORKING DOCUMENT

Accompanying

**the Communication from the Commission to the European Parliament, the Council, the
European Economic and Social Committee and the Committee of the Regions**

on the Thematic Strategy on the Prevention and Recycling of Waste

COM(2011) 13 final

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Glossary

6EAP – Sixth Environment Action Programme of the European Community 2002-2012 (Decision No 1600/2002/EC). The 6EAP set out the framework for environmental policy-making in the EU for 2002-2012, and outlines actions that need to be taken to achieve them. It also called for the development of seven ‘Thematic Strategies’, including those on the Prevention and Recycling of Waste, and on Natural Resources.

C&D waste – Construction and demolition waste, which includes concrete, bricks, gypsum, wood, glass, metals, plastic, solvents, asbestos and excavated soil arising from activities such as the construction of buildings and civil infrastructure, total or partial demolition of buildings and civil infrastructure, road planning and maintenance.

EEA – European Environment Agency.

ELV – End of life vehicles, as defined in Directive 2000/53/EC.

Energy recovery – The use of waste as fuel or other means to generate energy. Directive 2008/98/EC introduced specific new criteria to determine the efficiency level at which incineration in municipal waste incinerators can be deemed an energy recovery rather than disposal activity.

ETC/SCP - European Topic Centre on Sustainable Consumption and Production

Industrial waste – Industrial waste is waste generated in industrial and manufacturing processes such as basic metals, food, beverage and tobacco products, wood and wood products and paper and paper products.

LCA – Life cycle assessment (or analysis) – the investigation and evaluation of the environmental impacts of a given product or service caused or necessitated by its existence.

MS – Member State i.e. a country that is a member of the EU.

Municipal waste – Article 2 of Directive 1999/31/EC defines municipal waste as waste from households, as well as other waste which, because of its nature or composition, is similar to waste from households.

Preparing for re-use – Article 3 of Directive 2008/98/EC defines preparing for re-use as ‘checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing’.

Recovery – Article 3 of Directive 2008/98/EC defines recovery as ‘any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy’.

Recycling – Article 3 of Directive 2008/98/EC defines recycling as ‘any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations’.

Re-use – Article 3 of Directive 2008/98/EC defines re-use as ‘any operation by which products or components that are not waste are used again for the same purpose for which they were conceived’.

Waste Hierarchy – Article 4 of Directive 2008/98/EC makes the waste hierarchy a ‘priority order’ in waste prevention and management legislation and policy, and defines it as, in order of preference: (a) prevention; (b) preparing for re-use; (c) recycling; (d) other recovery, e.g. energy recovery; and (e) disposal.

Waste prevention – Article 4 of Directive 2008/98/EC defines prevention as ‘measures taken before a substance, material or product has become waste, that reduce: (a) the quantity of waste, including through the re-use of products or the extension of the life span of products; (b) the adverse impacts of the generated waste on the environment and human health; or (c) the content of harmful substances in materials and products’.

Waste TS or TS – Thematic Strategy on the Prevention and Recycling of Waste (COM(2005)666) adopted in December 2005.

WEEE – Waste electrical and electronic equipment, as defined in Directive 2002/96/EC.

WFD – Waste Framework Directive originally adopted in 1975 and revised in 2008 as Directive 2008/98/EC. The Directive must be transposed into National legislation by 12 of December 2010.

1. INTRODUCTION

The Thematic Strategy on the Prevention and Recycling of Waste was adopted in 2005. This formed part of a number of Thematic Strategies that were proposed under the 6th Environmental Action Plan. The Strategy states that the Commission will make a review in 2010 of the progress made towards achieving the Strategy's objectives. If necessary, additional measures should be identified to meet the objectives of the Strategy.

This document accompanies the report reviewing progress on the implementation of the strategy. It provides additional information and justification for the points which arose in the main report. It was established with the support of external expertise¹, EEA², Eurostat and on the basis of the data extracted from the Environment Policy Review³. A Stakeholder consultation was organised in May-June 2010, key messages are summarised in section 5 of the present document. The structure of the present working document follows the same as the main report.

2. PROGRESS ON KEY ACTIONS

2.1 Better Implementation

The Thematic Strategy on Waste Prevention and recycling recognized the need to ensure that legislation on waste is properly implemented. Several reports on the implementation of legislation were adopted by the Commission:

- report on the implementation of general waste legislation (COM(2009) 633);
- report on the implementation of waste shipment legislation (COM(2009) 282);
- and, a report on the implementation of End of Life Vehicles legislation (COM(2009) 635).

These reports highlight significant disparities between Member States. Insufficient importance is attached to the enforcement of waste laws particularly regarding the Waste Framework Directive, the Landfill Directive and the Waste Shipment Regulation.

The Commission has taken steps to aid the better implementation of waste legislation in Member States:

- Awareness-raising events have been held on the Waste Framework Directive and a web-based forum is being set up⁴. 15 information exchange and awareness-raising events have been held on Waste Shipment Regulations. Awareness-raising events on the application of community legislation on shipments of waste, on landfills, on waste management plans and on waste prevention programmes were also organised by the Commission⁵.

¹ Report supporting the Thematic Strategy on waste prevention and recycling, IEEP with Arcadis, Ecologic, Umweltbundesamt, BIO intelligence and VITO, 2010

² EEA 2010, The European Environment, State and Outlook 2010 : Thematic Assessment – Material Resources and Waste

³ See: <http://ec.europa.eu/environment/policyreview.htm>

⁴ <http://www.wasteconsult.de/Euwm/index.htm>

⁵ http://ec.europa.eu/environment/waste/shipments/pdf/report_131209.pdf

- Numerous guideline documents have been produced on waste stream specific legislation including Batteries⁶, End-of-Life Vehicles⁷, Electrical and Electronic Waste⁸ legislation and on the Waste Shipment Regulation⁹. These guidance documents are continually evolving. Notably the WEEE guidance document has been incorporated into the proposed recast of the Directive¹⁰. Additional guidelines on interpretation of the Waste Framework Directive, including the definition of waste, energy efficiency and the waste hierarchy, are under development.
- Joint enforcement and inspection actions have been carried out in cooperation with the IMPEL Network. The study 'Implementation and Enforcement of Environmental Law'¹¹ built on earlier work conducted by this organization finding that 20% of waste shipments were illegal. A study is currently being undertaken on the case for developing European level legislation on the criteria and standards of shipment inspections.
- The revised Waste Framework Directive¹² includes revised obligations on Member States to produce Waste Management Plans; including for example, simplified reporting formats and the requirement for waste prevention planning. A study has been launched to analyse national plans and to help provide guidelines for MS for further improved reporting.
- Financial support has been made available for Member States through Cohesion Policy¹³ to improve waste management systems. The total support for waste management policies for the period 2000-2006 amounted to around 4.1 billion € of which 1.5 billion € from European Fund for Regional Development (ERDF) and 2.6 billion € from the Cohesion Fund¹⁴. Projects funded under ERDF have led to the closure or rehabilitation of 964 unauthorised landfills (mainly in Spain and Greece) and the creation of new treatment capacity of 231,649 m³ per day in Spain and Hungary). Beyond public support, waste management has become more and more attractive for private enterprises as demonstrated in an ex post study achieved by DG REGIO on the use of the Cohesions funds.
- According to another DG REGIO study¹⁵, the global investment need for municipal solid waste management and for the period 2007-2013 for the EU 12 plus Greece, Portugal and Spain is estimated at 8,398 M €(in 2004 prices).

The Commission made an assessment on the feasibility of the creation of a waste implementation agency¹⁶.

⁶ See : <http://ec.europa.eu/environment/waste/batteries/index.htm>

⁷ Directive 2000/53/EC on End-of-Life Vehicles Guidance Document, January 2005, European Commission., see: http://ec.europa.eu/environment/waste/pdf/guidance_doc.pdf

⁸ http://ec.europa.eu/environment/waste/weee_index.htm

⁹ <http://ec.europa.eu/environment/waste/shipments/guidance.htm>

¹⁰ (COM(2008) 810)

¹¹ Seaport project II: 'International cooperation in enforcement hitting illegal waste shipments', June 2006, European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL), no110643/CE6/0M9/000398. See: <http://impel.eu/wp-content/uploads/2010/02/2005-8-Seaport-II-Final-Report.pdf>

¹² Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives

¹³ Council Regulation (EC) No 1084/2006 of 11 July 2006 establishing a Cohesion Fund

¹⁴ Source: DG REGIO estimations and DG REGIO study on the "ex-post evaluation of Cohesion Policy Programmes 2000-2006", See:

http://ec.europa.eu/regional_policy/sources/docgener/evaluation/expost2006/wp5b_en.htm

¹⁵ http://ec.europa.eu/regional_policy/sources/docgener/evaluation/pdf/strategic_environ.pdf

The study identified key problems in the implementation and enforcement of EU waste legislation such as the lack of sufficient capacity, coordination and organisation to ensure an appropriate enforcement of the waste legislation. In some Member States, implementation of EU waste legislation is not considered as a key priority, resulting in insufficient allocation of resources for enforcement.

2.2 Simplification and Modernisation

In order to further simplify and modernise the EU waste legislation, the following initiatives were taken:

Waste Framework Directive

The Waste Framework Directive (2008/98/EC) repealed directives on waste disposal (75/439/EEC), hazardous waste (91/689/EEC) and waste oils (2006/12/EC). The Directive also added clarity by incorporating basic definitions relating to waste management. It also opened the possibility to establish "end-of-waste" criteria for certain waste streams in order to simplify the procedures. Criteria for ferrous, aluminium and copper scrap metals as well as for paper, glass and Biowaste are under development.

Waste Shipment Regulations

Regulation (EC) No 1013/2006 on shipments of waste came into force in July 2007. It aims to reinforce, simplify and specify the existing procedures for controlling waste shipments. This has been done through streamlining the existing control procedures, incorporating recent changes of international law (including incorporating into EU legislation the amendments to the lists of waste annexed to the Basel Convention as well as the revision adopted by the Organization for Economic Cooperation and Development in 2001) and strengthening the provisions on enforcement and cooperation between Member States in case of illegal shipments.

Since 2007 several amendments have been made to the regulations to take into account technical progress and the changes agreed under the Basel convention¹⁷. In addition instructions for completing notifications and movement documents have been developed and answers from non-OECD countries concerning their rules on import of green-listed non-hazardous wastes have been incorporated¹⁸.

End-of-Life Vehicle Directive

The End of Life Vehicles Directive (2000/53/EC) came into force in 2006. Work is being done with the industry to make the requirements for design more specific, further reducing the

¹⁶ 'Study on the feasibility of the establishment of a Waste Implementation Agency', Dec 2009, Milieu Ltd, AmbienDura and FFact for the European Commission, http://ec.europa.eu/environment/waste/pdf/report_waste_dec09.pdf.

¹⁷ Commission Regulation (EC) No 308/2009, Commission Regulation (EC) No 1379/2007, Commission Regulation (EC) No 669/2008

¹⁸ Commission Regulation (EC) No 1418/2007, Commission Regulation (EC) No 740/2008, Commission Regulation (EC) No 967/2009

numbers of hazardous materials used. To date four amendments have been made to annex II of the directive and the Fifth Amendment is currently being discussed¹⁹.

Guidance documents to assist Member States in their efforts to produce high-quality and harmonised data on end-of-life vehicles (ELVs) in accordance with the reporting requirements of Commission Decision 2005/293/EC are in preparation.

Waste Electrical and Electronic Equipment (WEEE) Directive and Directive Restricting the use of Hazardous Substances (RoHS)

EU legislation restricting the use of hazardous substances in electrical and electronic equipment (RoHS Directive 2002/95/EC) and promoting the collection and recycling of such equipment (WEEE Directive 2002/96/EC) has been in force since February 2003. In December 2008, the Commission proposed that these Directives should be recast (COM(2008) 810). The proposed recast targets are significantly higher but more flexible, taking into account the divergent consumption rates of electronic equipment for different Member States.

Registration and reporting may also be harmonised, in accordance with a communication on Distance sellers issued in October 2009 (COM(2009)557). This will work to reduce market barriers between Member States and reduce administrative burden when cross border market transactions occur.

Streamlined reporting under the Landfill Directive

The Waste Statistics Regulation (Regulation (EC) No 2150/2002, WStatR) will cover data collections from 2010 onwards on the number of existing landfills, their remaining capacity and the number of landfills closed; data which is currently collected by the questionnaire in Commission Decision 2000/738/EC. The data frequency will increase from every three years to every second year. Hence, the redundant information request will be deleted from the implementation questionnaire immediately without creating a data gap.

Stoiber Group recommendations

The Stoiber high level group was established with the aim to reduce administrative burden by 25% by 2012. The group produced recommendations on waste and the environment²⁰. Many of the recommendations have been taken onboard. In particular, recommendations on the relabeling of batteries and harmonisation of the European waste list have been taken into consideration. In addition, aspects such as harmonisation for information exchange using electronic systems for waste shipments are being taken up by some Member States. For ELV the suggestion to register and deregister the vehicles electronically has been addressed to the Member States. In the proposed re-cast of the Electric and Electronic Waste Equipment (WEEE) Directive, methods of registration and reporting are also planned to be standardised, thus reducing market barriers and administrative burdens. The registration procedure for battery producers was standardised in 2009.

¹⁹ See: http://ec.europa.eu/environment/waste/elv_index.htm

²⁰ Administrative burden reduction; priority area Environment, April 2009, European Commission. See: http://ec.europa.eu/enterprise/policies/better-regulation/files/hlg_opinion_environment_160409_en.pdf

In addition to the initiatives described above, the Commission has launched a study on coherence of waste legislation focusing on the consistency of the recycling directives with the WFD and with resource efficiency objectives and consistently addressing the question of extended producer responsibility. Additional initiatives to further simplify and clarify the legislation might be proposed as a result.

2.3 Diffusion and integration of key concepts

The Strategy brought together a number of key concepts such as Life-Cycle thinking, waste hierarchy and Producer responsibility.

Life cycle thinking – Life-cycle thinking is the consideration of the supply chains, use, as well as the end of life management associated the provision of goods and services (collectively termed products) - sometimes called "from cradle to grave". The environmental impacts and the resources consumed associated with a product's life cycle are assessed. Life Cycle Assessment (LCA) is one tool - standardised in ISO14040/44 - that quantitatively supports life-cycle thinking.

Life Cycle thinking as a concept has been actively developed and promoted by the European Union²¹ detailed guidance on life cycle assessments has been produced²². For example, the International Reference Life Cycle Data System Handbook was launched in 2010, providing detailed guidance on how to conduct assessments in line with international standards. New guidance documents are currently finalised on Life Cycle Thinking for Biowaste, construction waste and general waste management.

The Waste Framework Directive requires Member use life-cycle thinking. The only deviation from the waste hierarchy can solely be justified through life cycle analysis (Article 4 Directive 2008/98/EC). The life cycle thinking perspective is incorporated into the Eco-design Directive (Directive 2005/32/EC) as well as highlighted as a desirable approach in the Sustainable Consumption and Production and Sustainable Industries Policy Action Plan (COM(2008) 397). This Action Plan highlights the ways in which the Commission will work to ensure the life cycle approach is extended across product streams and ways in which further information on life cycle impacts of products will be made available to consumers.

The objective of the Ecodesign Directive (2009/125/EC) is to improve the overall environmental performance of products. In principle it applies to any product, but the priority was given to energy-using (e.g. appliances) and other energy-related (e.g. windows, insulation) products (apart from vehicles). The Directive includes a process, conditions and criteria for setting requirements regarding environmentally-relevant product characteristics to be met for products to be placed on the market. The Directive defines ecodesign parameters relating to different phases in the product life cycle: raw material selection and use; manufacturing; packaging, transport, and distribution; installation and maintenance; use; and end-of-life.

For each phase, the following aspects of the product must be assessed: predicted consumption of materials, of energy and of other resources; anticipated emissions to air, water or soil;

²¹ See: http://lct.jrc.ec.europa.eu/index_jrc

²² ILCD Handbook, 2010, European Commission & Institute for Environment and Sustainability. See: <http://lct.jrc.ec.europa.eu/pdf-directory/ILCD-Handbook-General-guide-for-LCA-DETAIL-online-12March2010.pdf>

anticipated pollution; expected generation of waste material; and possibilities for reuse, recycling and recovery of materials or of energy.

Waste Hierarchy – The Waste Framework Directive lays down the waste hierarchy and requires Member States to apply the hierarchy when developing their national waste policies and legislation (Article 4 Directive 2008/98/EC). Guidance tools on how to apply the life-cycle approach in waste policies are about to be finalised and will be published soon.

Extended Producer Responsibility – The definition of Extended Producer Responsibility is set out in the Waste Framework Directive and gives power to Member States to take legislative measures to apply this concept (Article 8 Directive 2008/98/EC). Extended responsibility is also being considered as part of the recast of the WEEE Directive (COM(2008) 810).

2.4 Waste Prevention (table on waste prevention in EU policies)

The definition of waste prevention is set out in the Waste Framework Directive (Article 3.12 Directive 2008/98/EC). In addition, the Directive contains the following requirements on waste prevention:

- Member States have to establish waste prevention programmes no later than 12 December 2013 (Article 29). Guidelines for these waste prevention programmes are currently under review and will be made available shortly.
- The Commission will report on waste prevention and the associated measures deemed appropriate. (Article 9).

To ensure that Waste Prevention remains a priority it has been incorporated into legislation on different waste streams:

- The Batteries Directive²³ bans or restricts the use of 2 heavy metals (mercury in all batteries and cadmium in portable batteries with certain exemptions).
- WEEE and its sister Directive on RoHS²⁴: restricts the use of a number of heavy metals and other substances such as flame retardants. Both Directives are under recast with the particular aim to improve the degree to which hazardous substances are restricted.
- The Packaging Directive²⁵ bans the use of 4 heavy metals, with some exemptions (crystal glass or plastic crates and pallets). Also the Directive includes provisions aiming at decoupling economic growth and packaging generation.
- Four amendments have been made to the End-of-life Vehicles Directive²⁶, Annex II. These amendments show a reduction in the use of hazardous substances in the new vehicles

²³ Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC

²⁴ Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment

²⁵ Directive 94/62/EC on packaging and packaging waste

²⁶ Directive 2000/53/EC on end-of-life vehicles, See: http://ec.europa.eu/environment/waste/elv_index.htm

where their use is no longer necessary and consequently an improvement in the quality of the waste produced.

- The Directive 2005/64 “on the type-approval of motor vehicles with regard to their reusability, recyclability and recoverability and amending Council Directive 70/156/EEC” established that vehicle manufacturers and their suppliers should include reusability, recyclability and recoverability of component parts “at the earliest stages of the development of new vehicles, in order to facilitate the treatment of vehicles at the time when they reach the end of their life. The focus shifted to the recyclability and recoverability of the vehicles before being produced and commercialised. Vehicles have to be constructed as to be: reusable and/or recyclable to a minimum of 85 % by weight, and reusable and/or recoverable to a minimum of 95 % by weight. In addition the Commission is currently working to encourage the development of clean and energy efficient cars, which includes aims facilitating the recycling of car batteries (COM (2010) 186).
- The Directive on the Management of Extractive Waste²⁷ requires Member States to ensure that operators draw up a waste management plan, including the objective of preventing or reducing the production and harmfulness of waste. In addition, the Batteries Directive introduces a requirement for a safe removal of waste batteries that are incorporated in appliances.

Other legislation has the potential to become key instruments to favour waste prevention:

- The REACH Regulation (1907/2006) aims at ensuring a high level of protection of human health and the environment, including the promotion of alternative methods for assessment of hazards of substances, as well as the free circulation of substances on the internal market while enhancing competitiveness and innovation; ensuring that by 2020 chemicals are produced and used in ways that lead to the minimisation of significant adverse effects on human health and the environment among other issues. Substitution of substances that cause an unacceptable risk to human health or to the environment should be required where technically and socio-economically feasible as well as restrictions or prohibitions may also be placed on substances.
- A revision of the Ecodesign Directive (2009/125/EC) is foreseen in 2012, its extension to all products could contribute to improved prevention.
- On 16 July 2008 the European Commission presented the Sustainable Consumption and Production and Sustainable Industrial Policy (SCP/SIP) Action Plan²⁸. It includes a series of proposals on sustainable consumption and production that will contribute to improving the environmental performance of products and increase the demand for more sustainable goods and production technologies. It also seeks to encourage EU industry to take advantage of opportunities to innovate. Several policies at EU and national level already foster resource efficient and eco-friendly products and raise consumer awareness. The proposals complement these policy instruments and provide measures where gaps exist.

²⁷ Directive 2006/21/EC on the management of extractive waste

²⁸ See: http://ec.europa.eu/environment/eussd/escp_en.htm

- To raise awareness and promote best practice, the European Week for Waste Reduction was launched in 2009²⁹ and, a collection of example of good practice has been made available by the Commission³⁰.

2.5 Better knowledge and information

The following resources have been established and/or further developed to try and improve the spread of knowledge and the quality of information available:

- The Waste Data Centre has been established and hosted by Eurostat³¹.
- The European Topic Centre on Sustainable Consumption and Production (ETC/SCP)³² is a consortium of environmental authorities and research centres across Europe. Overseen by the EEA, it regularly publishes on developments in waste and recycling.
- Regular information is also provided through publications such as the State of the Environment Report (SOER)³³ by the EEA as well and the Environmental Policy Review³⁴, published by the Commission, both of which increasingly include reporting on waste and resource related issues.
- The Commission launched the European Platform on Life Cycle Assessment (LCA) in 2005 providing a range of information and on-line support tools. Additional guidance on how to conduct in practice LCA's particularly in the waste sector were developed.
- REACH can also contribute to a better knowledge of the composition of waste by providing useful information about chemicals and their management. For example, it may provide information on waste streams that contain substances of very high concern (e.g. helping in the classification of waste). It will contribute to establishing more robust scientific judgement on the hazardousness of specific waste streams and improve the application of the precautionary principle.

These initiatives have improved the quality of information and availability of statistics on the generation and treatment of waste has improved with the implementation of the Waste Statistics Regulation. However, there are still knowledge gaps which need to be filled, in particular statistics on the flows (import and export) of waste within the EU and at the global scale are to be further developed, as are indicators to monitor progress.

2.6 Development of common reference standards

The following initiatives were taken develop common standard references:

- According to Article 6 (1) and (2) of the new Waste Framework Directive 2008/98/EC certain specified waste shall cease to be waste when it has undergone a recovery operation and complies with specific criteria to be developed in line with certain legal conditions, in

²⁹ See: <http://www.ewwr.eu/>

³⁰ See: <http://ec.europa.eu/environment/waste/prevention/practices.htm>

³¹ See: <http://epp.eurostat.ec.europa.eu/portal/page/portal/waste/introduction>

³² See: <http://scp.eionet.europa.eu/>

³³ See: <http://soer2010.ew.eea.europa.eu/>

³⁴ See: <http://ec.europa.eu/environment/policyreview.htm>

particular: there is an existing market or demand for the material, the use is lawful, the use will not lead to overall environmental or human health impacts.

- Such criteria should be set for specific materials by the Commission in Comitology. This mechanism was introduced to further encourage recycling in the EU by creating legal certainty and a level playing field as well as removing unnecessary administrative burden. A methodology to develop criteria has been elaborated by the Joint Research Centre³⁵
- The Commission is developing end-of-waste criteria for ferrous scrap metal, aluminium scrap metal, copper scrap metal, paper, glass and Biowaste. The Commission has submitted a first set of criteria for ferrous and aluminium scrap for adoption in the Comitology procedure.
- Minimum recycling efficiency levels have been set up for battery recycling processes. The Commission is preparing rules on the calculation of the recycling efficiency across Europe. In addition, for waste batteries exported outside the EU, criteria for the assessment of treatment and recycling conditions equivalent to the requirements of the Batteries Directive are to be set up under Comitology.
- The LIFE programme is financing a project from 2009 to develop a common and harmonized set of standards for processing e-waste in an environmentally safe manner and in compliance with EU legislation. The aim is to create a “WEEE label of excellence”, showing environmental standards of a superior level throughout the whole recycling process.
- Under the Integrated Pollution Prevention and Control Directive, a reference document (BREF) for the Waste Treatments Industries was published in August 2006, describing the best available techniques for waste treatment. The Proposed recast of the IPPC Directive 2008/1/EC includes detail on permitting of installations, including combustion plants, waste incineration plants and waste co-incineration plants³⁶.

2.7 Further elaboration of EU recycling policies and targets

Table 1 below summarizes the main targets and objectives as included in the existing European legislation. The following recycling targets have been revised over the last 5 years

- New recycling targets for municipal waste and construction and demolition waste were added to the revised Waste Framework Directive (Directive 2008/98/EC).
- In 2006 the targets in the End of Life Vehicles Directive (2000/53/EC) were considered as sufficiently challenging and no new targets were put in place.
- The Batteries Directive was adopted in 2006. This Directive includes targets for collection (25% in 2012, 45% in 2016) and recycling of batteries, limitations on the use of some hazardous substances in batteries. 65% of the average weight of lead-acid batteries should be recycled, 75% of the average weight of nickel-cadmium batteries and 50% recycling of the average weight of other waste batteries.

³⁵ JRC reports are to be found under <http://susproc.jrc.ec.europa.eu/activities/waste/index.html>

³⁶ See: <http://ec.europa.eu/environment/air/pollutants/stationary/ippc/index.htm>

- The Commission's proposal for the recast of the WEEE Directive includes new mandatory collection targets (COM(2008) 810).
- The Landfill Directive (Directive 99/31/EC) puts limitations on the amount of biodegradable waste to be disposed of in landfills.
- Following a green paper on Biowaste (COM(2008) 811) the Commission has adopted a Communication on Biowaste (COM (2010) 235)³⁷ accompanied with an assessment of the Biowaste management in the EU³⁸.

³⁷ See: http://ec.europa.eu/environment/waste/compost/pdf/com_biowaste.pdf

³⁸ See: http://ec.europa.eu/environment/waste/compost/pdf/sec_biowaste.pdf

Table 1: main targets and objectives as included in the existing European legislation

	Year	Collection targets	Recovery targets	Recycling targets
End-of-Life Vehicles	2006	100%	85%	80% including reuse
	2015	100%	95%	85% including reuse
	2005		Vehicles to be recoverable to a minimum of 95 %	Vehicles be reusable and/or recyclable to a minimum of 85 %
WEEE	2006	Min. 4kg per inhabitant per year	70-80% depending on category of WEEE	50-80% including reuse, depending on category of WEEE
	2016 <i>(proposed)</i>	<i>65% of what is set on the market or 85% of waste arising</i>		
Packaging waste	2008		60%	55% of which 50% metal, 60% glass, paper/cardboard, 22,5% plastics, 15% wood
Batteries and accumulators	2009			100% of collected batteries
	2011			65% for lead-acid batteries; 75% nickel-cadmium and 50% for others
	2012	25%		
	2016	45%		
Paper, metal, plastic and glass waste from households, other household waste and similar waste	2015	Separate collection for at least paper, metal, plastics and glass		
	2020			50%
Construction and Demolition	2020		70% by weight of non-hazardous waste to be prepared for re-use, recycled or recovered	
Biodegradable municipal waste	2006 or 2010 (*)	Reduction to 75% of 1995 landfill levels		
	2009 or 2013(*)	Reduction to 50% of 1995 landfill levels		
	2016 or 2020 (*)	Reduction to 35% of 1995 landfill levels		
Tyres	2006		Zero landfill	

(*) for Member States having a derogation (EE,UK, PL, CZ, LT, GR, IE, RO, BU, LV, SK)

2.8 Actions implementing the Thematic Strategy

Table 2 below summarises the actions and achievements resulting from the Waste Thematic Strategy. In summary, most of the proposed actions as defined in the Thematic Strategy have been achieved in the predicted timescale.

Action / activity	Timetable / deadline	Achievements to date	Status
Proposal for a directive amending the Waste Framework Directive and repealing the Waste Oils Directive	Proposed together with Waste TS	Adoption of the Directive on Waste 2008/98/EC (merging the Waste Framework Directive with the Hazardous Waste Directive and repealing the Waste Oils Directive)	Completed 2008
Report on the implementation of Directive 94/62/EC on packaging and packaging waste	2006	Publication of COM(2006)406 and COM(2006)767	Completed 2006
Review of the targets set under Directive 2000/53/EC on end-of-life vehicles	2006	Publication of COM(2007)5	Completed 2007
Proposal for a Directive bringing together in one Directive the three Directives on waste from the titanium dioxide industry	2006	Proposed recast of the IPPC Directive 2008/1/EC to include the provisions of the titanium dioxide Directives	Completed 2007
Publication of guidelines, on the issue of when by-products should or should not be considered waste	2006	Publication of COM(2007)59	Completed 2007
Publication of guidelines for Member States on applying life-cycle thinking to management of biodegradable waste that is diverted from landfill	2006	JRC project initiated in 2007: http://viso.jrc.ec.europa.eu/lca-biowaste/index.htm	To be finalised by end 2010
Improving the knowledge base on impact of resource use, waste generation and waste management and more systematic forecasting and modelling	Starting 2006	<ul style="list-style-type: none"> – Establishment of the International Panel for Sustainable Resource Management, under the auspices of the Sustainable Consumption & Production Branch of UNEP's Division of Technology, Industry, and Economics – Various follow-up studies to the Natural Resources TS, and studies on the sustainable management of resources (see http://www.eu-smr.eu/) – Creation and continuing work of the Environmental Data Centre on Waste 	Ongoing

Action / activity	Timetable / deadline	Achievements to date	Status
Proposal to clarify and extend the scope of the IPPC Directive to additional waste management activities, including biological treatment for recovery of waste and preparation of hazardous waste for incineration and of incineration slags for recovery	2007 (as part of general review of IPPC Directive)	Proposed recast of the IPPC Directive	Completed 2007
Proposal for revision of Council Directive 86/278/EEC on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture	2007	Impact assessment launched in 2009, expected proposal in 2011	Ongoing
Publication of basic guidelines to make life-cycle tools easily usable in waste policymaking, with an agreed approach and methodology	2007	<p>Short (4 page) guidelines available at http://lct.jrc.ec.europa.eu/pdf-directory/Making-Sust-Consumption.pdf</p> <p>International Reference Life Cycle Data System (ILCD) Handbook launched March 2010: see http://lct.jrc.ec.europa.eu/assessment/publications</p> <p>Making sustainable consumption and production a reality: A guide for business and policy makers to Life Cycle Thinking and Assessment published 2010: see http://ec.europa.eu/environment/pubs/pdf/sustainable.pdf</p> <p>Detailed guidance documents on applying LCA thinking for Biowaste, Construction and Demolition Waste and on Waste Management in general</p>	<p>Completed</p> <p>To be finalised by end 2010</p>

Action / activity	Timetable / deadline	Achievements to date	Status
Review of the targets under Directive 2002/96/EC on waste electrical and electronic equipment	2008	Proposal for recast WEEE Directive published December 2008 (proposes: collection target of 65% of EEE put on the market in the two previous years by 2016; integrating re-use target into recovery and recycling targets; and introducing 5% overall increase in reuse and recycling targets)	Ongoing, the proposal is in first reading in the Parliament and Council
Adoption of a first set of quality standards for defining when certain waste flows cease to be waste, starting with compost and recycled aggregates	2008 – subject to entry into force of the revised Waste Framework Directive	<p>End-of-waste criteria under preparation for ferrous scrap, aluminium scrap, copper scrap, waste paper; waste glass; textile waste and plastic waste</p> <p>JRC project produced two reports:</p> <p>"Study on the selection of waste streams for End of Waste assessment": identifies suitable waste streams for a detailed End of Waste assessment, using quantitative and qualitative selection criteria; and</p> <p>"End-of-waste criteria, methodology and case studies": presents a general methodology or guidelines analysing principles for setting criteria; provides related analytical and impact assessment frameworks required to determine end of waste criteria; includes case studies on aluminium and steel scrap, aggregates and compost</p> <p>Details available at http://susproc.jrc.ec.europa.eu/activities/waste/index.html</p>	First proposal of Commission Decision for scrap metals in Comitology
Clarification of the obligation for Member States to develop publicly available waste prevention programmes	Revision of the Waste Framework Directive	Obligation clarified in Article 29 of Directive 2008/98/EC.	Guidelines to be finalised to assist Member States in development of waste prevention programmes
Identifying an efficiency threshold for incinerators to define whether they are to be classified as recovery or disposal	Revision of the Waste Framework Directive	Efficiency threshold included in Annex II (Recovery Operations) of Directive 2008/98/EC	Completed
Develop quality criteria for compost	Following revision of the Waste Framework Directive	<p>Provision made for this in Article 22 of Directive 2008/98/EC</p> <p>Final report on 'Assessment of the options to improve the management of bio-waste in the EU' published in February 2010</p> <p>Two set of quality standards under development: one in the framework of the end-of-waste criteria and another under the revision of the Sewage Sludge Directive (86/278/EEC)</p>	Ongoing

3. PROGRESS ON KEY OBJECTIVES

This section will provide a brief overview of progress on reaching the Key objectives of the strategy in the context of reducing overall negative environmental impacts of resource use.

3.1 Prevention

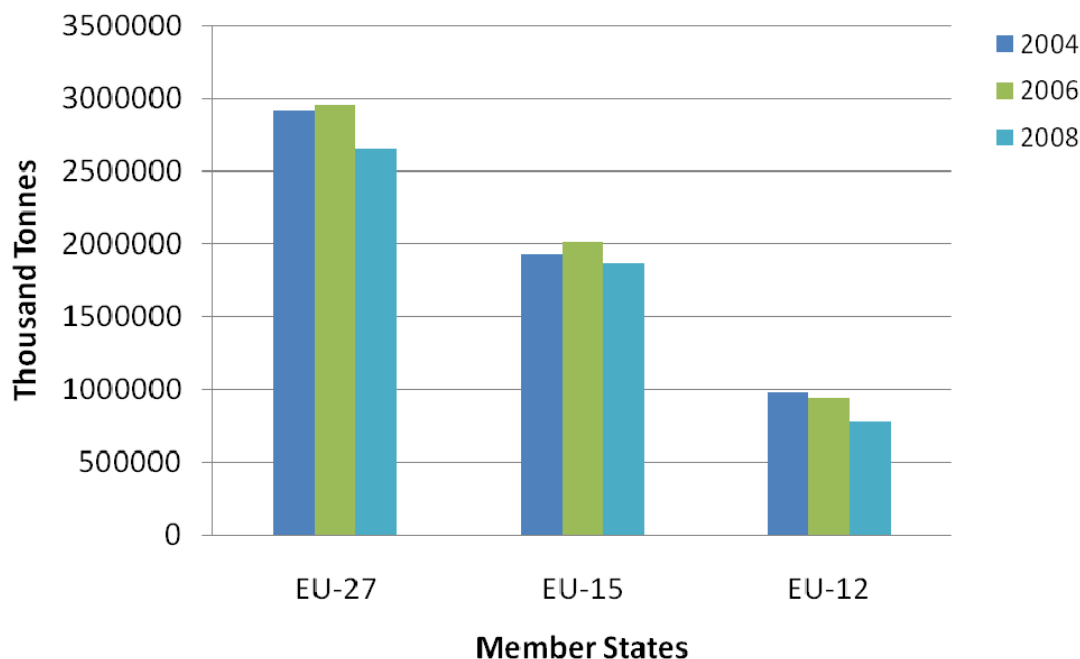
Quantitative Prevention

In 2004, total waste generation in the EU-15 was estimated at 1.93 billion tonnes. By 2006 it had reached an estimated 2.01 billion tonnes (increase of 4%) but it fell in 2008 beyond the 2004 level. In the EU-12, total waste generation actually fell from 0.98 billion tonnes in 2004 to 0.94 billion tonnes in 2006, a decrease of almost 4%.³⁹

For the EU-27, total waste generation was estimated to be 2.91 billion tonnes in 2004, roughly 6 tonnes per capita. By 2006 the estimate had risen to 2.95 billion tonnes, an increase of just over 1% in two years³⁹ but fell again in 2008 to around 2.6 billion tonnes (Figure 1). Nevertheless, in most Member States total waste generation seems to stabilize or increase except in 4 Member States (FR, SE, RO and PL) where a strong decrease has been observed.

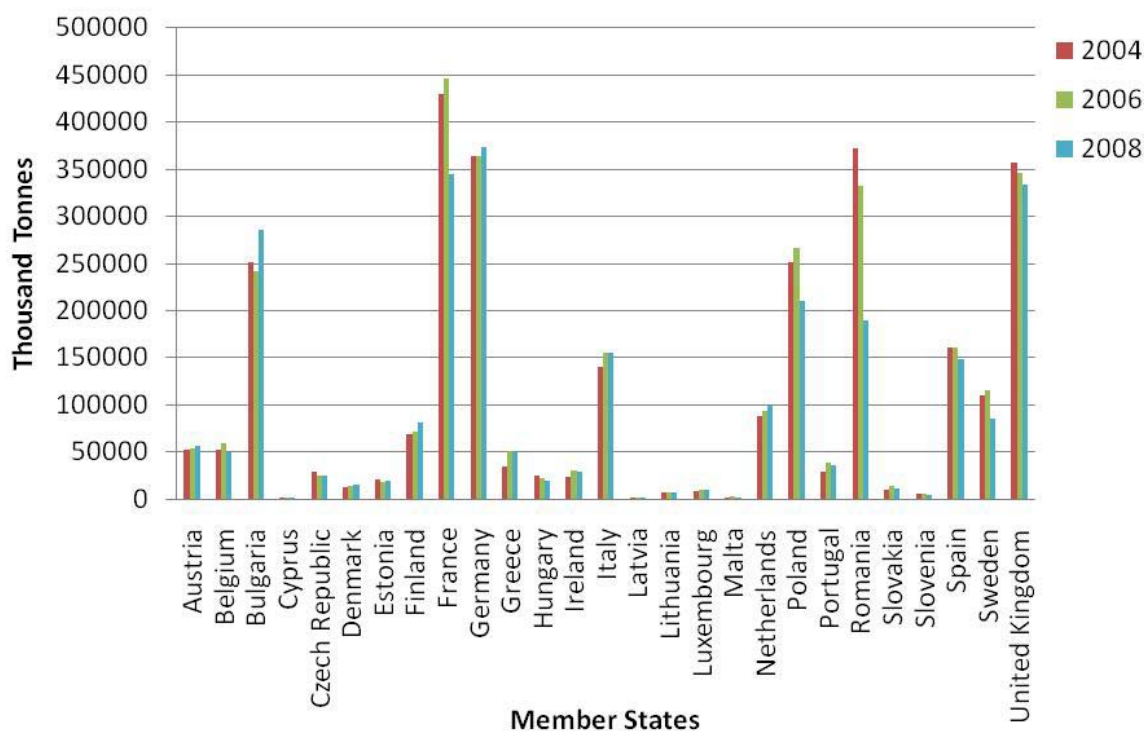
As the 2008 data are very recent additional in-depth analysis is needed to verify whether these decreases are linked with the impacts of the economic crisis, or with modified reporting methods or with progress in term of prevention. As shown in Figure 2, there is a high variability between Member States: in 2008 this ranged from more than 350 million tonnes (Germany) to less than 2 million tonnes (Latvia) reflecting the economic, demographic, social and environmental conditions across the different Member States.

Figure 1: Overall generation of waste (in 1000 tonnes)³⁹



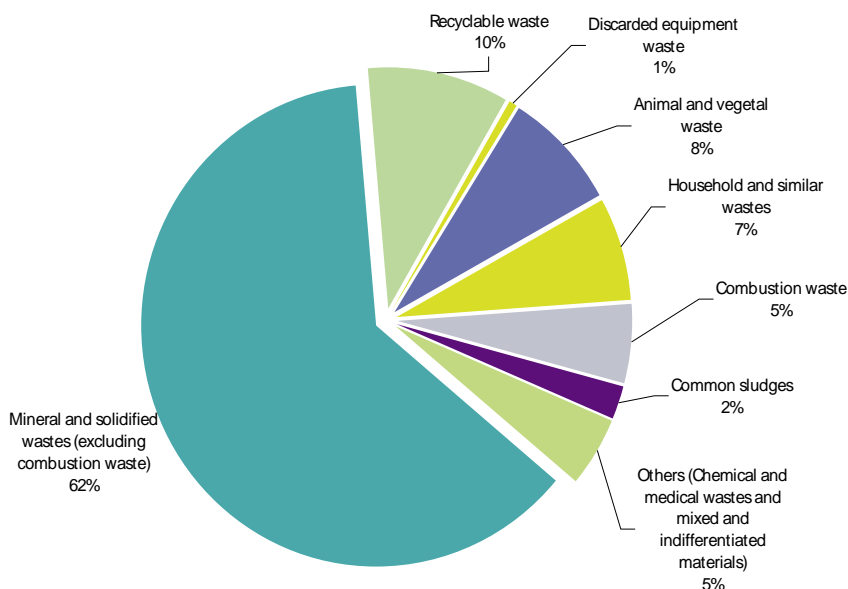
³⁹ Derived from Eurostat, 2010, Environmental Data Centre on Waste, Overall Waste Generation

Figure 2: Overall generation of waste per Member State (in 1000 tonnes)³⁹



As shown in Figure 3 about two thirds (62 %) of the waste generated in EU-27 is mineral waste, stemming from construction and demolition activities (25-30 %) and from mining and quarrying 25 %. The rest is from manufacturing (12%), households (7%) and other activities.

Figure 3: Composition of waste EU-27, 2006⁴⁰

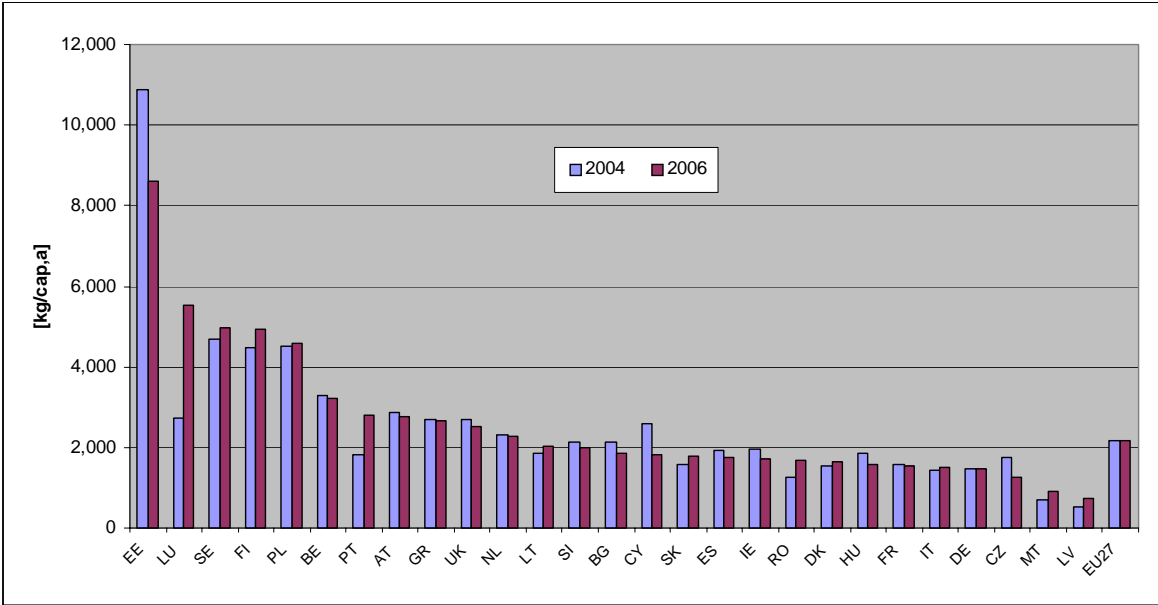


To better assess performance of individual economic activities, the non-mineral waste should be analysed with more attention. The high amounts of mineral wastes, soil and dredging spoil representing 62% of total, overlay waste generation in rest of economy.

⁴⁰ Source : Eurostat waste data centre 2010

Furthermore the data quality for mineral waste from mining and construction sectors is lower than for other better monitored waste categories. Presenting the non mineral waste separately, better allows analysing trends in waste generation by economic activities, with higher accuracy and interpretability. Overall non mineral waste generation was remarkably stable at EU 27 level between 2004 and 2006.

Figure 4: Generation of non-mineral waste per inhabitant in EU 27 – 2004, 2006⁴⁰



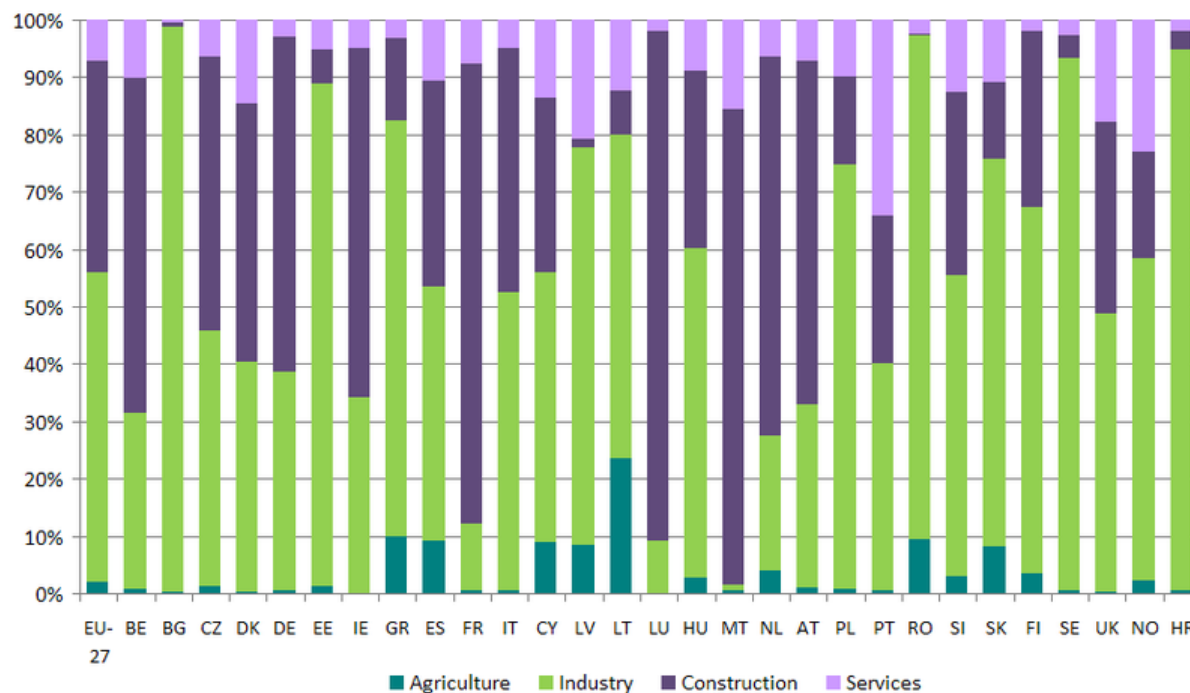
In 2008, **industrial waste** accounted for around 55% of waste generated in the EU-27. Other economic activities that also contributed significantly to levels of waste generation included the construction and services sectors, accounting respectively for more than 30 and 8% of total waste. More than a half of industrial waste produced in the EU-27 came from mining and quarrying. In the Member States with a significant mining industry, mining accounted for 40% or more of industrial waste. Similarly, in over half of the Member States the energy sector was responsible for less than 10% of industrial waste, whereas in Hungary, Greece and Estonia this sector accounted for around 40% of industrial waste.

As shown in Figure 5 below, there is a large amount of variation between Member States; these differences can be partly accounted for by the dominance of different activities within the economy of each country. Data from Eurostat suggest that the generation of manufacturing waste in the EU-27 fell by 5.4% between 2004 and 2006 (from 384.6 million to 363.7 million tonnes). Waste from mining and quarrying fell by 14% over the same period (from 862.1 million to 740.7 million tonnes).Waste from other economic sectors (services) increased by 6.2% (from 146.8 million to 155.8 million tonnes).⁴¹

These trends may be a consequence of efficiency measures in industry or as a result of changing economics within the EU favouring service industries rather than primary or secondary industrial activities such as manufacturing and mining.

⁴¹ Eurostat, 2009, Europe in figures – Eurostat Yearbook 2009

Figure 5: Waste generated by economic activity, 2008 (% of total waste generated)⁴²



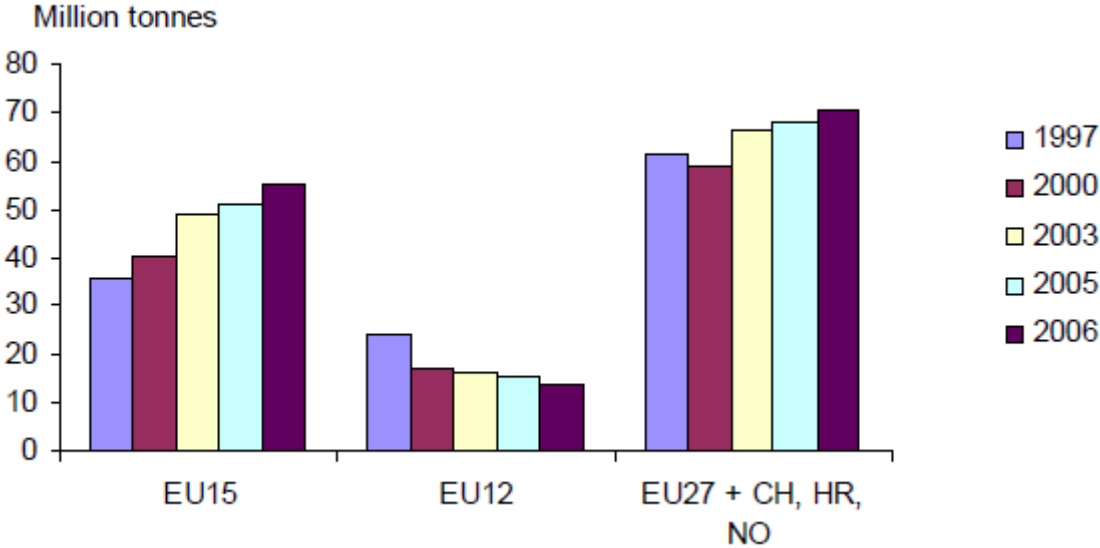
The EU27 Member States, Croatia, Norway and Switzerland together reported the generation of 70.6 million tonnes of **hazardous waste** in 2006, an increase of 15% since 1997 (see Figure 6 below). Between 1997 and 2006 generation increased by 54% in the EU15 but decreased by 42% in the EU 12. According to the EEA, taking into account the limited data available, the overall trend shows growing or stabilising amounts of hazardous and nonhazardous waste in the EU.⁴³

The decrease in hazardous waste generation in the EU12 can be explained by introduction of cleaner technology and mine closures. In addition, some waste types historically deemed hazardous were re-classified as non hazardous compared as a consequence of the introduction of the European Waste List upon accession to the EU. The increase in hazardous waste generation in the EU15 is more difficult to explain, although changes in the EU hazardous waste list in 2001 increased the number of waste codes to cover hazardous wastes that were previously only classed as hazardous in some countries. Other contributing factors may include increased municipal waste incineration (which is estimated to have contributed to an increase in hazardous flue gas cleaning residues of at least 600,000 tonnes between 1997 and 2006) and remediation of contaminated sites.⁴³

⁴² Eurostat, 2009, Statistics in Focus 30/2009, Generation and treatment of waste

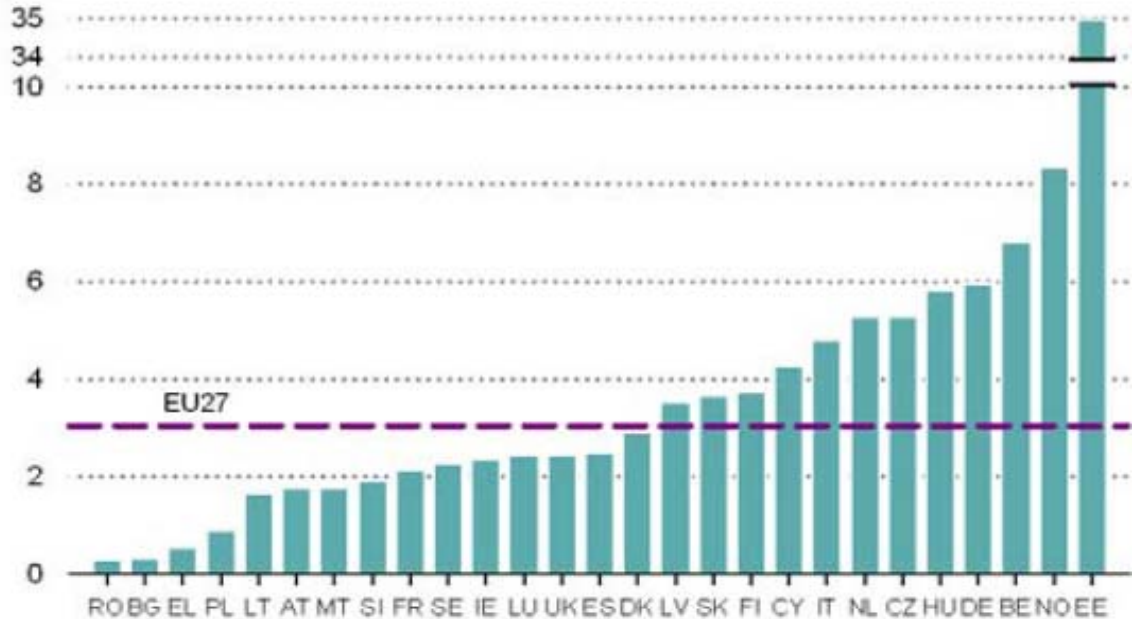
⁴³ EEA 2010, The European Environment, State and Outlook 2010 : Thematic Assessment – Material Resources and Waste

Figure 6: Hazardous waste generation in the EU-27 plus Norway, Switzerland and Croatia, 1997 to 2006⁴³



Across the EU27, hazardous waste accounts for an average of 3% of total waste generated but with high impact on the environment. The proportion varies greatly between Member States, however, as a result of the dominance of different economic sectors: from 0.3% in Greece, Bulgaria and Romania to 35% in Estonia (due to shale oil production) (see Figure7 below).

Figure 7: Hazardous waste generated, 2008, EU-27 (in % of total waste generated)⁴⁴

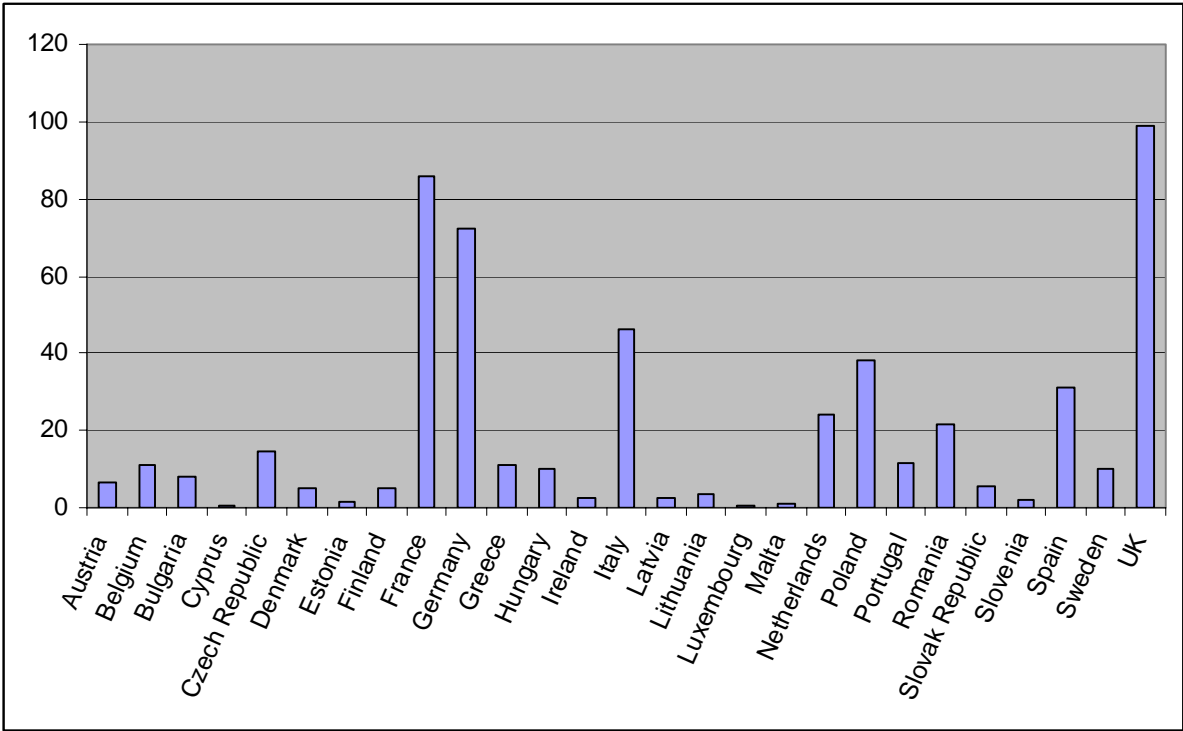


⁴⁴ Source: Eurostat Waste Data Centre 2010

Generation of **construction and demolition waste(C&D)** (figure 8) is estimated to account for approximately 25%-30% of wastes in the EU. Given the lack of recycling and recovery targets for C&D wastes at EU level in the past, no standardised reporting systems had been developed, thus resulting in diverging methodologies and different wastes being considered as C&D wastes.

The estimates of construction and demolition waste generation range from 510 million tonnes⁴⁵ to 970 million tonnes⁴⁶. Some Member States have not reported any figures, whilst others seem to include excavation material in their figures. A recent study⁴⁷ has introduced some correction factors in order to take into account the diverging reporting practices and has estimated the C&D waste generation at 535 million tonnes.

Figure 8: Generation of construction and demolition waste in the EU in 2006 (in millions of tonnes) ⁴⁷



The range of reported generated construction and demolition waste per capita and year varies between less than 0.1 tonnes in Romania and 15.2 tonnes in Luxembourg. This variation cannot be explained by differences in construction activity only, and seems partly due to diverging reporting methodologies.

As Figures 9 and 10 show, construction and demolition waste generation seems to be lower in EU-12, where per capita generation is in most cases below 2 tonnes per year.

⁴⁵ WBCSD (World Business Council for Sustainable Development), 2009, The Cement Sustainability Initiative, Recycling concrete

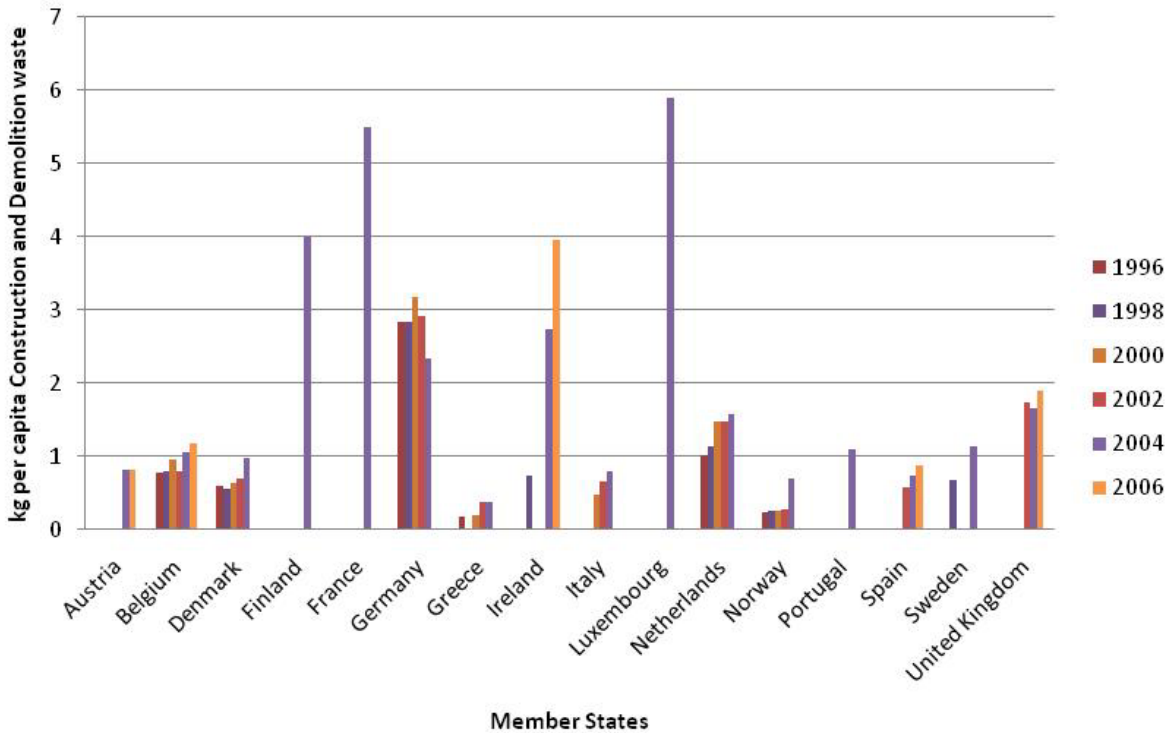
⁴⁶ Eurostat, 2010

⁴⁷ BioIS: Management of construction and demolition waste in the EU - requirements resulting from the Waste Framework Directive and assessment of the situation in the medium term (draft final report, 2010). Note: for some Member States, only data for 2004 were available

Figures 9 and 10 have to be seen only as indicative of the trend as regards the evolution of production of construction and demolition wastes within a given Member State. The amounts indicated are based on diverging definitions of C&DW (and may include e.g. excavation material) and do not allow for cross-country precise comparisons. Given the lack of comparable data and of complete time series, it is difficult to assess the evolution of the amounts of construction and demolition waste.

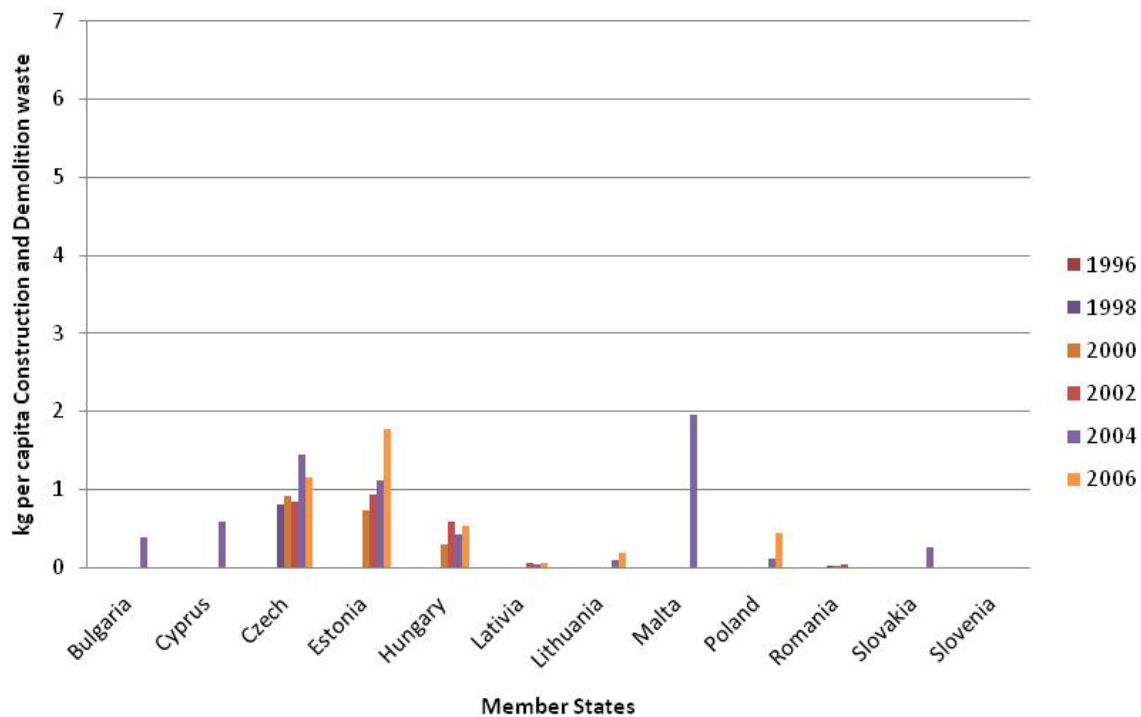
As illustrated by Figure 9 below, all EU 15 countries where data are available for more than one year have seen an increase in generation per capita during the period 1995 to 2006⁴⁸, with the exception of Germany.

Figure 9: Generation of construction and demolition waste per capita in EU 15⁴⁸



⁴⁸ EEA, 2009, Working paper 'EU as a Recycling Society: Present recycling levels of Municipal Waste and Construction & Demolition Waste in the EU'

Figure 10: Generation of construction and demolition waste per capita in the EU 12⁴⁸



As shown in Figure 11, the generation of **Municipal solid Waste** per capita in the EU-27 had been increasing until recently (from 499kg in 1997 to 524kg in 2006), but since 2000 appears to be stabilising. This compares to figures reported by the OECD of 750kg for the USA, 400kg in Japan in 2005 and around 444kg for urban China whilst the generation rate in rural areas was not known.^{49 50}

Total municipal waste generation has increased of around 5% in the EU-27 (from 239.5 million tonnes to 260.7 million tonnes) in ten years. The total amount of MSW generated by the EU continues to increase associated with a slight increase in EU-27 population.

According to EEA⁵¹, the annual generation of municipal waste in the EU-27 has reached 524 kg per person (see Figure 11). In the past, growing consumption and the trend towards smaller and more households (see SOER Thematic Assessment: *Consumption and Environment*) have been strong drivers of municipal waste generation but it now seems that these factors are decoupling from municipal waste generation: municipal waste generation per person in the EU-27 stabilized between 1999 and 2007 while consumption expenditure in constant prices increased by 16.3% per person and the number of people per household decreased by 5.6% (Odyssee database). However, mainly as a result of the small growth in population, the total amount of municipal waste generated in the EU-27 over the same period increased slightly to 258 million tons (Eurostat data centre on waste).

Figures 11 and 12 below show the trend in waste generation for each Member State.

⁴⁹ OECD, 2007, Municipal waste generation outlook

⁵⁰ OECD Environmental Data Compendium, 2008, Waste

⁵¹ EEA 2010, The European Environment, State and Outlook 2010 : Thematic Assessment – Material Resources and Waste

Figure 11: Municipal waste generation and treatment in kg per capita ⁵²

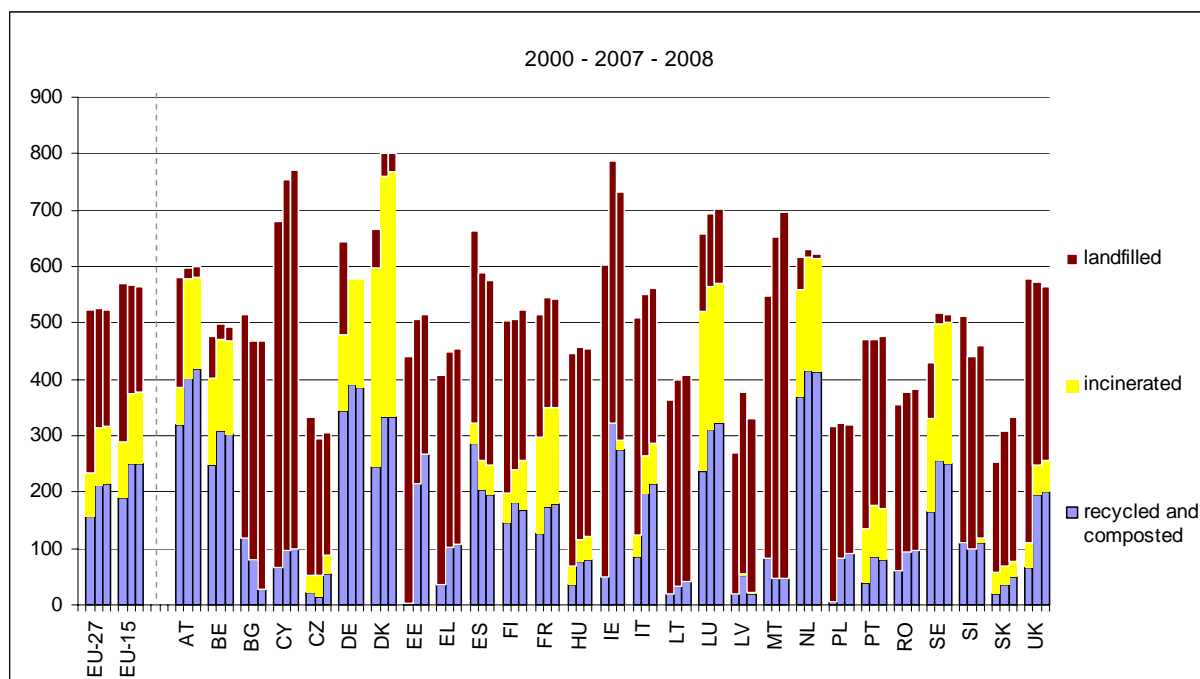
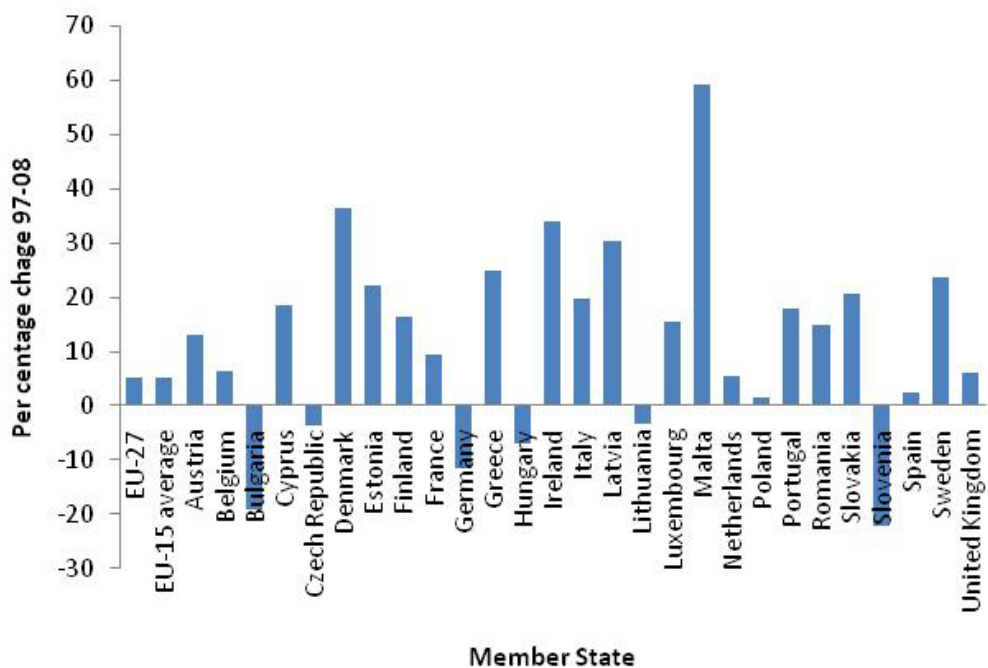


Figure 12: Percentage change in per capita municipal waste generation 1997-2008 ⁵³



⁵² Environmental Policy Review 2010, derived from Eurostat, see: <http://ec.europa.eu/environment/policyreview.htm>

⁵³ Eurostat, 2010, Environmental Data Centre on Waste, Municipal Waste

EU-12 Member States generate less municipal waste per capita than the EU-15, and less than the EU-27 average⁵⁴. For the EU-12, municipal waste generation is increasing slightly more quickly than in the EU-15, with an increase of around 7% between 1997 and 2008⁶² Figures 11 and 12 also demonstrate the variation in trends across the Member States in terms of municipal waste generation per capita.

According to EEA⁵⁵, **packaging waste** from households and commercial sources accounts for around 3% of total waste. Generation of this waste stream is increasing, although it appears to be relatively decoupled from GDP growth. Generation per capita varies between Member States, from 41kg in Bulgaria to 245kg in Ireland.

Qualitative Prevention

Steps have been made to achieve qualitative waste prevention. WEEE through the RoHS Directive, batteries, packaging and vehicles are expected to become less hazardous over time. The impact of the RoHS Directive has been recently estimated⁵⁶: the application of the Directive has resulted in reducing the quantities of the banned substances being disposed of and potentially released into the environment by 89 800 tonnes of lead, 4 300 tonnes of cadmium, 537 tonnes of hexavalent chromium, 22 tonnes of mercury, and 12 600 tonnes of octa-BDE per year.

The progressive application of the REACH regulation will also encourage a reduction in the production of hazardous waste although no precise estimation has been made so far on the exact possible impact of the regulation on waste generation.

3.2 Re-use

Under the new Waste Framework Directive the concept of "preparing for reuse" is defined. This is where products and materials have become waste but can be reused without reprocessing (which would be considered recycling). This concept was introduced to clarify the waste hierarchy. In practice reuse covers widespread activity for many waste streams across the EU 27; reuse 'markets' exist notably for textiles, furniture, car components and electrical household appliances. As under these markets materials are considered second-hand and never become waste it is difficult to monitor the scale of activities or understand the scale of waste avoided/impact upon waste generation activities.

However, in some Member States re-use is well developed and even subsidized and promoted. Already not only has this avoided waste generation but also has given another life to some still valuable products and therefore avoided a kind of over consumption. Other benefits are linked with the social impacts of these activities as they are generating new kind of jobs while providing second hands products at accessible prices.

⁵⁴ Eurostat, 2010, Environmental Data Centre on Waste, Municipal Waste

⁵⁵ EEA 2010, The European Environment, State and Outlook 2010 : Thematic Assessment – Material Resources and Waste

⁵⁶ Commission Staff working paper accompanying the Proposal for a Directive of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE) (recast) – Impact Assessment, COM(2008) 810 final, 3 December 2008 , p. 30, available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SEC:2008:2933:FIN:EN:PDF>

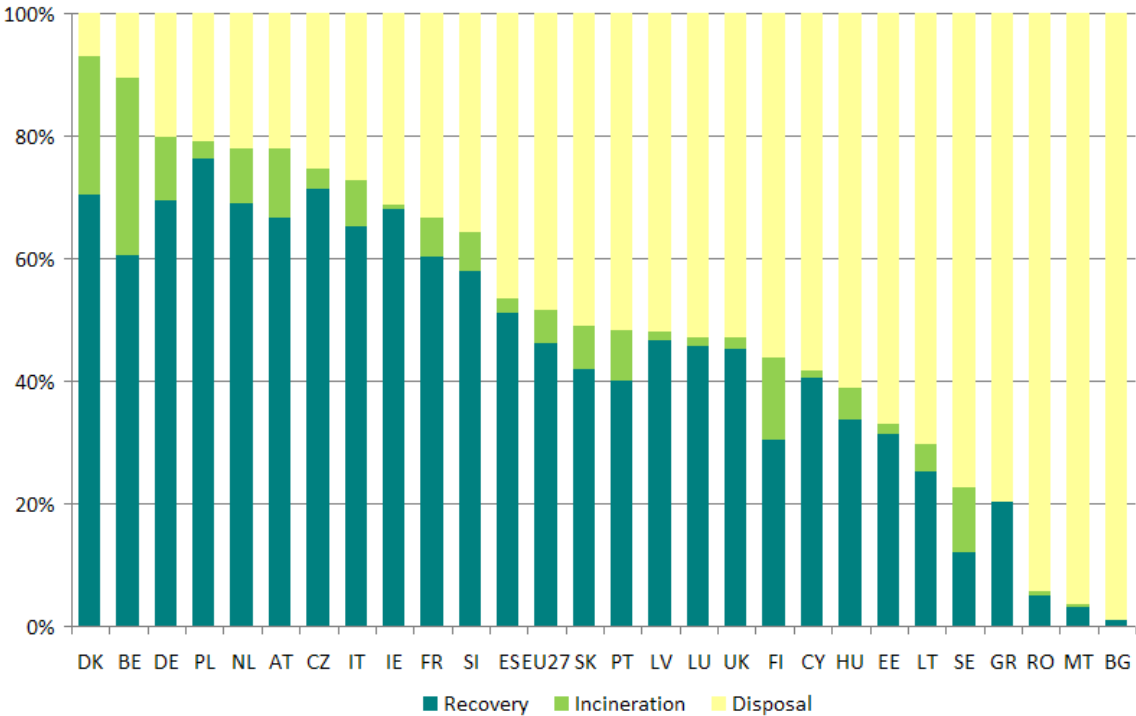
Given that it is a new concept, data on preparing for reuse is not currently available at EU 27 level. This lack of data represents a significant gap in data coverage when trying to identify performance in the EU waste management sector.

3.3 Recycling

Overall waste

Figure 13 summarises the volume of waste treated by the three main treatment types: disposal, incineration and recovery (excluding energy recovery). In the EU, 5.5 % of waste was incinerated, 46 % recovered and 48.5 % disposed in 2008.

Figure 13: Types of waste treatment, 2008⁵⁷



Municipal Solid Waste

The most extensive data set available, that enables the comparative analysis of EU and Member State performance in terms of recycling effort, is for municipal solid waste. Recycling and composting of MSW has increased from 19% to 38% between 1998 and 2007⁵⁸ with significant disparities between Member States in terms of recycling.

Figure 11 compares Member State performance in 2000, 2007 and 2008. It demonstrates that large differences persist between Member State performances. In 2006, Germany, Belgium and the Netherlands had the highest levels of recycling, also demonstrating significant growth levels in municipal waste recycling.

⁵⁷ in percent of total waste treated, Source: Eurostat Waste Data Centre 2010

⁵⁸ EEA 2010, The European Environment, State and Outlook 2010 : Thematic Assessment – Material Resources and Waste

Meanwhile rapid increases in the level of recycling, starting from a low base in 2000, can be seen for Ireland, the UK, the Czech Republic, Slovenia, Latvia and Poland. The more detailed trend data, however, also shows a levelling off of recycling efforts for municipal waste in certain higher achieving Member States.

A working paper by the ETC/SCP⁵⁹ concluded, based on analysis of national performance, that in 2005-2006 the EU 15 recycled between 60kg and 370kg of municipal waste per capita; meanwhile the level of municipal waste recycling in the EU 12 varied from 20kg to 100kg per capita. When interpreting these figures, one must take into account the variations in levels of waste generation in the Member States i.e. a country with high overall levels of generation may show high levels of recycling in terms of weight, but as a proportion of total generation the achievement may be low.

Bio Waste

Figures from Eurostat suggest that in 2008, 17% of waste treated in the EU-27 was composted⁶⁰ meaning transformed into an organic fertiliser. The EU-27 has shown steady year-on-year increases between 1995 and 2008 in the quantity of municipal waste composted, as demonstrated by Figure 14 below.⁶¹

With the implementation of the biodegradable waste diversion target of the Landfill Directive, increasing emphasis on composting and anaerobic digestion is expected.

Figure 15 shows a Baseline scenario which was developed in the context of the Communication on bio-waste management. The amounts of landfilled bio-waste are expected to drop considerably - from 35.7 Mt in 2008 to 15.1 Mt in 2020 – a reduction of 38%. By 2020 bio-waste is expected to be diverted from landfills to composting (expected increase of 48%), incineration (expected increase of 29.5%), Mechanical and biological treatment (MBT) (expected increase of 103%), Anaerobic digestion (AD) (expected increase of 349%) and home composting (expected increase of 148%).

Expected benefits are linked with production of quality compost and improvement of organic depleted soils, reduction of green house gas emission linked with reduced landfilling and production of energy and compost. On top of the baseline scenario, more prevention and more composting have the potential to multiply the potential benefits.

⁵⁹ ETC, 2009, Working paper 'EU as a Recycling Society: Present recycling levels of Municipal Waste and Construction & Demolition Waste in the EU'

⁶⁰ Eurostat, 2010, Presentation on 'Municipal waste' prepared for the Meeting of the Working Group "Statistics of the Environment", Sub-Group "Waste" of the Joint Eurostat/EFTA group

⁶¹ Eurostat, 2010, Municipal waste composted in the EU (1000 tonnes)

Figure 14: Total municipal waste composted 1996-2007⁶²

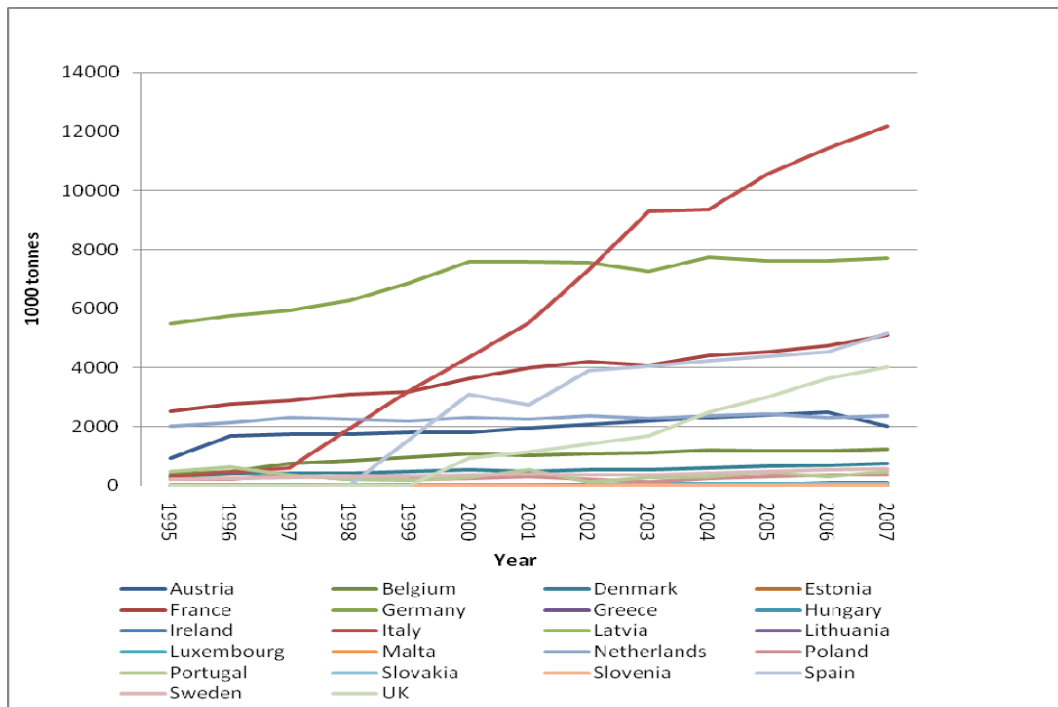
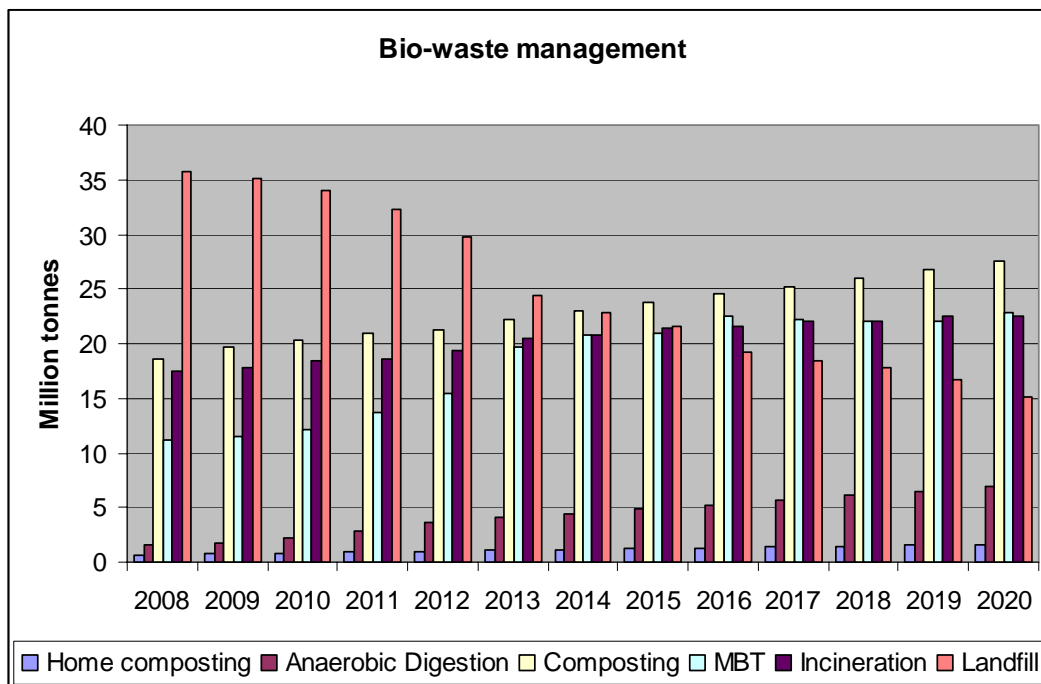


Figure 15: Biowaste management – Baseline scenario⁶³

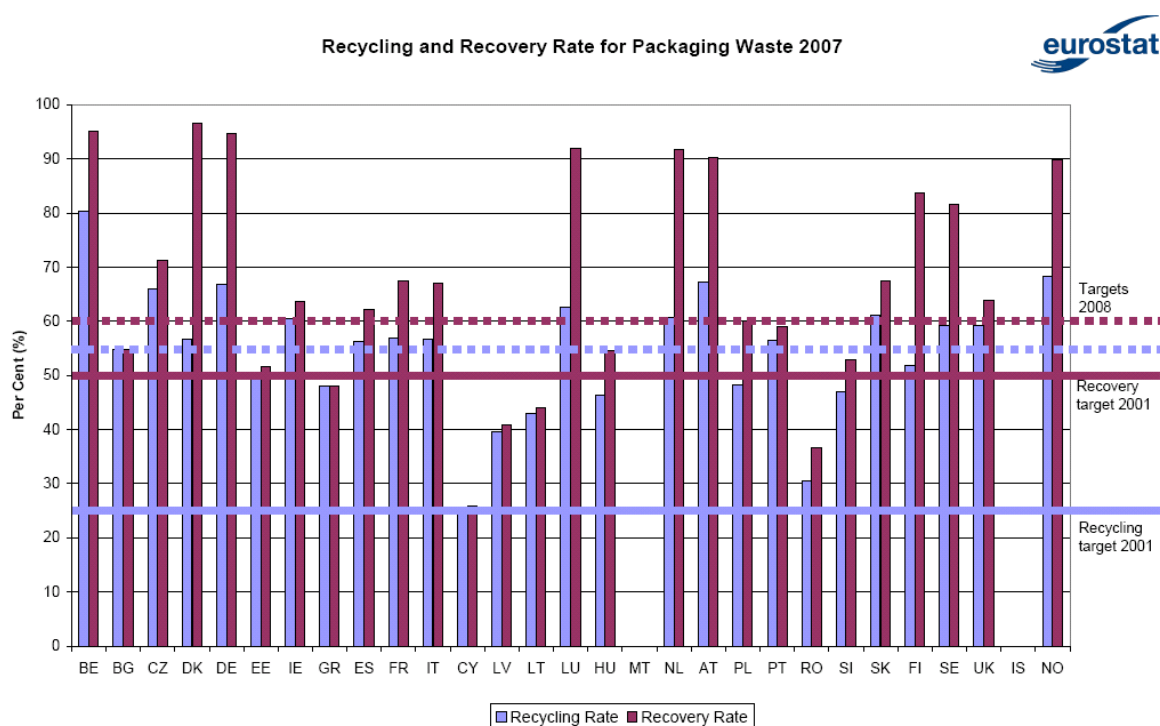


⁶² Derived from Eurostat, 2010, Municipal waste composted in the EU (1000 tonnes)
⁶³ Staff Working Document accompanying the Communication on Biowaste (COM 2010 (235))

Packaging

Figure 16 below provides a picture of the performance of the EU-27 with regards to recycling of packaging waste. In 2007, 16 Member States had met the 2008 target to recycle 55% of packaging put on the market (not including energy recovery)⁶⁴. By 2007, 59% of packaging waste in the EU27 was recycled and 14% went for energy recovery.⁶⁵ The figures, however, appear to indicate that some Member States that have already achieved a high recycling rate are experiencing problems to further increase or maintain this high level.⁶⁶

Figure 16: Recycling and recovery rates for packaging waste 2007⁶⁷



Paper and cardboard

Data from the European Recovered Paper Council (Figure 17) suggest that year on year from 2002-2008, paper and board consumption has been increasing. Levels of recycling of paper and board have also been increasing each year, however, and have risen from 55.8% in 2002 to 66% in 2008.⁶⁸ In 2009, a 72.2% recycling rate was achieved for all paper and board in the EU-27 plus Norway and Switzerland.⁶⁹ Higher recycling rates observed in 2008 and 2009 might be partly due to the low paper consumption due to the impact of the economic downturn. When the economy will recover its usual growth rates, it will be interesting to verify whether the increasing trend of the recycling rates will continue.

⁶⁴ Eurostat, 2008, Energy, transport and environment indicators

⁶⁵ EEA 2010, The European Environment, State and Outlook 2010 : Thematic Assessment – Material Resources and Waste

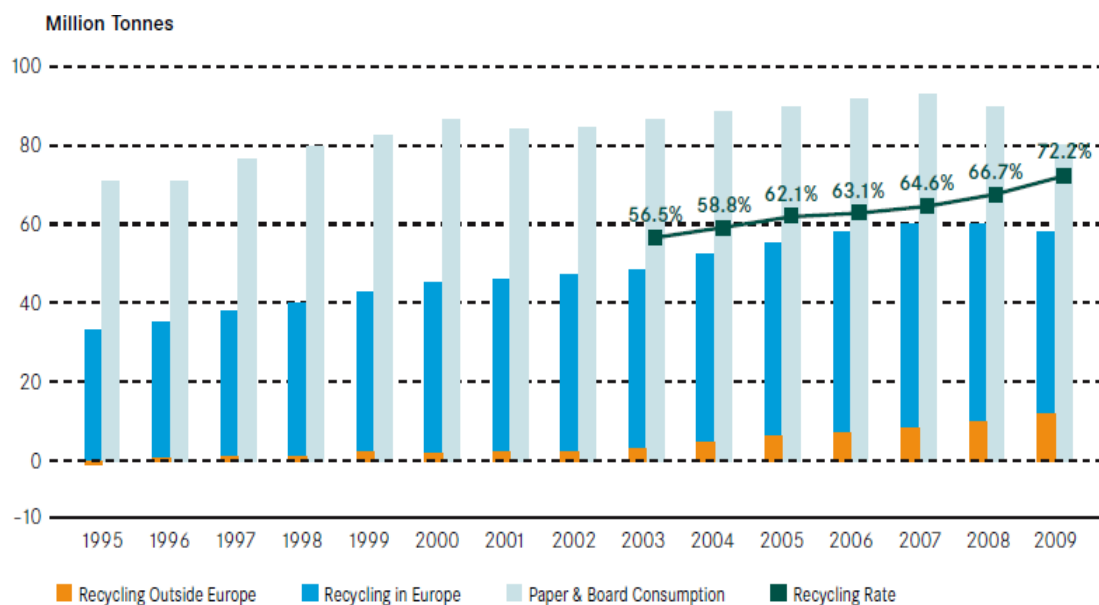
⁶⁶ Eurostat, 2008, Energy, transport and environment indicators

⁶⁷ Source: Eurostat Waste Data Centre 2010

⁶⁸ European Recovered Paper Council, 2010

⁶⁹ European Recovered Paper Council, 2009, European Declaration on Paper Recycling 2006 – 2010, Monitoring Report 2009

Figure 17: Paper recycling, EU-27 plus Norway and Switzerland, 1995-2009⁷⁰



Plastics waste

The Commission (DG ENV) is finalising a study on "plastic waste in the environment". The final report is expected by end 2010. The study is aiming to gather and analyze available data on plastics and plastic waste, its current management options and the related environmental and health risks. It also aims to review existing policies and initiatives to reduce plastic waste and consider and recommend additional potential policy measures to reduce plastic waste and its associated effects.

Global production of plastics in 2009 is estimated at around 245 Mt of which 25% in the EU⁷¹. China produces more plastic than any other country, at 15% of global production. Germany produces the greatest amount in EU, accounting for 8% of global production. The main sources for European plastic waste are identified in the study: 38% is linked with packaging, building and construction accounts for 21% followed by automotive 7%, electrical and electronic equipment 6%, agricultural sector 5% and other sectors for the remaining.

End of Life Vehicles

Figure 18 shows the performances of the Member States in terms of ELV management. By 2008, six Member States of 25 (data are missing for Estonia and Malta) had already met the 2015 reuse/recycling target; three Member States had failed to meet the 2006 target and all other Member States had met the 2006 target.⁷²

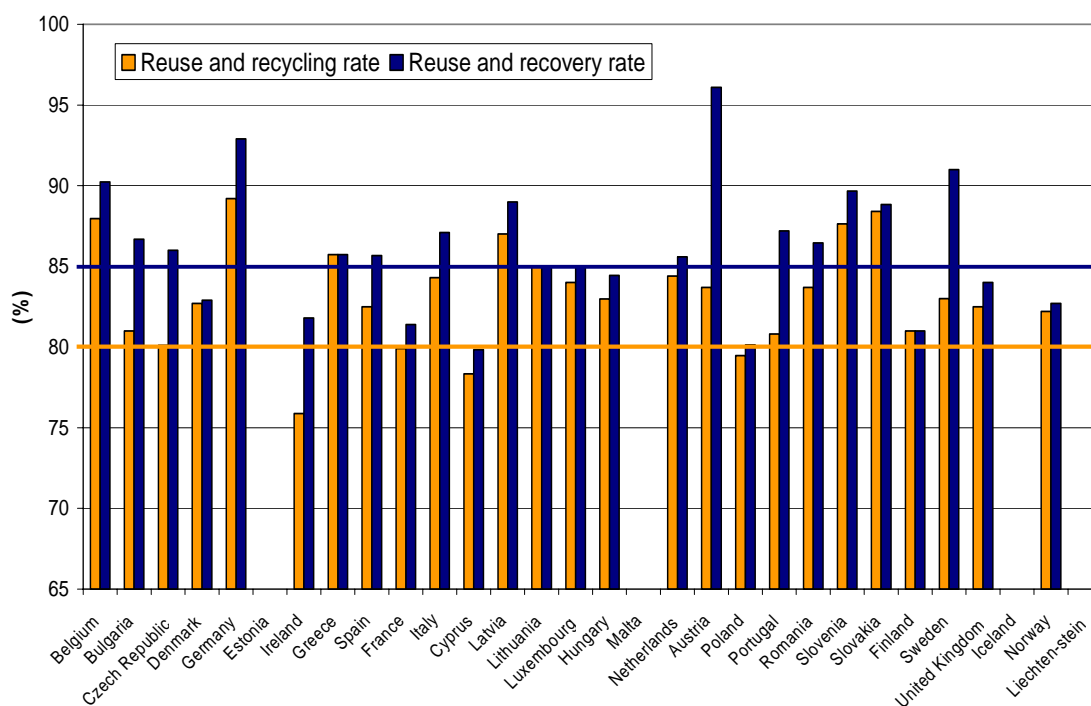
Also by 2008, 17 Member States (of 25) had met the 2006 reuse/recovery target although 9 Member States failed to meet the 2006 target.

⁷⁰ European Recovered Paper Council, 2009, European Declaration on Paper Recycling 2006 – 2010, Monitoring Report 2009

⁷¹ PlasticsEurope (2009), *The Compelling Facts about Plastics – An analysis of European plastics production, demand and recovery for 2008*

⁷² Eurostat, 2009, Environmental Data Centre on Waste

Figure 18: ELV Reuse, Recycling and Recovery rates, 2008⁷³



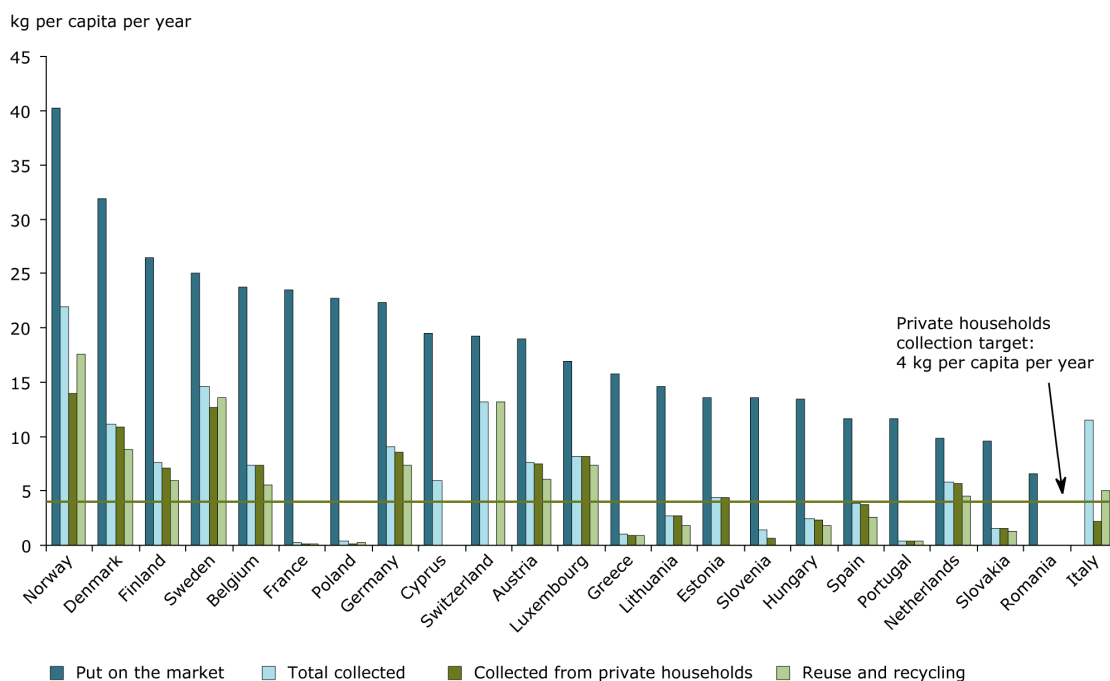
Electric and Electronic Waste (WEEE)

Figure 19 below shows that by 2006, only 10 Member States (plus Norway) had reported meeting the 4kg per capita collection target. In percentage terms, in 2006 the average collection rate (of the 18 countries for which data were available) was 23% by weight of amounts placed on the market. It is likely that part of what is collected is not reported. Where WEEE is collected separately, however, it is widely recycled: for 17 countries where recycling rates can be calculated, the average recycling rate was 79%.⁷⁴ The proposed recast for the WEEE Directive includes a minimum collection target of 65% of WEEE arising (corresponding to 85% of what is put on the market) to be met by 2016.

⁷³ Eurostat, 2010, Environmental Data Centre on Waste

⁷⁴ EEA 2010, The European Environment, State and Outlook 2010 : Thematic Assessment – Material Resources and Waste

Figure 19: WEEE placed on the market, collected and recycled/recovered/reused in 21 European countries (kg/capita), 2006⁷⁵



Batteries

Figure 20 indicates the waste batteries generated per capita in 2006. It shows the significant difference between Member States: from 8,1 kg per year and per inhabitant in Finland to less than 0.1 kg in Bulgaria.

Figures collated by the European Battery Recycling Association (EBRA) indicate that in 2008, 27,600 tonnes of used portable batteries in the EU-27 were recycled by EBRA members, equating to an average of 14.5% of batteries put on the market.

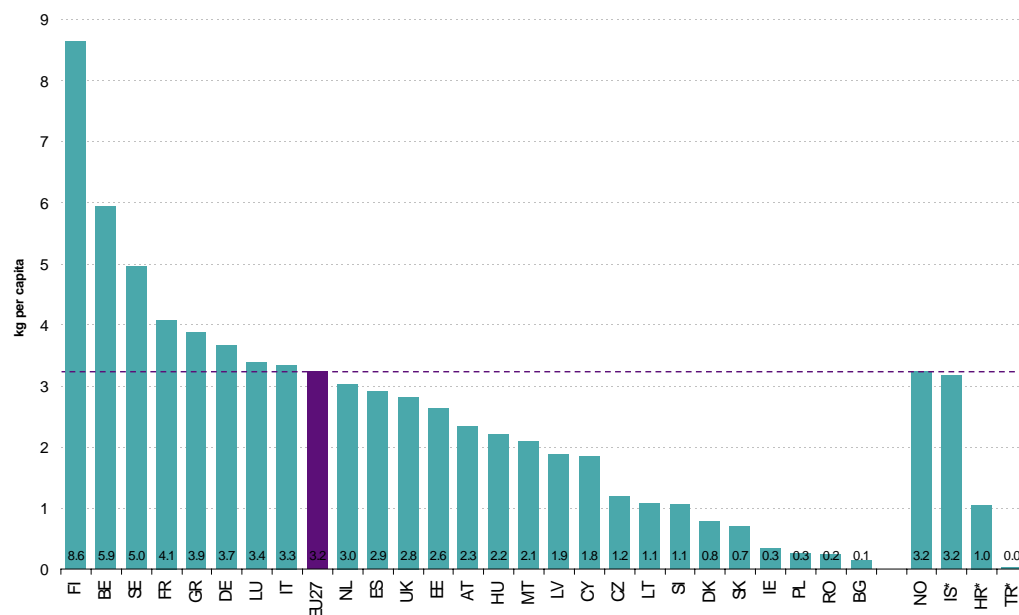
Factoring in collection and processing by non-EBRA members, the figures increase to around 35,000 tonnes or 18.4% which is lower than the collection rate of 25% (equating to around 50,000 tonnes) which must be met by 2012 under Directive 2006/66/EC on batteries.

According to EBRA, seven Member States (Austria, Belgium, France, Germany, Luxembourg, Sweden and the Netherlands) had, however, reached the 25%, and six others (Denmark, Portugal, Greece, Ireland, Spain and Latvia) seem to be able to meet the target by 2012. Considerable efforts will be needed in the remaining MS to meet the EU targets.⁷⁶

⁷⁵ EEA 2010, The European Environment, State and Outlook 2010 : Thematic Assessment – Material Resources and Waste

⁷⁶ European Battery Recycling Association (EBRA), 2009, Press release ‘Stagnation of the quantities of used portable batteries recycled in 2008’

Figure 20: Batteries waste arising, 2006⁷⁷



Compared to 2008, EBRA report that the quantities of used batteries, excluding lead-acid batteries, recycled by EBRA members in 2009 increased to 37,000 tonnes in the EU-27. This significant increase is due to more efficient collections schemes set up for used batteries in Europe in response to the requirements of the Batteries Directive.⁷⁸

Construction and Demolition waste

Data on the generation, composition and recycling of construction and demolition waste are more limited. Figure 2 below indicates that in percentage terms the rate of generated construction and demolition waste recycled is over 60% in most of the EU15 and Norway. For some Member States it is over 80% but in others it is only 15%-30%.

⁷⁷ Source: Eurostat Waste Data Centre 2010

⁷⁸ European Battery Recycling Association (EBRA), 2010, Press release 'Significant increase of the quantities of recycled used batteries and accumulators in 2009: 37 kT'

Figure 21: recycling of construction and demolition waste in percentage of generated amount in the EU and Norway⁷⁹

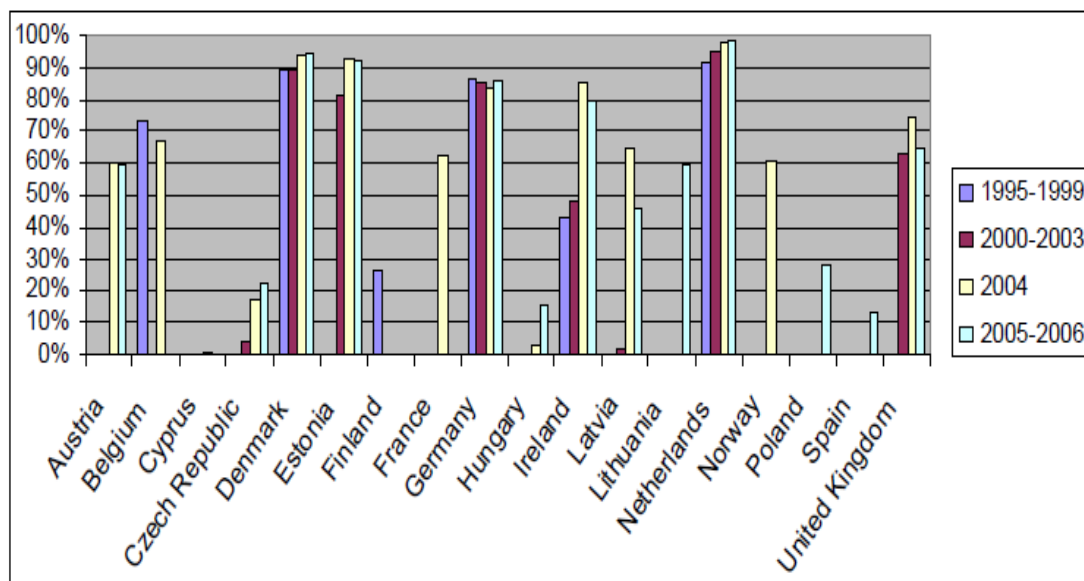
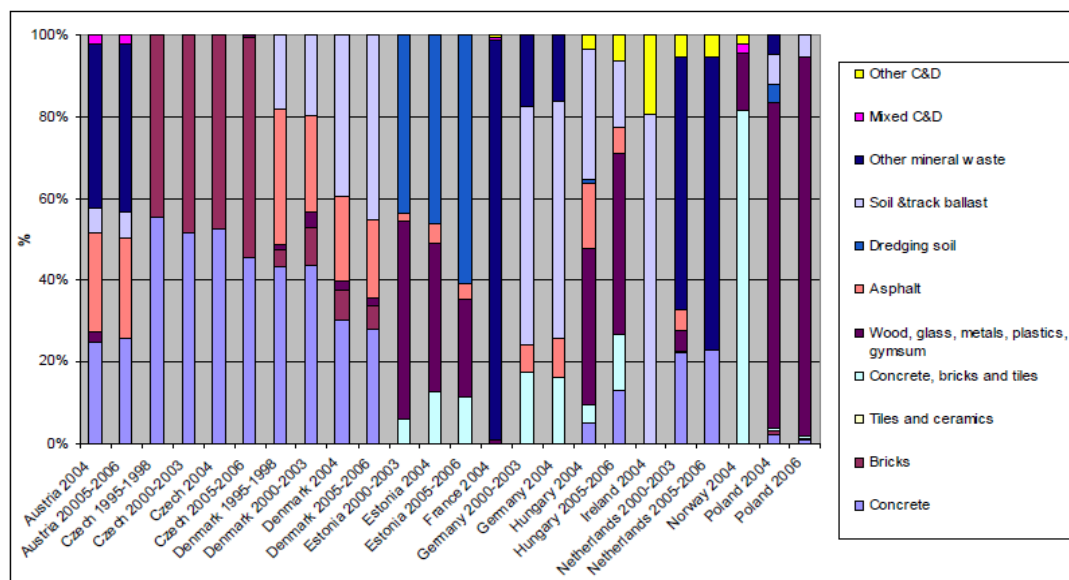


Figure 22 shows that commonly recycled materials are concrete, bricks, tiles and asphalt; dredging soil, soil and track ballast contribute significantly in Member States with a high percentage of recycling. It is worth noting that soil recycling does not count towards the 70% EU target for construction and demolition waste.

Figure 22: Percentage composition and development of recycled construction and demolition waste in the EU and Norway⁷⁹



⁷⁹ EEA, 2009, Working paper 'EU as a Recycling Society: Present recycling levels of Municipal Waste and Construction & Demolition Waste in the EU'

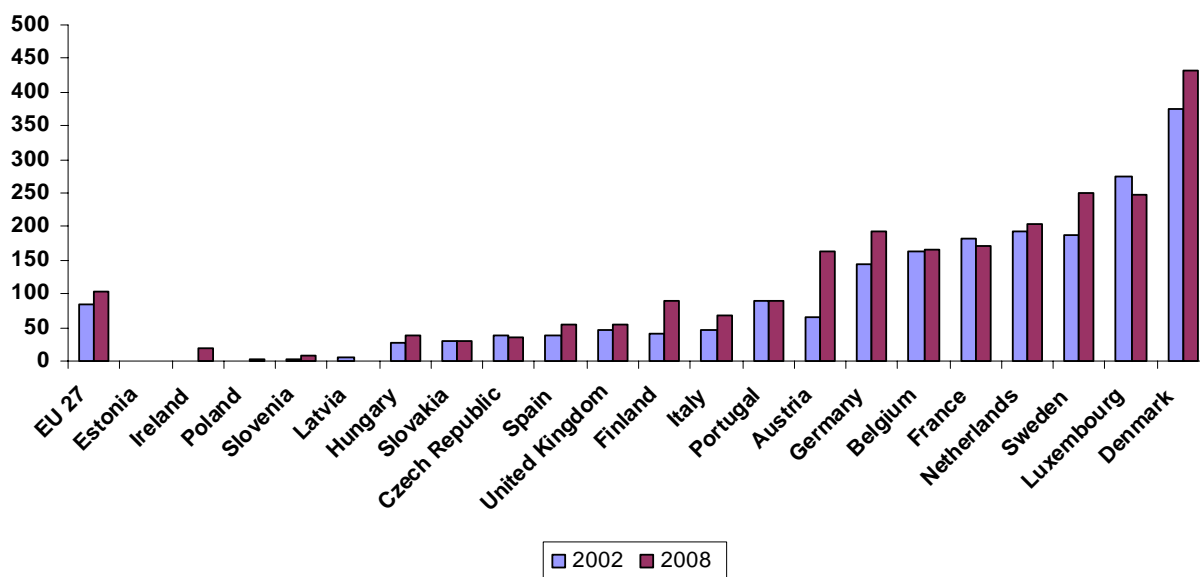
3.4 Energy Recovery

In the EU, municipal waste incineration per capita has increased since the introduction of the strategy from 96 tonnes per capita in 2005 to 102 tonnes per capita in 2008 (Figure 23). This indicates a relative stabilization of incineration in the long term as in 1997 incineration represented around 70kg per capita.

Three Member States are exceptions to this trend, and have experienced a decrease in incineration rates between 1995 and 2008: Belgium, France and Luxembourg (where a large drop of nearly 20% has occurred).

The Member States with the largest number of waste-to-energy facilities are France (130), Germany (67), Italy (51), Sweden (30), Denmark (29), UK (20), Belgium (16), Netherlands (11) and Spain (10).⁸⁰

Figure 23: Municipal waste incinerated kg per capita in the EU-27, 2002 to 2008⁸¹



All statistics presented in relation to incineration and energy recovery originate from before the adoption of the new Directive on waste, when specific new criteria were adopted to determine the efficiency level at which incineration can be deemed an energy recovery rather than disposal activity. It is anticipated that this will help to increase the consistency and reliability of reporting on this issue, with additional information becoming available on the level of energy recovery from waste and the efficiency of plant.

During the next data collection process Eurostat will ask countries to specify from which reference year the energy efficiency criterion will be applied.⁸²

⁸⁰ Capel, C., 2009, Innovations in waste, Waste Management World, Volume 11, Issue 2

⁸¹ Derived from Eurostat 2010

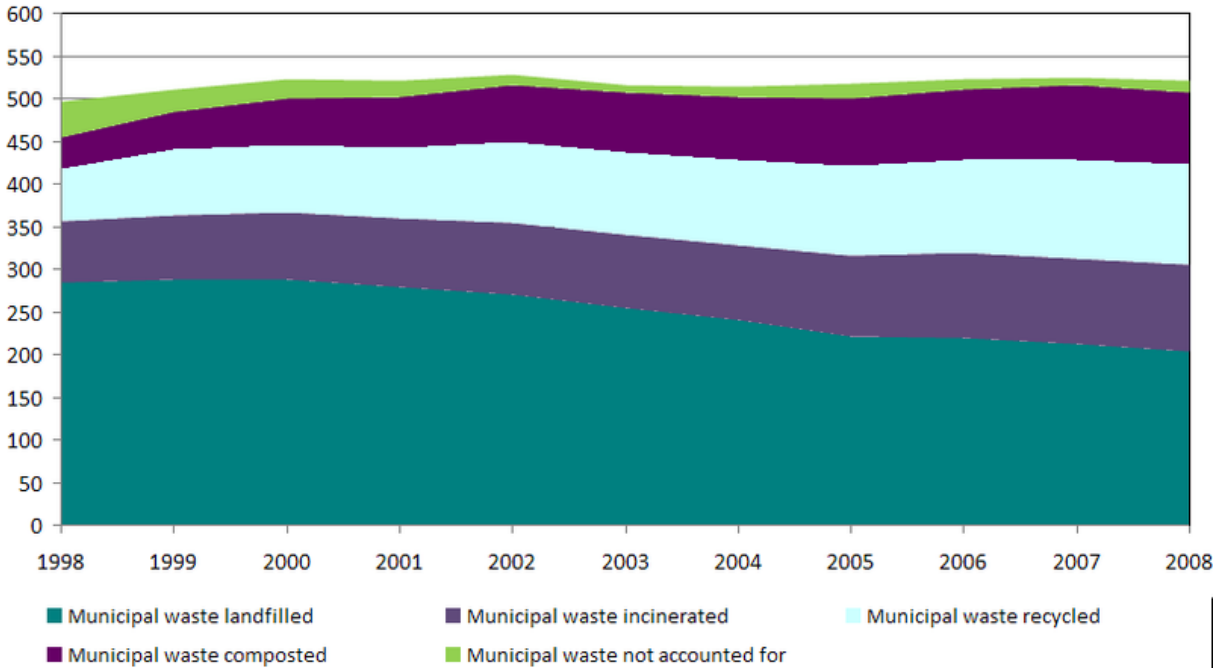
⁸² Document on the 'Structural indicator on municipal waste' (Doc. WASTE WG 6.1 (2010)) prepared for the Meeting of the Working Group "Statistics of the Environment", Sub-Group "Waste" of the Joint Eurostat/EFTA group

According to estimations about 50 to 60% of municipal waste incinerators in the EU might be able to achieve the energy efficiency criteria for municipal waste incinerators set by Directive 2008/98/EC.⁸³

3.5 Landfilling

There have been some significant successes in this regard over recent years. Figure 5 and 24 shows a clear decrease over time of municipal waste landfilling. Sending municipal solid waste (MSW) to landfill has long been the dominant waste management option in the EU-27, but in recent years this has begun to change,⁸⁴ and in contrast to rising quantities of MSW generated, since 1997 the quantity of MSW landfilled in the EU has decreased: from 293kg per capita in 1997 to 207kg per capita in 2008.⁸⁵

Figure 24: Municipal waste treatment⁸⁶



Nevertheless, many countries still sent the majority of their waste to landfill: all ‘EU-10’ countries (the EU-12 prior to the entry of Romania and Bulgaria into the EU) had landfill rates of at least 60%, as Ireland, Finland, Portugal and the UK. Conversely, most of the EU-15 had low rates of landfill and high rates of calculated material recovery and incineration with energy recovery.

⁸³ CEWEP, 2009, Energy Report II (Status 2004-2007)

⁸⁴ EEA, 2008, Briefing No 1/2008, Better management of municipal waste will reduce greenhouse gas emissions

⁸⁵ Eurostat, 2010, Environmental Data Centre on Waste, Landfill and incineration (For stats on incineration, choose from drop down menu)

⁸⁶ Source: Eurostat Waste data centre 2010

Figure 25 shows that the majority of EU-27 countries have reduced the amount of municipal waste disposed of in landfills between 1995 and 2007. Over that time, six countries (Bulgaria, Malta, Portugal, Romania, Slovakia and Slovenia) increased their disposal of municipal waste in landfills. It is appreciated that there are marked differences between Member States, especially between the EU-12 and the EU-15 Member States. For example, in 1995, an average of 62% of MSW was landfilled in the EU-15 in contrast with the 87% average in the EU-12. By 2007, the above figures had fallen to 42% and 79%, respectively.⁸⁷

Figure 25: Percentage of municipal waste that is landfilled in the EU-27, 1995 and 2007⁸⁸

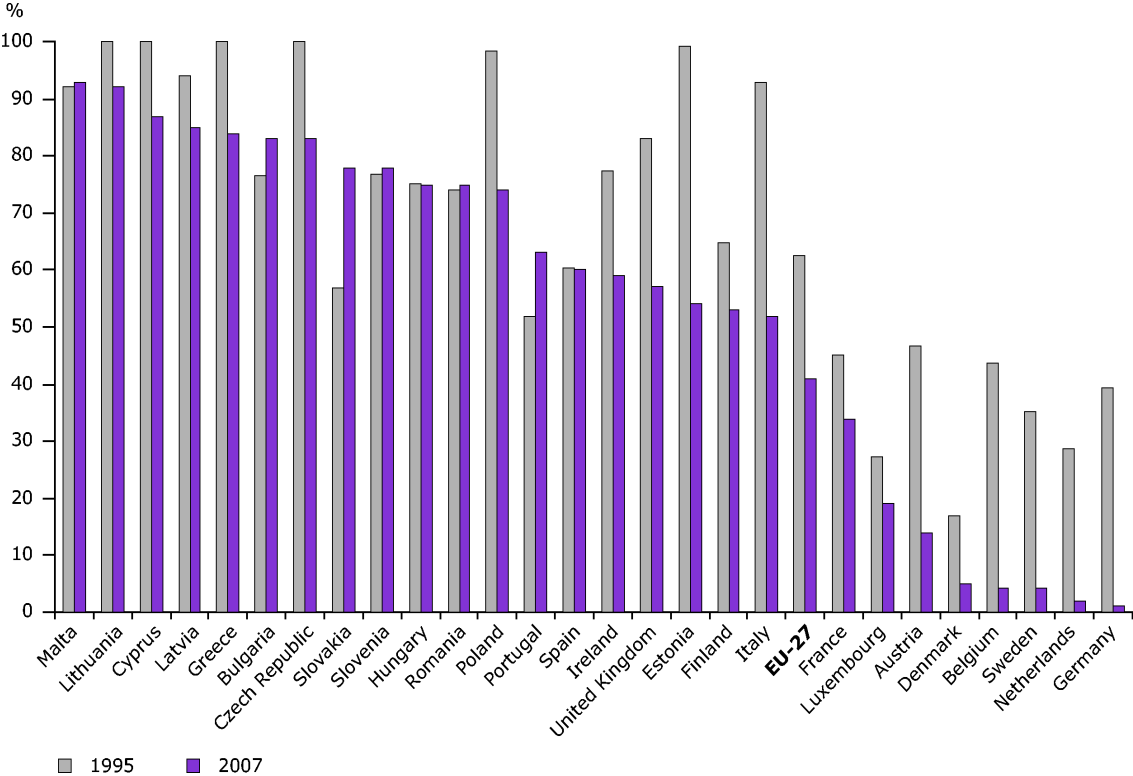
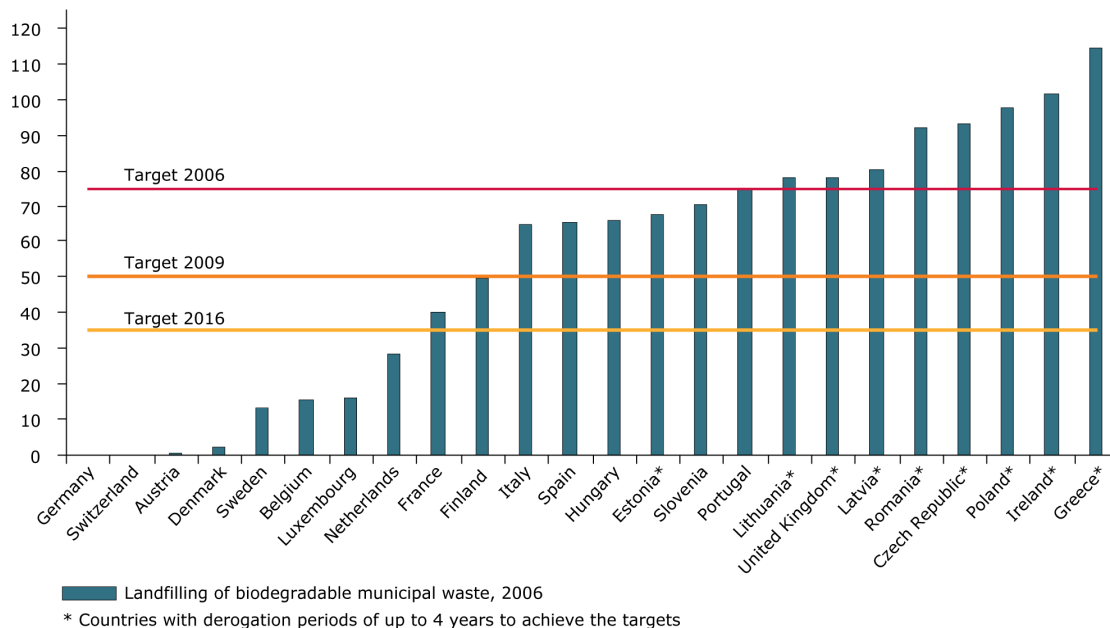


Figure 26 below shows that nine Member States had already met the 2016 target for diversion of the biodegradable municipal waste from Landfill by 2006, whereas eight Member States (all with derogation periods) still needed to substantially reduce landfill of biodegradable municipal waste to meet even the 2006 target. Data was missing for three Member States.

⁸⁷ Derived from EEA, 2009, Diverting waste from landfill – Effectiveness of waste-management policies in the European Union (Report 7)

⁸⁸ EEA, 2009, Diverting waste from landfill – Effectiveness of waste-management policies in the European Union (Report 7)

Figure 26: Biodegradable municipal waste landfilled in 2006 (% of biodegradable municipal waste generated in 1995), compared to targets of Directive 93/1999/EC⁸⁹



In addition to the reduction of waste landfilled, considerable efforts have been achieved by the Member states to close **sub-standards Landfills**. On the basis of the data reported by the Member States, more than 3,300 landfills in EU countries were closed between 2004 and 2006. However, countries also reported a large number of landfills which did not comply with the technical requirements of the Landfill Directive and thus still have to be closed or re-equipped. Many landfills were constructed without proper measures to reduce their potentially negative environmental impacts and have had to be closed or upgraded in order to comply with the minimum requirements of the Landfill Directive.

The Commission has identified thirteen non-conformity cases and eleven bad application cases in 2009 as well as a vast number of complaints related to illegal landfills and failure of many Member States to improve the situation. In addition, the Commission has taken action against those Member States which have failed to meet the deadline of 16 July 2009 regarding closure of sub-standard landfills.

3.6 Member States Performances

Meeting the minimum European binding collection and recycling targets will represent a real challenge for some Member States while others are already well ahead of these targets. For instance:

- In 2008, 8 MS failed to meet the 2006 reuse and recycling target for ELV's although 7 MS have already met the 2015 target (85%);

⁸⁹ EEA 2010, The European Environment, State and Outlook 2010 : Thematic Assessment – Material Resources and Waste

- In 2006, 12 MS had met the 2008 target for packaging waste (55%) with 4 MS below 30% and 5 MS above 60%;
- In 2008, the collection rate for batteries was estimated at 18% compared to the 25% EU target for 2012. 7 MS have already met this target in 2008;
- By 2006, only 10 MS had met the collection target for WEEE (4kg per capita per year), some MS collecting up to 8kg. This represented 23% of the amount put on the market. Once collected, WEEE was recycled at 79%.
- In 2007, seven Member States have already reached the 2016 landfill diversion target, however, a number of countries with derogation periods still have substantial work to accomplish in order to meet this target.

Recycling rates vary from one waste stream to another: 72,5% for paper and cardboard (2009 – a progress of around 10 % since the adoption of the Strategy), 60% for construction and demolition waste (EU15 – 2006), 59 % for packaging (2007), 82% for ELV's (2007) and respectively 18 % and 23% for WEEE due to the low collection rate.

The analysis of the performances of the Member States in terms of moving towards the waste hierarchy is clearly showing significant differences between MS. It is important to better understand what policies and instruments have been set in place in the better performing Member States have led to these differences.

In a first analysis, it seems that – apart from a good implementation of the basic legal principles of environmentally sound waste management - an appropriate use of economic instruments on top of the legal instruments could lead to improved performances. Different schemes have been put in place in the most performing Member States which are summarised below:

'Pay as you throw' schemes (or 'variable charging') are used in several Member States – including Austria, the Netherlands, Belgium, Italy, Denmark, Germany - as a fiscal incentive to encourage consumers to improve waste separation and/or reduce waste. Households are required to pay in proportion to volume or weight and frequency of collection. Electronic systems are used for the identification of bags and weighting of waste. It seems that these schemes where they have been introduced have reduced the total amount of residual waste collected and increased the participation to separate collection schemes. For instance, in Belgium, pay-per-bag schemes are set in place at local level with an impact of the collection of residual waste (decrease estimated up to 70%) and an increase of the participation to separate collection. Similar effects have been observed in Denmark and Italy where similar systems have led to a reduction of 18% of the residual waste collection and an increase of 8% of separated collected waste⁹⁰. More information and evaluation at EU level is needed.

Producer responsibility and voluntary agreement schemes is another method to promote better waste management. In most of the performing countries producer responsibility schemes have been put in place whether on a voluntary basis or by law (notably in Belgium, Germany, Austria).

⁹⁰ Eunomia Research & Consulting (on behalf of Ecotech Research & Consulting), 'Financing and Incentive Schemes for Municipal Waste Management: Case Studies – Final Report to Directorate General Environment, European Commission'

The waste streams covered by such systems are amongst others packaging, ELV's, batteries, WEEE, oils, paper, cardboards, tyres, expired medication, etc. The financial and operational responsibility of the producers varies from one Member State to another and could cover either the entire waste management process (collection, sorting, recycling, treatment of the residues, information to the public) or a part of it.

In general producer responsibility schemes are leading to improved recycling performances by creating new durable financial means for the organisation of separate collection schemes. It also moves the financial charge of waste management from the citizen (through general taxes) to the consumers through the consumer (through inclusion in the product price).

Deposit refund schemes was set in place for instance in Germany in 2003 for one-way drink packages as a results of the German Packaging Ordinance. A flat rate deposit of 0.25€ is charged on all one way drinks packaging containing between 0.1 and 3 litres.

Grants schemes are also used for instance to promote the separate collection and re-use of WEEE, textile, furniture, but no reliable statistics at European level are available so far on these type of activities.

One particular tool that is used by a large majority of Member States to encourage the diversion of waste from landfill is various forms of **landfill tax**. Table 3 illustrates that in general those countries having successfully reducing the amount of waste landfilled have a higher landfill tax in place. Some countries have also introduced a landfill ban for most of the waste streams (Germany and Austria).

Table 3: Landfill taxes and bans in place in the EU Member States⁹¹

Country	Landfill tax implemented in €/t	Landfill tax planned in €/t	Landfill ban implemented (beyond Landfill Directive)	Landfill ban planned
Austria	87 (from Jan 2006) – depending on composition of waste and standard of landfill	Prices adjusted in line with inflation	Total organic carbon (TOC) >5% from 2008. Exceptions for landfilling MBT-treated outputs (separate standards)	
Belgium (Flanders)	29.71-42.44 (from 2010, non-combustible waste). 55.70-79.56 (from 2010, combustible waste). Ranges exist due to private/public landfill sites.	Prices adjusted in line with inflation	TOC >6% ban on unsorted wastes, sorted and non-sorted wastes for recovery, combustible residual fraction from sorting	

⁹¹ Confederation of European Waste to Energy Plants (CEWEP), 2010, 'Landfill taxes & bans'

Country	Landfill tax implemented in €/t	Landfill tax planned in €/t	Landfill ban implemented (beyond Landfill Directive)	Landfill ban planned
Belgium (Wallonia)	65 (2010, hazardous waste). 60 (2010, non-hazardous waste).	Prices adjusted in line with inflation	Ban enacted since 2004	
Denmark	63 (from 2010)		From 1997 ban on waste suitable for incineration	
Netherlands	107.49 (from 2010)		For 35 categories of waste	No
Sweden	40		Sorted combustible waste from 2002. All organic waste from 2005.	
Germany	NONE (total landfill ban instead)		For all untreated waste from 2005	
Czech Republic	17 (from 2009)			
Finland	30 (exceptions for private landfills, fly ash, waste used in construction of landfills)			Aim for transitional ban on BMW from 2011
Ireland	30 (from 2010)	Under review – higher landfill tax expected	Some landfills ban certain waste streams but no national legislation	No
Italy	1-25 (depending on type of waste, e.g. inert, MSW)		Yes – to be determined	Some combustible waste from 2011
France	10-50 (from 2010, depending on type of landfill and amount of energy recovered. Exemptions for certain waste types.)	Annual increases between 10-100 (until 2015)	Introduced in 2002 on non-residual wastes (definition of ‘residual’ under discussion)	No

Country	Landfill tax implemented in €/t	Landfill tax planned in €/t	Landfill ban implemented (beyond Landfill Directive)	Landfill ban planned
United Kingdom	35.19 (from 2007) 3.67 (inert waste)	Rising by 11.72 per annum then top rate of 82.60 from 2013/2014	No	Under consultation
Hungary	7-15 (from 2010, exceptions for certain types of waste)		Tyres from 2004, rubber scrap from 2006	From 2015 for untreated wastes
Portugal	3.50	Updated each year	No	No

Top performers in the EU with regards to minimising the amount of waste landfilled are Germany (1%), the Netherlands (2%), Sweden (3%) and Belgium (also 3%). This may indicate a correlation between rates of landfill tax/bans and the proportion of waste sent to landfill.⁹²

Germany has implemented a landfill ban for all untreated waste with greater than 3% organic content. Since its implementation in 2005, the amount of municipal waste landfilled has fallen to 1%. Separate collection schemes have also resulted in notably higher recycling rates demonstrating the importance of developing alternative treatment methods together with the progressive rising of landfill taxes.⁹³

In the Netherlands, the landfill tax has contributed to a 60% decrease in the amount of waste landfilled between 1996 and 2004 (over the same period the amount of waste incinerated increased by 50% and the recycling rate increased by approximately 20%). Complementary measures in the Netherlands include a ban on 35 types of waste from landfill, pay-as-you-throw schemes,⁹⁴ and deposit-refund schemes for bottles. The landfill tax has also paved the way for improved separation of waste.⁹³

3.7 Recycling society

One of the long term goals of the Thematic Strategy was the establishment of a "Recycling Society" in the European Union that "seeks to avoid waste and use waste as resource" and therefore reduce the impacts of resource use on the environment while providing new opportunities in terms on job creation. No clear and accepted definition of a "recycling society" was provided in the Thematic Strategy. Clear progress have been made in terms of recycling since the adoption of the Thematic Strategy but at the same time the need for resources and raw materials has increased at European level.

⁹² Dutch Waste Management Association, 2009, 'Uneven playing field for landfill in Europe

⁹³ EEA, 2006, 'Country fact sheet: Germany'

⁹⁴ Earth911.com, 2009, 'Trash Planet: The Netherlands'

An ongoing study⁹⁵ has provided first estimates of the current level of recycling compared to the demand of virgin raw materials. Table 4 presents an estimation of the recycled totals per material and waste stream in 2006. It shows that in tonnage the contribution of the construction and demolition waste is by far the largest contributor followed by packaging waste. ELV's and WEEE contribute to large amounts of steel.

Table 4: Estimates of the material recycled per material and waste stream, 2006

Material	Material recycled under current policy (tonnes)				
	C&D	ELV	Packaging	WEEE	Total
Metal	9 989 944	4 294 855	3 600 212	1 169 576	19 054 587
Ferrous metals	9 989 944	3 842 765	2 788 713	1 063 251	17 684 673
Non ferrous		452 090	811 499	106 325	1 369 914
Aluminium	-	-	604 453	-	604 453
Glass	-	-	11 233 183	-	11 233 183
Aggregates	209 788 824	-		-	209 788 824
Plastic	4 994 972	-	4 838 694	531 626	10 365 292
Paper	-	-	30 509 027	-	30 509 027
Wood	9 989 944	-	5 323 356	-	15 313 300
Total	234 763 684	4 294 855	55 504 472	1 701 202	296 264 213

Table 5 provides the first estimates for potential recycled amounts if all existing waste targets as described under section 2(7) were achieved. The potential is mainly linked with construction and demolition waste and WEEE as the current amounts of packaging waste and ELV are not far from the EU targets. Beyond the quantitative analysis, it is important to note that further investigations would be needed to better identify specific material flows which have a significant impact on the environment.

The same study made comparisons between the actual and potential recycled materials and the global demand for raw materials. In summary, reuse, recycling and recovery of construction and demolition waste – estimated at 47% in 2006 - represents between 4 to 14% of the mineral material set on the market; this rate could increase to 7 to 21% if the EU target of 70% recycling is respected. Recycled, reused and recovered ELV's, WEEE and packaging waste represent respectively around 1,7%, 0,5% and 1,3% of total metal inputs in the EU economy.

⁹⁵ "Analysis of the key contributions to Resource Efficiency", BIO Intelligence Service with Social Ecology Vienna, for DG ENV ongoing study

Table 5: Estimates of the potential material recycled if existing legislation is fully implemented

Material recycled implementation of existing legislation (tonnes)					
Material	C&D	ELV	Packaging	WEEE	Total
Metal	15 684 560	4 294 855	3 626 182	1 571 160	25 176 757
Ferrous metals	15 684 560	3 842 765	2 822 122	1 428 327	23 777 774
Non ferrous	-	452 090	804 059	142 833	1 398 982
Aluminium	-	-	633 057	-	633 057
Glass	-	169 534	11 941 037	-	12 110 571
Aggregates	329 375 760	-		-	329 375 760
Plastic	7 842 280	565 113	5 367 396	714 164	14 488 952
Paper	-	-	30 548 745	-	30 548 745
Wood	15 684 560	-	4 924 692	-	20 609 252
Total	368 587 160	5 029 501	56 408 052	2 285 323	432 310 037

Another study analyses recycling rates, recycling contents and share of old scrap in then total scrap flow for 60 metals at global level⁹⁶.

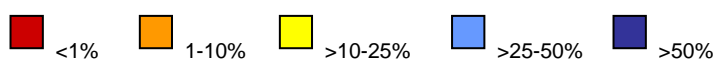
It shows that end-of-life recycling rates are still globally low due to the relative abundance of primary material and due to the absence of performing collection and processing of old metals. Recycling rates is above 50% only for 18 metals of 60 (see figure 27) and the share of old scrap in the total flow is above 50% only for thirteen metals. Metal recycling could be improved in the future and contribute to meet a significant part of the future demand. To that end, collection of old metals and processing should be improved as well as design of the products to increase the “recyclability” of some metals.

⁹⁶ « Recycling Rates of Metals : A Status Report », second report of the Global Metal Flows working group of the International Panel on Sustainable Resource Management of UNEP

Figure 27: Average end-of-life functional recycling⁹⁷

1																	2
H																	He
3	4											5	6	7	8	9	10
Li	Be											B	C	N	O	F	Ne
11	12											13	14	15	16	17	18
Na	Mg											Al	Si	P	S	Cl	Ar
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
55	56	*	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
Cs	Ba		Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
87	88	**	104	105	106	107	108	109	110	111	112	113	114	115	116	(117)	118
Fr	Ra		Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Uub	Uut	Uuq	Uup	Uuh	(Uus)	Uuo

* Lanthanides	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
** Actinides	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103
	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr



As demand grows for a range of materials, the supply of raw materials has been receiving increased attention. Recycling plays an important role in this context as it acts as a form of supply. In 2008 the Commission launched the Raw Materials initiative, on the issue of critical raw materials (COM(2008)699). This Communication includes three "pillars" with the aim of "ensuring access to raw materials, foster sustainable supply of raw material from EU sources and boost resource efficiency and promote recycling to reduce EU's consumption of primary raw material". It will be reviewed in 2010.

In the 2010 report of the working group on defining critical raw materials, it is highlighted that EU's recycling of specific metals - inputs which are essential for the maintenance of our standard of living as well as for future green or enabling technologies - remains low⁹⁸.

⁹⁷ Source : UNEP 2010 – see previous note

⁹⁸ More information is available from the following link: http://ec.europa.eu/enterprise/policies/raw-materials/critical/index_en.htm and the whole report is available from the following link: http://ec.europa.eu/enterprise/policies/raw-materials/files/docs/report-b_en.pdf

Recycling markets

The importance of recycling markets following the downturn was highlighted and discussed in the Environment Council, March 2009⁹⁹. Promoting and maintaining waste management and recycling markets is of strategic importance for the environment and for European competitiveness. It enhances material efficiency and offers significant energy savings. It also helps to make valuable and strategic materials available to EU industry. The importance of recycling markets was evidenced in 2009, following the economic downturn due to a drop in demand for materials. This mainly pointed to the importance of recycling quality and effective sorted materials, as well as the degree of exports of EU waste.

Since the publication of the strategy, increasing attention has been paid to market forces, working alongside and interacting with a legislative framework:

- The Lead Market initiative on Recycling (SEC (2009) 1198),¹⁰⁰
- End-of-waste Criteria. A methodology for establishing end-of-waste criteria has been agreed (see above);
- Waste Shipment Regulation Illegal shipments of waste contribute to unfair competition.
- The environmental guidelines for state aid published in 2008, have specific provisions that are relevant to waste, recycling and eco-innovation. (“Community Guidelines on State aid for Environmental Protection” Official Journal No C 82, 1.4.2008, p.1)
- A number of initiatives have been put into place to promote new technologies and innovation:
 - LIFE has helped facilitate a number of projects developing and testing solutions to specific technological challenges, particularly with regard to waste treatment in the manufacturing sector¹⁰¹;
 - Eco-innovation, ETAP and R&D funding.

Environmental impacts

One of the expected impacts of the Thematic Strategy is to reduce the environmental impacts associated with the generation and treatment of waste. The most reliable and extensive data sets relate to the greenhouse gas (GHG) emissions associated with waste management in Europe, more limited information is available regarding the broader pollution implications associated with waste management.

⁹⁹ See: http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/envir/106430.pdf

¹⁰⁰ See: <http://ec.europa.eu/enterprise/policies/innovation/policy/lead-market-initiative/>

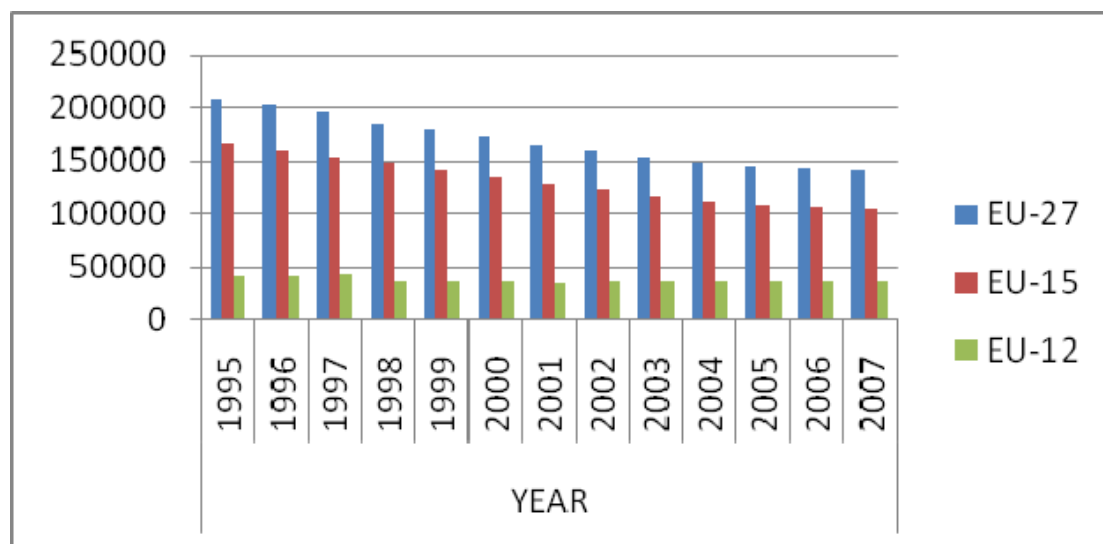
¹⁰¹ See: <http://ec.europa.eu/environment/life/themes/waste/index.htm>

- Green House Gas Emissions

Figure 28 provides an overview of GHG emissions directly contributed by the waste sector in the EU-27 from 1995 to 2007. The waste sector's emissions are defined by the IPCC – the Intergovernmental Panel on Climate Change - as GHG directly emitted by landfills, incineration without energy recovery, waste water treatment and biological treatment. In 1995, GHG emissions from the waste sector in the EU-27 were 207.2 million tonnes CO₂ equivalent, accounting for 3.97% of total EU-27 GHG emissions. By 2007, this figure had dropped to 141.2 million tonnes CO₂ equivalent, accounting for only 2.8% of total EU-27 GHG emissions.

In the EU-15, GHG emissions from the waste sector fell by 39% from 1990-2006; they are projected to fall a further 6% below 1990 levels by 2010, based on existing policies.¹⁰²

Figure 28: Total greenhouse gas emissions from the waste sector, EU-27, EU-15 and EU-12, in 1000 tonnes CO₂ equivalent¹⁰³



A different approach, which demonstrates the real effect of waste management activities in the technosphere, is to include the life cycle impacts of solid waste management. If emissions avoided by replacing virgin materials and energy with materials and energy derived from recycling and recovery of waste are taken into account, the GHG reduction are higher. Considering municipal solid waste only – which accounts for around 9 % of total waste – the net emissions from the management of this waste, that is the sum of emissions from landfills, incineration, recycling (including bio-waste) and waste transport and the emissions avoided through material and energy recovery, are estimated to have been cut by 57 % between 1995 and 2008 (Figure 29).

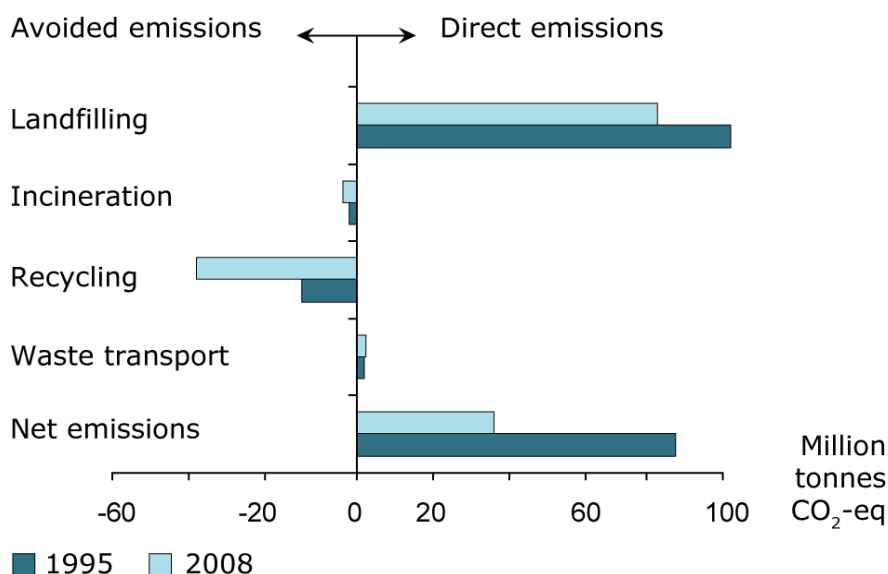
Negative emissions indicate that waste management leads to avoiding of emissions outside of the waste sector by reducing the demand for virgin materials and energy from fossil fuels.

¹⁰² Eurostat, 2009, Total greenhouse gas emissions & Eurostat, 2009, Total greenhouse gas emissions from the waste sector

¹⁰³ Derived from Eurostat, 2009, Total greenhouse gas emissions & Eurostat, 2009, Total greenhouse gas emissions from the waste sector

This compensates direct emissions from landfills, incineration, transport and recycling installations.

Figure 29: Emissions of municipal waste management in the EU-27 plus Norway and Switzerland (excluding Cyprus due to lack of data), 1995 and 2008¹⁰⁴



- **Air Pollutants**

Most of the air pollution associated with waste management was linked with waste incineration which is regulated by the revised incineration Directive 2000/76/EC. The Directive includes strict limit values covering heavy metals, dioxins and furans, carbon monoxide (CO), dust, total organic carbon (TOC), hydrogen chloride (HCl), hydrogen fluoride (HF), sulphur dioxide (SO₂), nitrogen monoxide (No) and nitrogen dioxide (NO₂). Since the entry in force of the Directive, the emissions have dropped considerably due to the closure or upgrading of existing installations.

- **Water**

The closure of sub-standards Landfills combined with the implementation of the Landfill Directive and the reduction of the amount of waste landfilled has certainly led to a decrease of the water pollution due to leachates produced by Landfills. No data is available at EU 27 level on this reduction which might be considerable at local levels.

- **Soil**

In addition to the benefits expected from the full implementation of the Landfill Directive, the increased of composting has led to the production of organic fertiliser.

¹⁰⁴ EEA 2010, The European Environment, State and Outlook 2010 : Thematic Assessment – Material Resources and Waste

It has been estimated that the market for quality compost could be increased by a factor of 2.6 to reach about 28 million tonnes¹⁰⁵. This could help to improve the quality of 3% to 7% of depleted agricultural soils in the EU¹⁰⁶ and to address the problem of degrading soil quality in Europe¹⁰⁷.

Economic impacts

Waste management and recycling Industry is already well established in Europe. According to Eurostat figures, in 2006, the EU27 had: 5,170 facilities for incineration with energy recovery; 3,897 facilities for other incineration; 50,682 facilities for recycling; 10,286 facilities for landfilling¹⁰⁸.

Most of the companies involved in the recycling sector (over 95%) are SMEs. In total the waste management and recycling industries were considered to provide between 1.2 and 1.5 million jobs in the EU¹⁰⁹.

Other estimates of low carbon jobs in Europe, for example by WWF¹¹⁰, place recycling as one of the core sources of employment. Given the EU's level of export of waste for reprocessing it is also important to acknowledge the generation of jobs and growth globally as a consequence of waste management and recycling. Global market estimates for sustainable resource management, presented in the WWF report, estimated that in 2005 solid waste management and recycling accounted for €30 billion world wide and that by 2020 this was anticipated to represent €46 billion.

Growth in jobs globally within this sector was estimated to be 9% in the 2004 to 2006 period and 7% between 2007 and 2009. In this global context the EU is considered to be a market leader in making the most of opportunities in the recycling industry and, according to a study on the competitiveness of the EU eco-industry,¹¹¹ holds 50% of market share in the recycling industry globally.

A recent study¹¹² achieved by the Friends of the Earth indicates that achieving 70% of recycling of key materials at European level could lead to the creation of around 563.000 new indirect and direct jobs, showing the relatively highest potential in terms of job creation of recycling compared to other waste treatment methods such as incineration and landfilling.

¹⁰⁵ Source: ORBIT/ECN, 2008, Compost production and use in the EU, Final report. The production of compost from bio-waste in 2005 was estimated at 10,5 million tonnes

¹⁰⁶ Source: ORBIT/ECN, based on the assumption of an application of 10 tons/ha/year of compost repeated every year

¹⁰⁷ Around 45% of EU soils lack humus – prerequisite of soil fertility

¹⁰⁸ Eurostat, 2006, Waste treatment facilities at country level in 2004

¹⁰⁹ Presidency Paper to the Environment Council, 2009, The fall in demand for recycled materials

¹¹⁰ WWF EPO, 2009, Low carbon Jobs for Europe, Current Opportunities and Future Prospects

¹¹¹ Ecorys, 2009, Study on the Competitiveness of the EU eco-industry (DG Enterprise and Industry)

¹¹² "More jobs, less waste" Potential for job creation through higher rates of recycling in the UK and the EU, Friends of the Earth 2010, More information can be found from the following link: http://www.foeeurope.org/publications/2010/More_Jobs_Less_Waste_Sep2010.pdf

4. INTERNATIONAL ASPECTS

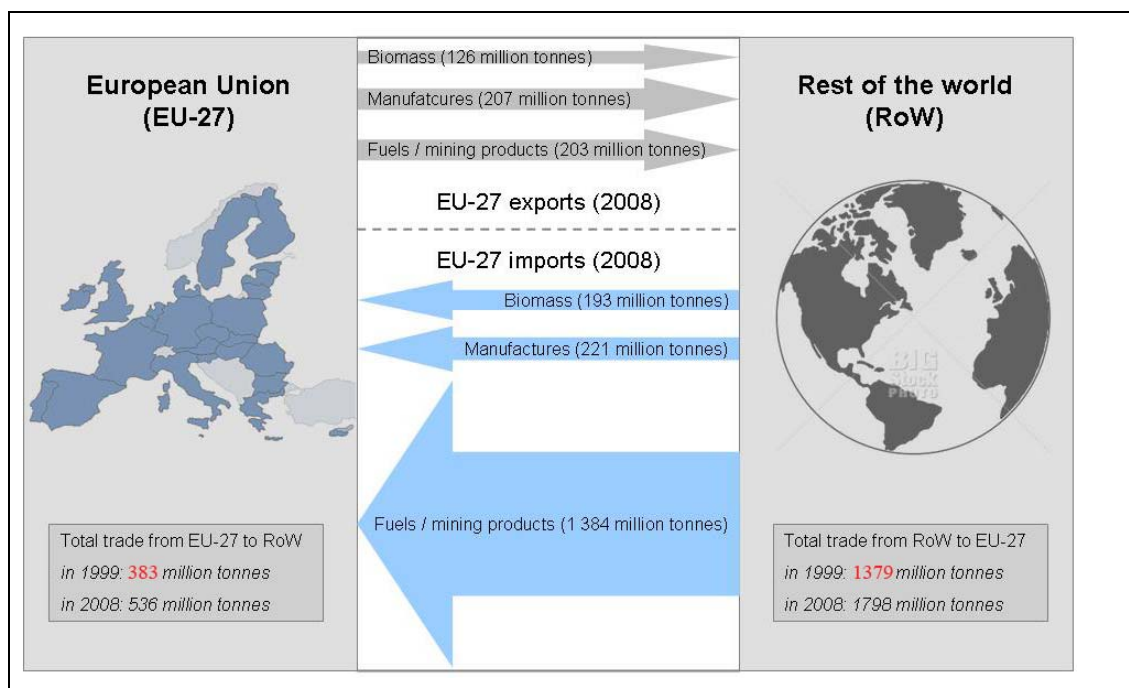
4.1 Increasing globalisation

The international context has become increasingly important since the publication of the Strategy.

Increased globalization and changes of the EU economy – less extraction and heavy industries, more services - had led to increased imports of raw materials and semi manufactured materials. As shown in Figure 30, in 2008, the EU imported six times more resources than it exported.

This figure is showing the large dependency of the EU on imports of raw materials and products. It reflects the globalization of the environmental impacts of EU consumption and production demonstrating the growing importance of developing instruments and tools able to capture this international dimension.

Figure 30: EU-27 physical trade balance with the rest of the World, 2008¹¹³



4.2 Waste exports

As shown in Figure 31 below, international trade in waste and secondary materials has been increasing, in particular for non-hazardous waste. Between 1997 and 2005 notified waste exports from Member States increased four-fold¹¹⁴.

¹¹³ Eurostat Comext Statistics, EEA 2010, The European Environment, State and Outlook 2010 : Thematic Assessment – Material Resources and Waste

¹¹⁴ EEA 2009, transboundary shipment of waste

The EU’s key market for export has been Asia. This export route accounts for the majority of non-EU trade in waste metal, paper and plastics; a trade which expanded five-fold for metals, 10-fold for paper and 11-fold for plastics between 1995 and 2007. In 2007 more plastic waste was shipped to the Asian market by the EU than was shipped within the EU.¹¹⁵ In addition half of all waste plastics were exported to China and Hong Kong.¹¹⁶

It has been estimated that in 2006, around 3% of waste paper (2.1 million tonnes), 10% of scrap metals (around 9 million tonnes) and a huge 71% of waste plastics (10 million tonnes) were exported from the EU-25 to non-EU countries; there is therefore a clear pattern of the majority of paper and metals waste being treated within the EU, whereas the vast majority of plastic waste is shipped to third countries.

According to other sources (PRODCOM data) in 2007, 9.8 million tonnes of recovered paper were exported. In 2009, 13.2 million tones were exported with 70% going to China. In 2010 it seems that several EU mills run out of recovered paper.

Figure 31: Shipments of notified waste from EU Member States to other EU and non-EU countries, 1997-2005¹¹³

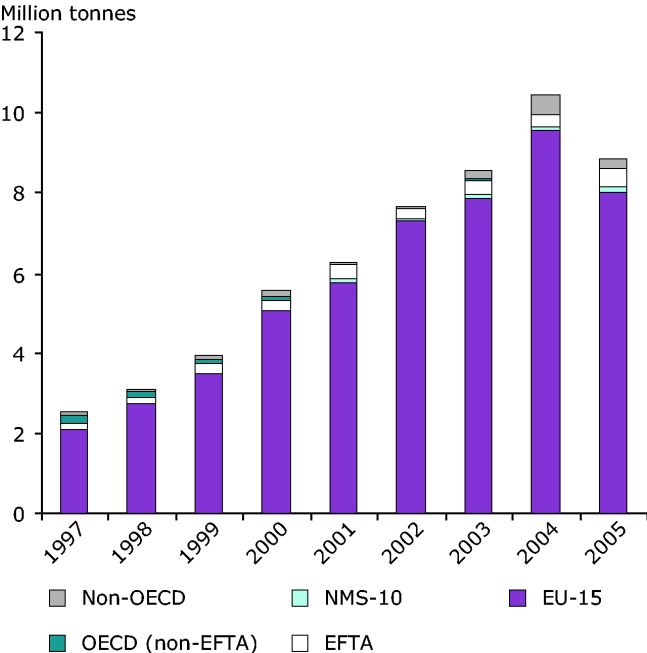
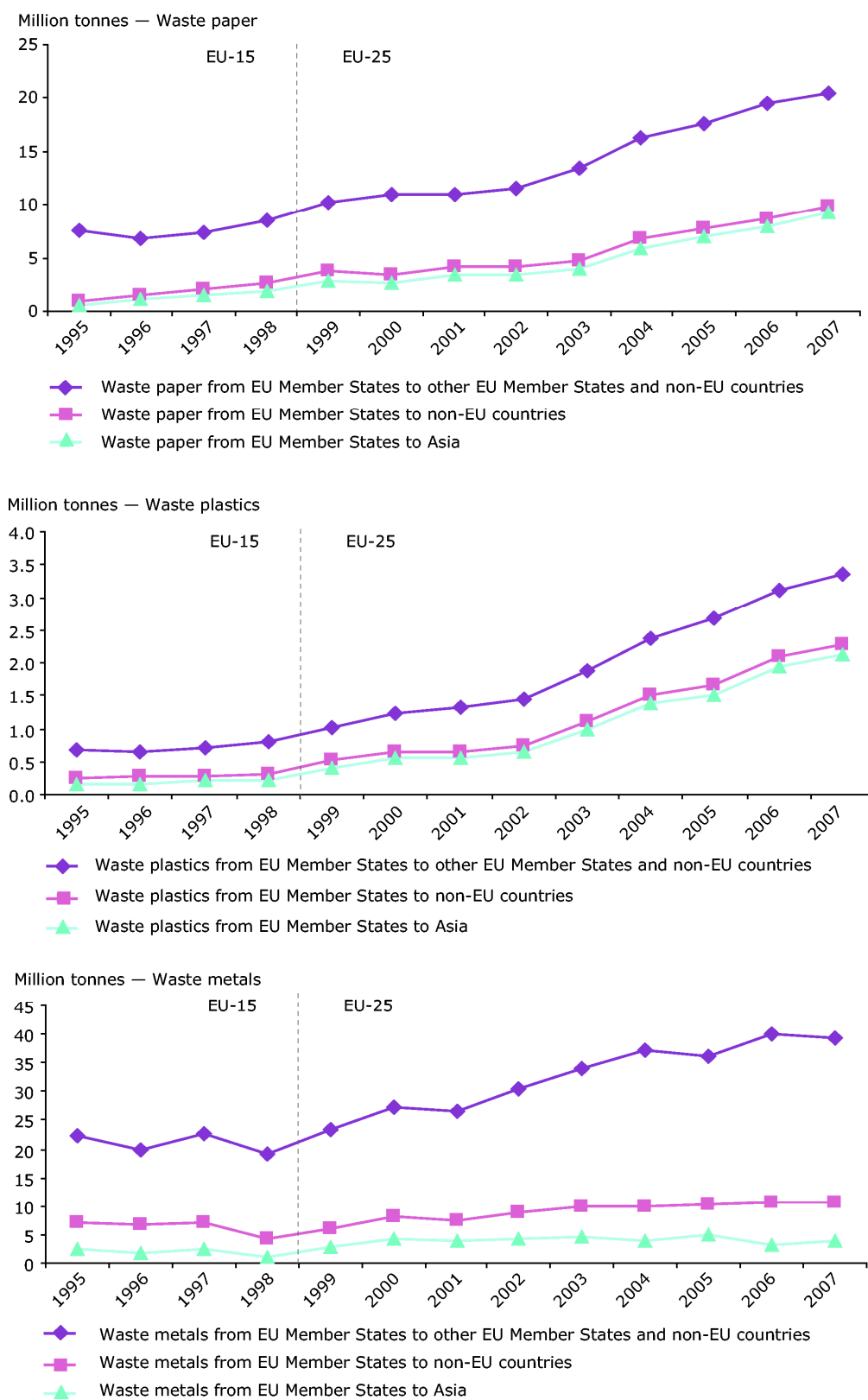


Figure 32 demonstrates the trend in terms of the increase in exports of both plastic and paper for treatment. It should be noted that it is not only the EU that is expanding exports of waste materials; Japan, for example, has shown a general upward trend in exports of iron, steel, copper and plastic waste since 1995.¹¹⁷

¹¹⁵ EEA, 2009, Waste without borders in the EU? Transboundary shipments of waste (Mar 2009)
¹¹⁶ EEA, 2008, ETC/RWM Technical Report 2008/1. Transboundary shipments of waste in the EU. Developments 1995-2005 and possible drivers
¹¹⁷ Japanese Ministry of Finance, 2010, Trade statistics

Figure 32: Developments in shipments of waste paper, waste plastics and waste metals out of and within the EU from 1995 to 2007¹¹⁸



¹¹⁸ EEA, 2009, 'Waste without borders in the EU? Transboundary shipments of waste' (Mar 2009)

The shipment of waste raises many questions. There is a trend towards increasing levels of export, however, there are concerns regarding the reliability of the data on trade in waste. For example according to findings by the European Topic Centre on resource and waste management (ETC/RWM), exports of WEEE (estimated at 250,000 tonnes) are considered low compared to total generated levels of WEEE (estimated at 7 million tonnes).¹¹⁹

The collection of statistical data for the shipment of 'green' listed waste that is not subject to the procedure of "prior written notification and consent" pursuant to Article 4 of the Waste Shipment Regulation, is particularly difficult, since copies of shipment documentation are not always required by the competent authorities concerned. In addition, there are also known gaps in the figures available for the shipment of 'green'-listed waste, with data not being thoroughly available for all waste types in every year, particularly for plastics.

Moreover, the rate of reported illegal shipments of waste increased between 2001 and 2005. For this period the EEA reported that on average the annual illegal shipments corresponded to 0.2% of notified waste¹²⁰, however the actual amount of illegal shipments is difficult to estimate. On the basis of data collected through coordinated actions of IMPEL-TFS between 2008 and 2009, it was estimated that 19% of waste shipments were related with some type of violation of the provisions of the Waste Shipment Regulation. More data and information would be needed in the future notably to better target inspection strategies.

A specific type of waste that can cause environmental problems is **end-of-life ships**. Worldwide, between 200 and 600 large end-of-life ships are broken up and recycled every year to recover valuable steel, other scrap metal and equipment. Older ships often contain many hazardous materials, including asbestos, polychlorinated biphenyls (PCBs), tributyltin and large quantities of oils and oil sludge.

Although the number of dismantling sites in the EU has fallen over the past two decades, the available capacity for environmentally sustainable dismantling in the EU and in other OECD countries is sufficient to cover all warships and other state-owned vessels that will be decommissioned over the next ten years but will be insufficient to ensure the dismantling of all merchant ships¹²¹. However, the majority of ship dismantling taking place in South Asia (predominantly India, Bangladesh and Pakistan), often under conditions that are environmentally unsound and threaten the health and safety of the workers involved. Ship dismantling remains largely manual, lacking in hazardous waste management and pollution prevention systems, and lacking in safe and fair conditions for the workforce. On the contrary, countries including China and Turkey had made advances in terms of environmentally sound practices and worker safety¹²².

Available data suggests that around between 1994 and 2006, approximately 5,600 ships were dismantled worldwide.¹²³ Worldwide between 2010 and 2030, an average of around 500 large and very large ships will be dismantled annually, amounting to some 34.7 million gross tonnes of ships, 2% of the gross tonnage or 0.5% of the total number of the world fleet.

¹¹⁹ EEA, 2008, ETC/RWM Technical Report 2008/1. Transboundary shipments of waste in the EU. Developments 1995-2005 and possible drivers

¹²⁰ EEA, 2009, Waste without borders in the EU? Transboundary shipments of waste (March 2009)

¹²¹ Europea, 2007, Ship dismantling and pre-cleaning of ships. Report published at: <http://ec.europa.eu/environment/waste/ships/index.htm>.

¹²² Europa, 2009, Support to the impact assessment of a new legislative proposal on ship dismantling – Final Report published at http://ec.europa.eu/environment/waste/ships/pdf/final_report080310.pdf

¹²³ Europa, 2007, Ship Dismantling and Pre-cleaning of Ships – Final Report

Under the International MARPOL Convention for the Prevention of Pollution from Ships, approximately 784 tankers will be phased out in 2010, 43 between 2011 and 2014, and 109 in 2015. Around 13% of ships dismantled globally will be EU flagged ships.¹²⁴ Another study estimated that EU-flagged vessels will account for around 20% of future scrapped tonnage.¹²⁵

4.3 European actions

In addition to the progress achieved improve the implementation of existing legislation and particularly the Waste Shipment Regulation (see section 2 above), the following specific actions were taken by the Commission:

- In the EU external action, the promotion of sustainable production and consumption patterns and sound waste management are addressed both as specific environmental issues and as regional or country specific needs. Sound waste management (including chemicals and hazardous waste) is a priority of the Environment and Natural Resources Thematic Programme (ENRTP)¹²⁶, in particular helping countries to meet their international commitments in this field. For instance, a project to build local capacity to address the flow of e-wastes and electrical and electronic products destined for reuse in selected African countries has been approved in 2008. A call for proposals targeting actions to improve resource efficiency in waste streams of production and consumption, in particular with respect to solid waste from urban areas, was launched in 2009. The call emphasised in particular recycling and energy production opportunities and multiplier effects; and end of life electronic equipment, with emphasis on recycling opportunities or safe disposal.

Several actions to support approximation to the EU acquis related to waste have also been financed in the European Neighbours (e.g. the ENPI East Waste Governance and Management of Environmental Data, approved in 2008 and with an EU contribution of €m)¹²⁷, while in Asia several activities in support of hazardous waste management, including e-waste management, are supported. Financial support is also foreseen for the Basel Convention's Secretariat on compliance, synergies and ship dismantling also under ENRTP.

- Following the publication of a Green Paper on ship dismantling in 2007, the Commission adopted in 2008 a strategy for better ship dismantling¹²⁸. The EU strategy includes: measures to anticipate the entry into force of the IMO Hong Kong Convention on ship dismantling - notably for certification and inventories of hazardous materials on board, the encouragement of voluntary industry action, measures to promote technical assistance to developing countries for safety training programmes and basic infrastructure for environmental and health protection and better enforcement of current waste shipment

¹²⁴ Europa,2010, Feasibility of a list of 'Green and Safe' Ship Dismantling Facilities and a List of Ships Likely to go for Dismantling-Final report

¹²⁵ Europa, 2009, Support to the impact assessment of a new legislative proposal on ship dismantling – Final Report

¹²⁶ More information can be found from the following links:
http://ec.europa.eu/europeaid/how/finance/dci/environment_en.htm and
http://ec.europa.eu/europeaid/what/environment/index_en.htm

¹²⁷ More information can be found on the following web sites: neighbourhood
http://ec.europa.eu/europeaid/where/neighbourhood/regional-cooperation/enpi-east/sustainable_en.htm
and http://ec.europa.eu/europeaid/where/neighbourhood/regional-cooperation/enpi-south/sustainable/index_en.htm

¹²⁸ COM 2008 (767) See: http://ec.europa.eu/environment/waste/ships/pdf/com_2008_767.pdf

rules. The strategy also proposed that the Commission should look at the feasibility of: developing a certification and audit scheme for ship recycling facilities worldwide and evaluating how EU ships can be encouraged to use such a scheme; making warships and other government vessels not covered by the Convention subject to EU rules for clean dismantling; and establishing a mandatory international funding system for clean ship dismantling.

- The Commission also participated actively in the negotiation which led to the adoption of the Hong Kong Convention. This Convention was adopted in May 2009 under the auspices of the International Maritime Organisation and needs to be ratified by both major recycling and flag States. Individual Member States have therefore been strongly encouraged to ratify it as a matter of priority, so as to facilitate its entry into force as early as possible and to generate a real and effective change on the ground. Technical guidelines supporting the Hong Kong Convention are being developed¹²⁹. Parties to Basel Convention are also carrying out an assessment of the level of control and enforcement established by the Basel Convention in comparison with the level of control and enforcement provided by the Hong Kong Convention. . Following this assessment it is expected that a decision will be made by the Parties to the Basel Convention on whether any amendments shall be introduced to this Convention.
- The EU has supported the so called "Ban amendment" to the Basel Convention since its adoption in 1995. This amendment prohibits the exports of hazardous waste from some OECD countries to other countries and, in particular, developing countries where they do not have the capacity to treat these wastes. This amendment has been fully transposed in the EU Waste Shipment Regulation, but is still not in force at international level for various reasons including an insufficient number of ratification, in particular from developing countries, but also because of difficult discussions to agree on a common legal interpretation on the entry into force requirement of this amendment.
- In order to break the current deadlock, Indonesia and Switzerland jointly launched an initiative¹³⁰ to explore alternative means by which objectives of the Ban Amendment might be achieved. Key Parties were invited to identify why these objectives are currently not met and to propose solutions which will be the presented and discussed with all Parties at the next Conference of the Parties. This initiative helped in particular the identification of the growing importance of the transboundary movements between non-OECD countries and of the need to develop and implement requirements for environmentally sound management of waste.

4.3 Worldwide actions

There are indications that waste generation in developing countries is likely to increase significantly. Waste and recycling policies are being actively developed in countries worldwide. Japan already has highly developed polices and legal framework for resource management. China has adopted a Circular Economy Law in August 2008 which contains measures for reducing, reusing and recycling activities conducted in the process of

¹²⁹ Guidelines on the development of the Inventory of Hazardous Materials adopted on 17 July 2009 : http://www.imo.org/includes/blastDataOnly.asp/data_id%3D26464/179%2859%29.pdf

¹³⁰ For more information about this "country-led initiative" (CLI) see: <http://www.basel.int/>

production, circulation and consumption.¹³¹ These policy developments are also being matched by increasing waste management performance.

At the same time a number of countries looking to the EU as a reference on how to develop their own policies. This includes adoptions of variants of the RoHS or WEEE Directives for instance in China, Thailand and Brazil. Russia plans to use the EU Packaging Waste Directive as the basis for their new legislation in this area.

It has been observed that a great amount of e-waste is exported from the EU under the label of “used products (non-waste)”. Distinguishing between genuine second-hand equipment and non functioning electronic scrap is difficult which offers opportunities to some exporters to circumvent applying the EU legislation. Guidelines regarding the distinction between waste and non waste have been adopted at European level and are under development at international level. The need to clarify¹³² this notion at international level was also identified by some Parties in the context of the Country Led Initiative jointly organized by Indonesia and Switzerland. Guidelines regarding the distinction between waste and non waste have been adopted at European level¹³³ and are under development at international level.

5. FUTURE TRENDS

5.1 Increasing demand and impacts from resource use

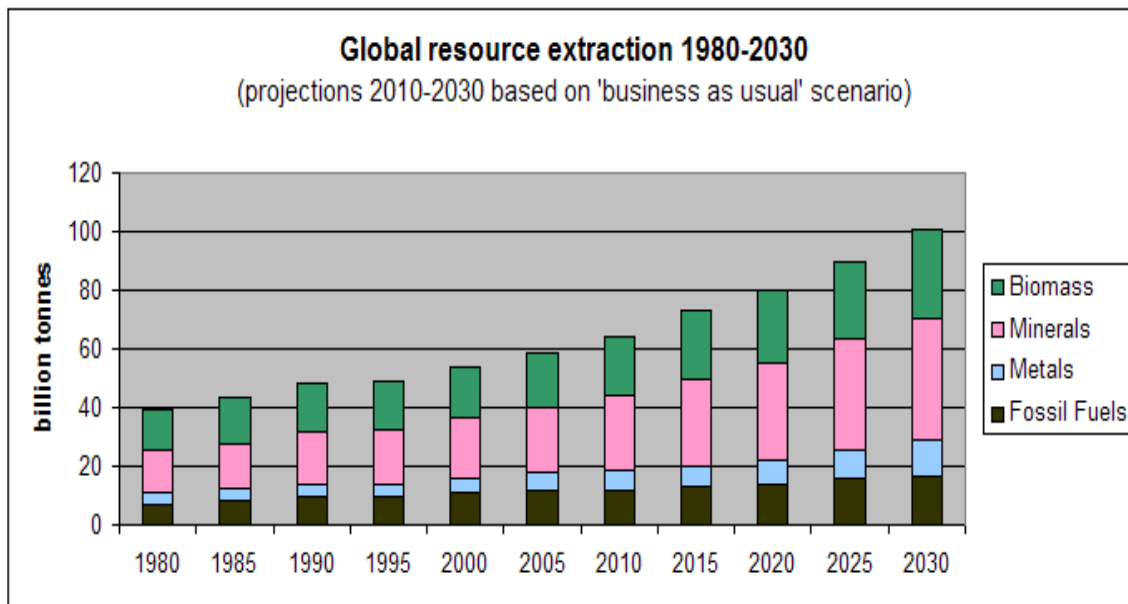
Without additional policies, global extraction of resources is expected to rise in the coming decades. This is due to a combination of increase of population with the growth of the worldwide middle class. Figure 33 shows projections of future demand of worldwide resources. Global extraction of resources is expected to increase from 58 billion tons in 2005 to more than 100 billion tons in 2030 representing an increase of 75% in 25 years. Biomass, metals and minerals are representing more than 80% of the future demand in tonnage.

¹³¹ See: <http://www.chinaenvironmentallaw.com/wp-content/uploads/2008/09/circular-economy-law-cn-en-final.pdf>

¹³² For more information see: <http://www.basel.int/convention/cli/index.html>

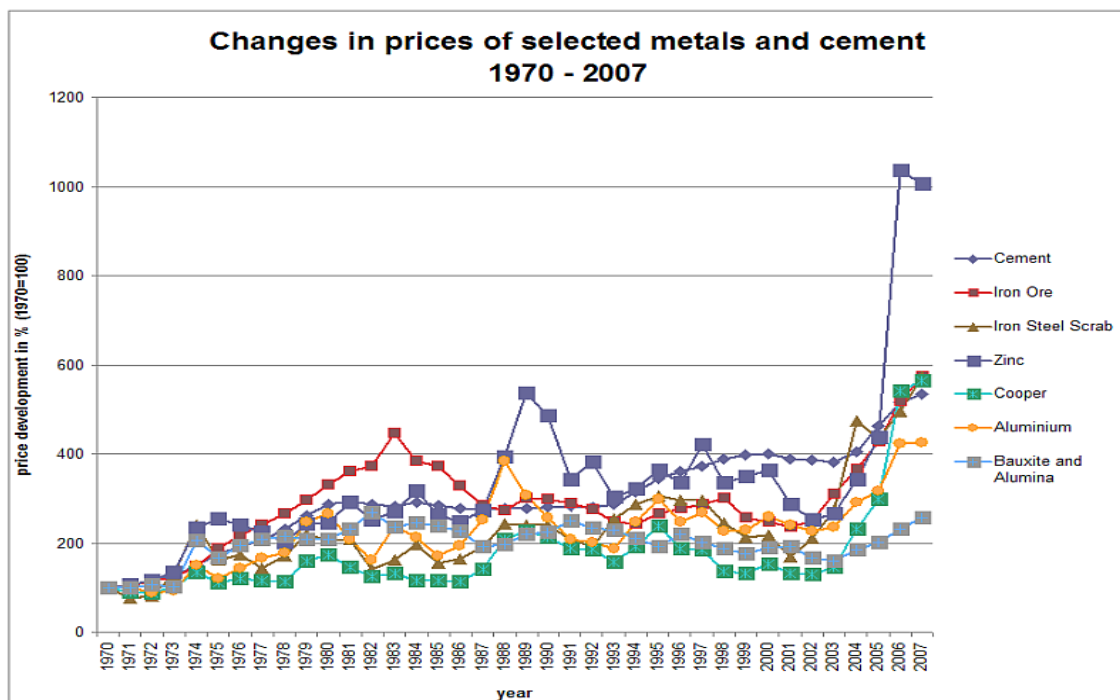
¹³³ European Commission “Revised Correspondents' Guidelines No 1 on shipments of waste electrical and electronic equipment” 2007
http://ec.europa.eu/environment/waste/shipments/pdf/correspondents_guidelines_en.pdf

Figure 33: Global Resource extraction 1980-2030¹³⁴



This increased demand for raw primary and secondary materials will have an influence on the evolution of the price of the resources offering new opportunities and incentives to promote recycling. This trend is illustrated in Figure 34 below.

Figure 34: Change in prices of metals and cement 1970-2007¹³⁵



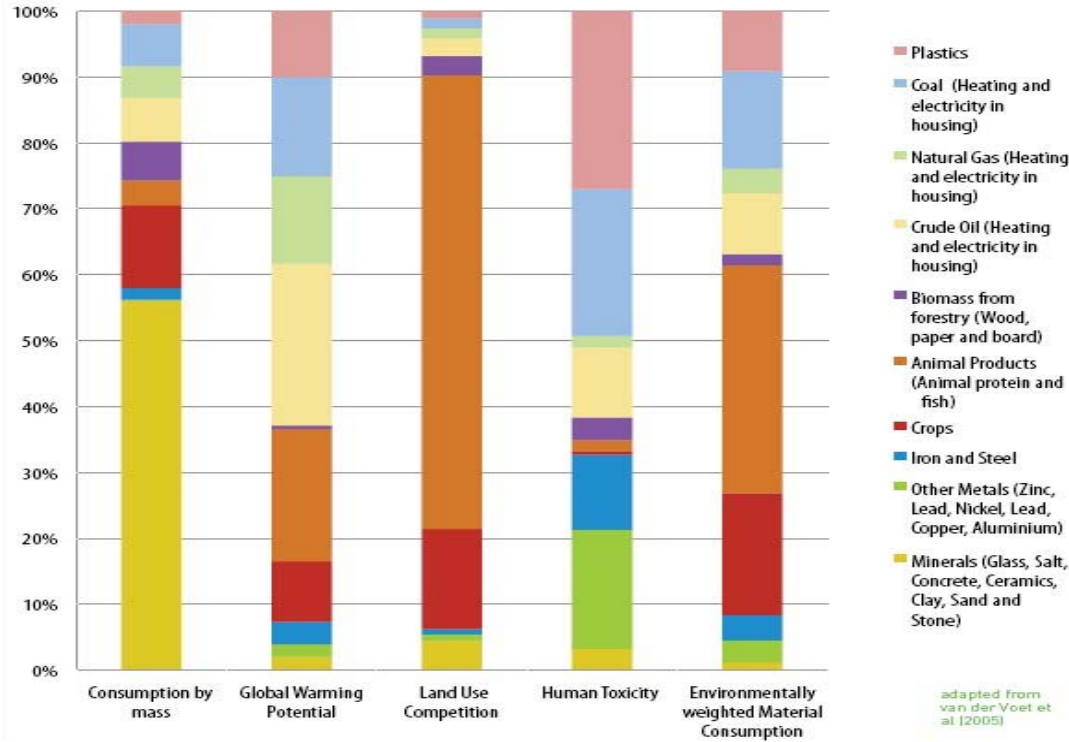
¹³⁴ Source: EEA 2010 derived from SERI GLOBAL 2000, Friends of the Earth Europe (2009), see: www.seri.at/resource-report

¹³⁵ Source: EEA 2010, The European Environment, State and Outlook 2010 : Thematic Assessment – Material Resources and Waste derived from USGS, data for the USA

As shown in figure 35, data from the environmentally weighted impacts of materials and Life Cycle assessments tend to show the large impacts associated with certain classes of materials. These can act as guide to the importance of waste prevention and recycling in particular in areas, for example such as bio-waste, metals and plastics.

Minerals contribute to consumption by mass although crude oil, coal, natural gas, plastics but also animal products and crops are of the most importance regarding global warming, animal products and crops dominate land use competition and plastics, metals, crude oil and coal have the largest impact on human toxicology. When aggregating these findings animal products, crops, coal, plastic, crude oil appear to be the main contributors to environmental impacts.

Figure 35: Environmental impact of materials¹³⁶



Crop and animal production seems to represent a significant proportion of the environmental impacts linked with material production and consumption. A recent study¹³⁷ has revealed the significance of the food wastage. The total amount of food waste the EU 27 is estimated at 89 Mt, or 179 kg/capita/year of which 76 kg (43%) from households, 70kg from manufacturing sector (39%), 8kg from retail/wholesale sector (4%) and 25kg from food service/catering (14%). These data have to be taken with precaution particularly for the manufacturing sector as part of the waste food is transformed into by-products which are not properly identified in the statistics.

¹³⁶ Source: UNEP Panel on resource, see: <http://www.uneptie.org/scp/rpanel/>

¹³⁷ Preparatory study on food waste across EU 27, BIO Intelligence December 2009– September 2010

Figures 36 ¹⁴¹ shows the total food waste arising per capita and per Member State although figure 37 shows the relative importance of the manufacturing sector for each Member State. These figures are mainly demonstrating the significant potential for additional prevention initiatives in some Member States.

Figure 36: Total food waste arising by MS based on best available data (kg per capita per year)

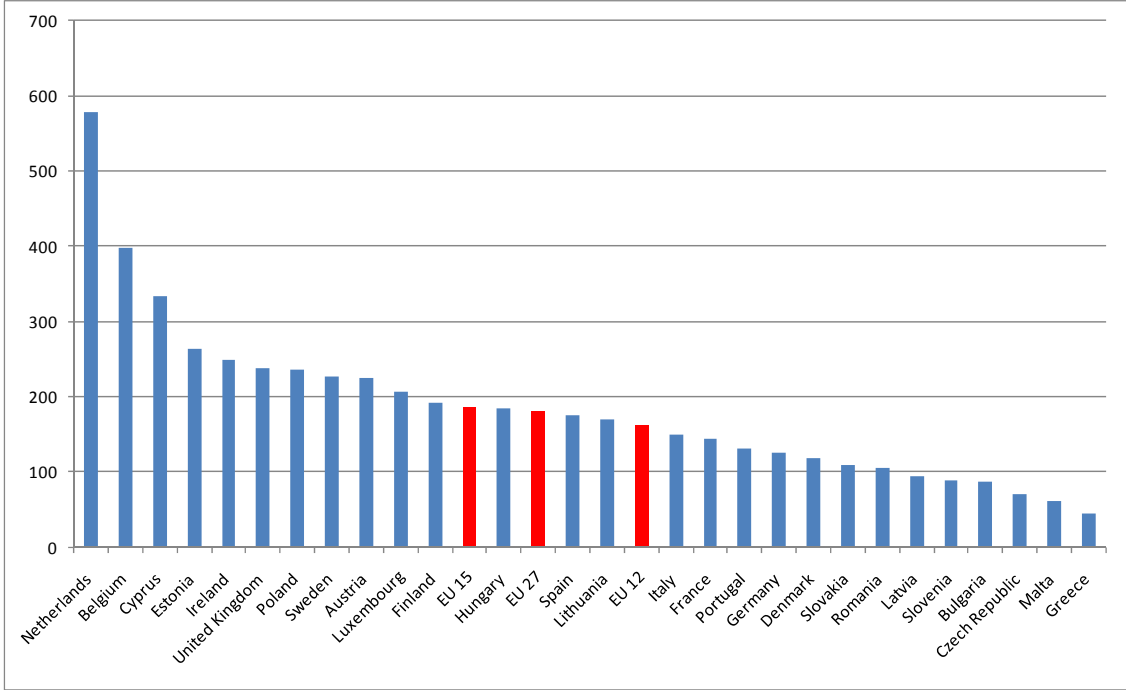
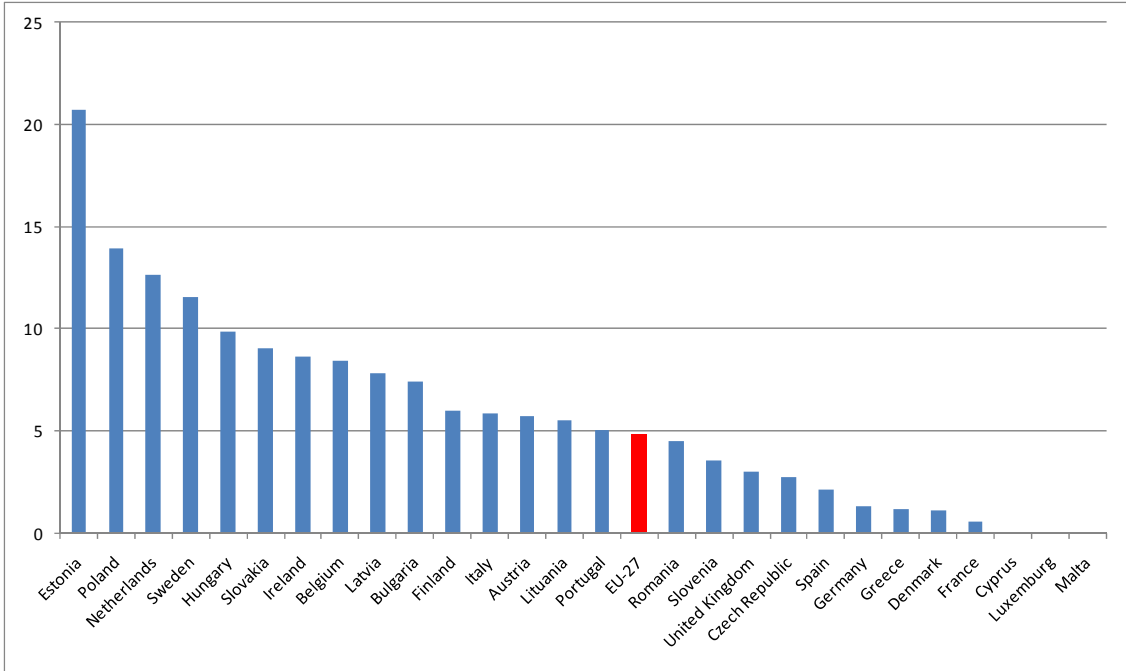


Figure 37: Percentage of food wasted in the Manufacturing sector by MS (Food waste in Manufacturing sector/Food production, %)



The data for households (76 kg/capita/year) seem to be confirmed notably by a detailed study led in UK. This study¹³⁸ found that 25% of the food purchased by households is discarded, of which 60% would be avoidable, representing about 565 €per household/per year.

In terms of GHG emissions, the study estimates the overall impact of food waste at 170 Mt CO₂ eq./year, i.e. 3% of total EU27 emissions in 2008. Various recommendations are included in the study including setting up a reporting system, improved product labelling to avoid confusion on the exact meaning of the date labels targeted awareness campaigns and EU targets for food waste prevention.

5.2 Waste generation and management

EEA projections for municipal waste are based on historical trends and correlations between municipal waste generation and influencing factors such as household consumption, number of people per household and population development.

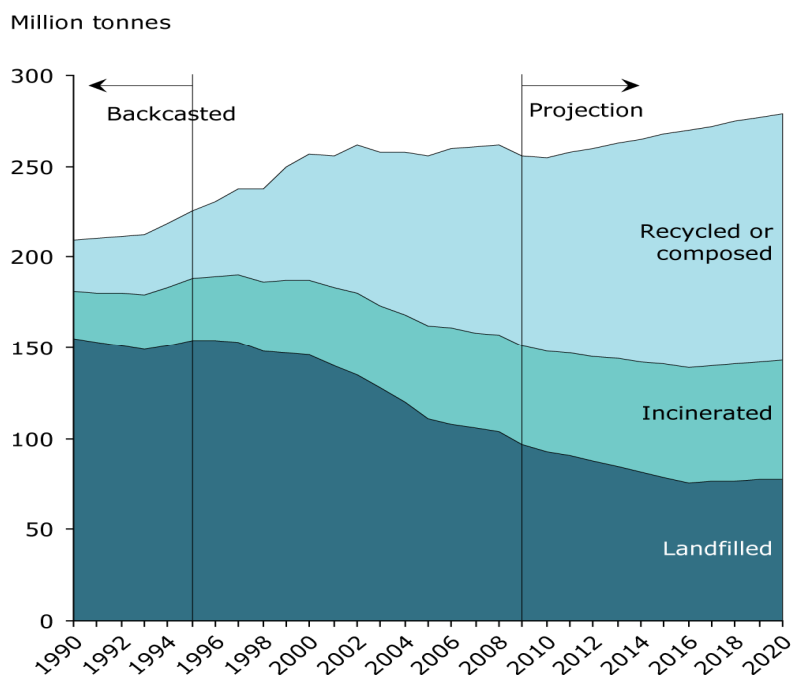
According to a model developed by the EEA and its European Topic Centre on Sustainable Consumption and Production, municipal waste generation can be expected to grow to around 280 million tons in 2020 in the EU-27 (excluding Cyprus), plus Norway and Switzerland, 7% above 2008 levels (ETC/SCP, 2010a).

This scenario uses projections of economic development, taking into account the economic downturn of 2008/2009, as used by the European Commission for the modeling of GHG emissions scenarios (EC, DG ENER 2010b), and the uncertainty in the economic projections also introduces uncertainties in the projection of municipal waste generation. This scenario does not take into account any specific policies on waste prevention. If the historic trends in the development of the shares of recycling and composting, incineration and landfill are used to project waste management until 2020, recycling of municipal waste would increase from 40% in 2008 to 49%, while landfill would stabilize at around 28% (see Figure 38).

However, full implementation of current EU waste policies, especially the EU Landfill Directive, across the EU could reduce landfilled quantities further, but requires additional implementation activities in a number of Member States.

¹³⁸ "The Food We Waste" report for the "Waste Resources Action Programme (WRAP) – UK" – April 2008

Figure 38: Trends and outlook for management of municipal waste in the EU-27 (without Cyprus due to lack of data), baseline scenario¹³⁹



5.3 Green House Gas Emission

According to EEA projections – see Figure 39 below, emission of GHG have in 2008 decreased by 48 millions tons compared to 1995 emissions. Improved management of municipal waste (business as usual scenario) would result in 92 million tons of GHG emissions avoided in 2020 compared with 1995, if the benefits of recycling and recovery are taken into account (see also chapter 3.7). This amount rises to 110 million tons if all countries fully comply with the Landfill Directive’s diversion targets for biodegradable waste and to 126 million tons in case of a hypothetical total landfill ban.¹⁴⁰

EEA mentioned that including other waste streams in the model would further increase the potential but due to methodological reasons (export of waste) it has not been calculated.

The potential for waste to play a key role in reducing GHG emissions is supported by a recent study on GHG emission reduction potential¹⁴¹. This study included non-MSW waste and found that improved waste management and implementation of EU waste legislation could achieve an additional reduction in CO₂ emissions of between 146 and 244 Mt which would be

¹³⁹ EEA 2010, The European Environment, State and Outlook 2010 : Thematic Assessment – Material Resources and Waste

¹⁴⁰ More information on estimated GHG savings from the landfill directive and waste incineration directive by DG CLIMA can be found here:
http://ec.europa.eu/clima/documentation/brief/eu/docs/ghgpams_report_180110.pdf

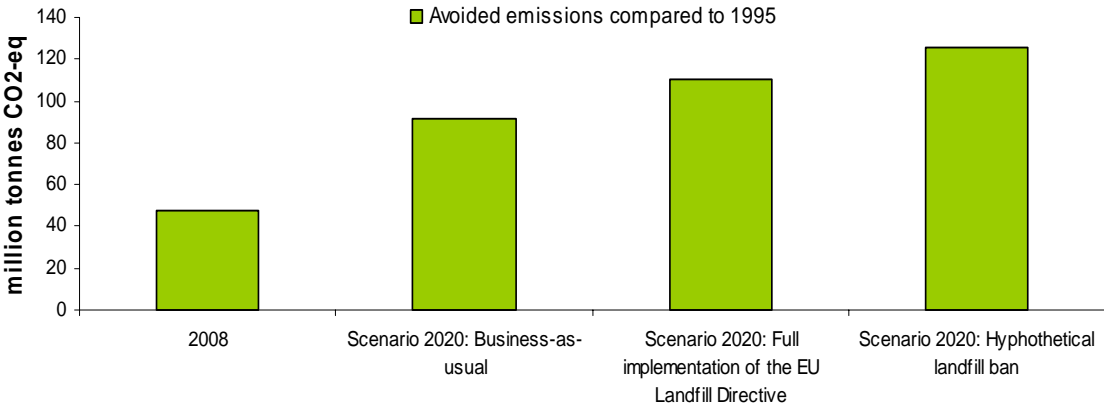
¹⁴¹ "Resource saving and CO₂ reduction potentials in waste management in Europe and the possible contribution to the CO₂ reduction target in 2020" IFEU, Prognos, See: <http://www.prognos.com/CO2-study.609.0.html>

equivalent to contributing 19-31% of the European climate reduction targets (780Mt CO2 equivalent) until 2020.

The study analyzed 18 waste streams representing in 2004 a total of 2.4 billions of tons of waste from several sources. This estimate may be seen as optimistic, however, as the comparison with the reference year does not account for progress in material and waste management unrelated to policy development.

Recent estimates from DG CLIMA¹⁴² forecast that, without further control measures in addition to those that are already adopted in current legislation – including full application of the Landfill and the revised Waste Framework Directive, total non-CO2 GHG emissions are expected to fall by 13 percent until 2020. Specifically, MSW baseline non CO2 emissions are predicted to decline from 72.6Mt CO2eq in 2005 to 22.3Mt CO2eq in 2030: an emission change from -50.4 % to -69%.

Figure 39: GHG Emissions avoided due to better management of municipal waste in the EU 27 (excluding Cyprus), Norway and Switzerland compared to 1995; 2008 and three different scenario for 2020¹⁴³



These conclusions have also been confirmed by an international review of 55 studies on life-cycle assessments (LCA) suggesting that recycling delivers significant carbon savings compared with incineration and landfill. Table 6 below indicates that this is the case in 83% of the LCA scenarios reviewed. No cases were identified where the incineration of glass or the landfill of plastics, aluminium, steel, wood and aggregates provided GHG benefits when compared with recycling. Very limited cases were found where landfill of paper and cardboard and glass, and incineration of aluminium and steel provided GHG benefits when compared with recycling.

¹⁴² Potentials and costs for mitigation of non-CO2 greenhouse gas emissions in the EU until 2030: http://ec.europa.eu/clima/documentation/docs/non_co2emissions_may2010_en.pdf

¹⁴³ EEA 2010, The European Environment, State and Outlook 2010 : Thematic Assessment – Material Resources and Waste

Table 6: Overall environmental preference of waste management options across LCA scenarios¹⁴⁴

Material	Recycling v Incineration			Recycling v Landfill		
	Recycling	Incineration	No preference	Recycling	Landfill	No Preference
Paper and cardboard	22	6	9	12	0	1
Glass	8	0	1	14	2	0
Plastics	32	8	2	15	0	0
Aluminium	10	1	0	7	0	0
Steel	8	1	0	11	0	0
Wood						
Aggregates				6	0	0
Totals	80	16	12	65	2	1

6. STAKEHOLDER CONSULTATION

On the 22 June 2010 a stakeholder event was held to help inform the review of the Thematic Strategy (TS) on Waste Prevention and Recycling. The Commission provided an introduction to the day by explaining the general policy context and the focus on resource efficiency, the approach to the review and technical presentations on key waste trends in the EU and their anticipated evolution up to 2030. A specific web site was created¹⁴⁵ in order to ensure open access to the information.

Four working groups took up the main part of the day. The groups were formed of invited stakeholders active in the field of waste policy and included representatives from industry (both production and waste management), NGOs, Member States, local and regional authorities and the research community. The four working groups were:

- (1) Practicalities of implementing the Waste TS and its objectives
- (2) Prevention of waste
- (3) International influence and impact of EU waste management policy
- (4) The EU recycling market

The outcome of each working group was presented and discussed in a plenary session. A summary of the key areas of discussion amongst the working group is presented below. The outcomes from discussions, and subsequent additional feedback from stakeholders, has been used to inform the study being completed by IEEP, and partners, to help support the review of the waste TS.

6.1 Key Overarching Messages

Throughout the day several themes continually emerged during discussions, these included the following:

¹⁴⁴ WRAP (Waste and Resource Action Programme), Environmental benefits of recycling; An international review of life cycle comparisons for materials in the UK recycling sector

¹⁴⁵ <http://www.eu-smr.eu/tswpr/meetings.php>

- That the TS was considered to have been useful for fixing a clear frame for waste management in the EU. The TS had some impact on the diffusion of key concepts such as the waste hierarchy or the LCA approach. The main action of consequence notes was the adoption of the Waste Framework Directive (WFD);
- That further efforts should be made to ensure that waste policies are based on sound knowledge by improving the reliability of statistics and developing new indicators that better reflect the progress made in applying the waste hierarchy and achieving a "recycling society";
- That further efforts are needed in order to effectively address the question of waste prevention and that new policy solutions are needed to deliver this; that some progress has been achieved in terms of recycling and landfill reduction, but that large differences persists between Member States which should be addressed;
- That EU policies are leading to higher levels of exports to third countries of materials for recycling and reuse; better mechanisms should be put in place to address the potential environmental and economic (missed opportunities, possible risks in terms of raw material supply) consequences of this trend. It was considered that the transformation of waste management solutions represents an opportunity for the EU as a whole, but we need additional instruments to help bring about sustainable improvements
- That promoting markets for secondary raw materials is important in helping deliver more environmentally sustainable waste management, however, delivering such a market is dependent upon product design, collection, processing, and economic factors;
- That a clear link should be established between waste, design and resources/climate policies.

6.2 Implementation of the Thematic Strategy

Reflecting on the main achievement/limitations of the Thematic Strategy:

- The TS was felt to have increased debate and led to the diffusion of key concepts (waste hierarchy, LCA approaches) and increased awareness;
- Stakeholders noted that there has been progress in terms of reductions in landfill and increases in recycling, however, extent of progress and speed varies significantly between Member States
- The new WFD was noted to have made a significant difference in policy terms, and need to now await its full implementation
- Limited results in terms of prevention, with quantitative waste prevention not happening to any significant degree
- Even if the collection and reliability of data has improved, significant limitations remain in terms of data quality and availability.

Main stakeholder recommendations to improve TS implementation

- Improve the knowledge base, this should include: the better collection and verification of data particularly on the prevention and export of waste; and the development of a new set of indicators related to resource efficiency.
- Improved integration ie better linkage between waste policy and product policies (ecolabel, ecodesign, GPP, REACH) and a need to better link future EU waste objectives with resource objectives (including the delivery of Greenhouse gas emission reduction).
- Optimal use of instruments, there was a need identified to better combine economic instruments (mainly in the hands of the MS and local/regional authorities) with legal instruments

6.3 Delivering Waste Prevention

Considering the state of action on prevention

- Stakeholders noted that this is not an isolated goal and should be linked to efforts on resource use, consumption etc
- Some reduction in the generation of harmful waste was considered to have taken place but major breakthroughs have yet to be achieved in terms of both quantitative and qualitative prevention of waste.
- Role of the new WFD – this was noted to have made a direct link between waste management and waste prevention activities (specifically Article 29 of the Directive) and considered as definite progress, providing a framework for ongoing action. However, stakeholders felt that dedicated enabling mechanism is needed to deliver change.

Barriers to/enabling prevention progress

- Barriers were noted both in terms of preventing waste (from high consumption trends offsetting efficiency gains to consumer reluctance to change their preferences) and measuring prevention progress (including a lack of comparability of measurement approaches across Europe and difficulties in measuring the environment impact of change).
- Stakeholders considered that there is no one overarching policy solution and that there is a need for different options to address different needs across society from the consumption patterns of consumers to the resource intensity of different industries
- There was division on the question of prevention targets, some felt that these are useful tools for focusing attention (even if they are largely aspirational). It was commented that there is a need not for one overarching target but some degree of specificity in order to drive action in different sectors.

6.4 International Influence

Patterns of export

- The level of trade in materials for recycling and reuse with third countries was noted to be rising, driven by: targets promoting increased rates of recycling; demand for raw materials in international market places; and pricing factors including the lower cost of labour and lower environmental standards in some regions outside the EU.
- Stakeholders noted that increasing levels of international flows in goods for recycling and reuse is not necessarily a bad thing, but this depends on the quality of processing delivered and quality of materials shipped ie reducing the levels of disposal of poorly sorted or inappropriate materials in the receiving country.

Options for addressing this question

- It was noted that the EU has a limited ability to impact on economic cycles ie to prevent export if materials are needed elsewhere, there is a need to find other mechanisms by which Europe can influence trade in recycling and secondary raw materials.
- Usefulness should be added as a condition applied to products exported for reuse to avoid products with short remaining life times or with no obvious use being exported under the guise of reuse. This is intended to close loopholes surrounding export of goods for reuse.
- Key tools noted for improving the situation were: the tightening of export standards for materials for recycling to ensure clarity of origin and processing; developing BAT mechanisms for processing and integrating these into shipment requirements; and to ensure more effective producer responsibility throughout all product lifecycles leading to an overall reduction in environmental impact

6.5 Delivering a Recycling society and recycling markets

Defining a recycling society

- It was considered that this should be more than simply reducing the level of waste disposed of, and should lead to a situation where management of resources is better considered.
- That Member States are likely to be at different stages along the road to achieving this.
- That such a society should: reuse/recycle products unless there is a good reason not to; have in place effective mechanisms to implement and enforce relevant legislation; and should promote high quality recycling and good sorting of recyclables.
- The key to delivering recycling markets Key is ensuring quality throughout the chain in order to make the market for secondary raw materials more robust and reliable
- Exports are needed in order to support a circular economy ie one where we import most of our goods from abroad, but we need to have mechanisms in Europe to support the quality of this market.

Tools for promoting improved recycling markets

- Addressing market distortions – this might include addressing perversities in the market for green certificates, that apply to energy from waste but not recycling; using VAT adjustment/other fiscal tools to take account of the environmental impact of recycled goods; focus more effort on preventing illegal exports, harmonising standards of implementation across MS.
- Dealing with the question of exports – developing a new system for ensuring the traceability of materials to provide a basis for quality processing; requiring preparation for recycling and reuse to occur in the EU to increase quality of material flows; and developing a system to ensure that the quality of recyclables is raised.
- Building on existing policies – analysis should be conducted to identify which policy mechanisms are currently working most effectively, in addition stakeholders highlighted the need: to centralise guidance to ensure each waste stream is dealt with in the most environmentally efficient way; apply extended producer responsibility to additional waste streams; increase targets to further drive the markets; set up voluntary schemes to approve the most environmentally responsible recycling chains.
- Improve demand for recycled goods – improved schemes for labelling recycled content, demonstrating/certifying the environmental responsibility of the recycling products and further supporting green public procurement.