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Ex-post evaluation of Five Waste Stream Directives

Accompanying the document

Proposal for a Directive of the European Parliament and of the Council

reviewing the targets in Directives 2008/98/EC on waste, 94/62/EC on packaging and packaging waste, and 1999/31/EC on the landfill of waste, amending Directives 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EC on waste electrical and electronic equipment

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Fitness check

of five Waste Stream Directives

1. INTRODUCTION

As part of the 2010 Work Programme[1], the Commission has started reviewing the body of EU legislation in selected policy fields through "Fitness Checks" informing regular review and update of EU legislation by a qualitative and quantitative retrospective assessment helping to keep legislation "fit for purpose".

The goal is to identify excessive burdens, overlaps, gaps, inconsistencies or obsolete measures which may have appeared over time since the EU law at issue was first adopted and implemented. This shall help promoting better/smart EU legislation, making it more responsive to current and future challenges and improving implementation.

Pilot exercises were launched in four areas: employment & social policy, environment, transport and industrial policy. Following its first Fitness Check in the area of freshwater policy, DG ENV will now present an evaluation of certain instruments concerning specific categories of waste and the following 5 Directives were selected:

- **Directive 86/278/EEC of the Council of 12 June 1986** on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture[1] (SSD).

- **Directive 94/62/EC of the European Parliament and of the Council of 20 December 1994 on packaging and packaging waste[2] (PPWD)**.

- **Directive 96/59/EC of the Council of 16 September 1996 on the disposal of polychlorinated biphenyls and polychlorinated terphenyls** (PCB/PCT)[3].

- **Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of life vehicles[4] (ELV)**.

- **Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators** and repealing Directives 91/157/EEC[5] (Batteries).

Other waste stream Directives have not been selected for reasons detailed in the mandate to this report, attached as Annex 1.

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1 OJ L 181, 4.7.1986, p. 6–12.
2 OJ L 365, 31.12.1994, p. 10–23.
3 OJ L 243, 24.9.1996, p. 31–35.
4 OJ L 269, 21.10.2000, p.34.
5 OJL 266, 26.0.2006, p. 1-14.

Stakeholder interest in this exercise was lively. Industry organisations representing the packaging sector, car manufacturers and battery producers as well as NGOs, national and regional authorities also took active interest in informing the process.

SMEs were given specific consideration. Their European roof organisations were invited to an ex-post evaluation workshop on 4 November 2013 and they were also consulted in writing. A second specific workshop with SMEs held in Brussels in December 2013 discussed specific SME concerns expressed on EU waste legislation. Major concerns relating to the Directives being evaluated in this exercise were not expressed.

2. BACKGROUND

This section sets out the context of the Fitness Check, in particular how the legislation developed along with changing waste – and resource policy objectives. It highlights the objectives of the Directives and points to their common features and differences.

a. The Five Waste Stream Directives in the overall context of waste legislation

The earliest European waste legislation dates back to 1975 with the adoption of the Council Directive 75/442/EEC of 15 July 1975 on Waste[6], the Waste Framework Directive (WFD). This Directive, revised in 1991 and re-adopted without modification on 5 April 2006 as Directive 2006/12/EC of the European Parliament and of the Council[7] was subject to a fundamental revision only in 2008. The new 2008/98/EC Waste Framework Directive[8], gave effect to the **6th Environmental Action Programme 2002-2012[9] as well as the Thematic Strategy on the Prevention and Recycling of Waste, adopted by the European Commission on 21.12.2005**. The Waste Framework Directive 2008/98/EC is the newest piece of EU waste legislation in relation to the 5 Directives screened here. It is also the most holistic and comprehensive piece of European Waste legislation, defining key concepts, such as environmental objectives, extended producer responsibility, the five step waste hierarchy, new waste specific definitions and life-cycle thinking. It also made a contribution to **simplification** and streamlining of legislation by integrating the Directive on hazardous waste and the waste oil Directive. **It sets the waste policy agenda for the 21st century**, giving effect to European resource and climate policy by prioritizing waste prevention and recycling of waste and stipulating a European recycling society as an important long-term objective.

Since its first adoption in 1975, the Waste Framework Directive remained over decades by far the most important piece of waste legislation, more than any other Directive invoked by the CJEU[10] in its judgments on waste policy cases, fundamentally adapted to the requirements of a changing political agenda. The most significant change in this context was the shift from primarily sanitary aspects to resource conservation through resource efficiency and waste

6 OJ L 194/39 of 25.7.1975, p.39.
7 OJ L 114/9, 27.4.2006, p.9.
8 OJ L 312/3 of 22.11.2008, p. 3.
9 Decision 1600/2002/EC laying down the Sixth Community Action Programme; OJ L 242, 10.9.2002, p.1.
10 Court of Justice of the European Union.

prevention. Thus it gradually developed importance beyond waste gaining profile in the context of product policy[11].

This shift beyond the area of waste finds its clearest expression in the five-step waste hierarchy setting waste prevention on top of the priority list. Waste prevention is an objective entirely outside any waste operation and yet regulated in a law on waste[12]. The Waste Framework Directive is therefore also a programmatic legal instrument setting the agenda for sustainable production and consumption. It highlights the importance of extended producer responsibility through product design. It also closes the loop between product and waste by introducing the principle of life-cycle thinking, creating a need for looking at products under the perspective of waste throughout the whole product life cycle. This approach mirrors the requirements of a **circular economy** in which ideally all products are designed in a way to be re-usable, repairable and fully recyclable.

Over time a supplementary corpus of law was developed in parallel to framework legislation and adapted to the specificities of important single waste streams. Some older instruments, such as the waste oil Directive 75/439 and the hazardous waste Directive 91/689/EEC were repealed and integrated into the WFD 2008/98/EC. The old PCB/PCT Directive 76/403 was revised in 1996. From this group of older Directives only the sewage sludge Directive survived without any alteration, mainly due to the fact that no consensus could be reached about the right adjustment of limit values for heavy metals in sludge and soil.

In contrast there was a relative standstill in developing waste framework legislation. This came to an end with the adoption of the Waste Framework Directive 2008/98/EC in 2008. This modern instrument of waste legislation was conceived as a tool of **simplification** because it integrated the waste oil Directive and the hazardous waste Directive and it **set the political waste for the objective of resource efficiency in a European "recycling society" moving towards a circular economy.**

This historic process of course had inevitably the consequence that the older waste stream Directives did to some extent diverge over time from key concepts and key provisions such as extensive new definitions provided for in the updated waste framework legislation. The picture of European waste legislation has therefore become and remains today more kaleidoscopic than would appear ideal. This may be not so much rooted in the way in which each single instrument functions on its own, but more in the lack of full synchronization of waste stream legislation and framework legislation, as will be shown later.

b. Objectives of the Directives

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[11] It is therefore necessary to revise Directive 2006/12/EC in order to clarify key concepts such as the definitions of waste, recovery and disposal, to strengthen the measures that must be taken in regard to waste prevention, to introduce an approach that takes into account **the whole life-cycle of products** and materials and **not only the waste phase**, and to focus on reducing the environmental impacts of waste generation and waste management, thereby strengthening the economic value of waste. Furthermore, the recovery of waste and the use of recovered materials should be encouraged in order to conserve natural resources. In the interests of clarity and readability, Directive 2006/12/EC should be repealed and replaced by a new directive.

[12] Measures taken at the stage of waste prevention must logically also encompass measures taken on the level of production, more precisely, the design of products.

All five Directives screened have a clearly defined environmental objective. Looking at them horizontally, however, allows categorising them into **three different groups**.

The PCB/PCT Directive is **end-of-life legislation**. PCB and PCT are highly toxic persistent organic pollutants that are to be eliminated. The Directive's objective is reached once elimination is completed. This Directive was least affected by existing framework legislation. Since this instrument is purely focused on phasing out substances and appliances containing such substances, it is a stand-alone instrument.

In contrast, The **Directive on sewage sludge** stands between a **recycling Directive** and an end-of-life Directive. It allows recovery of sludge on agricultural land under defined sanitary and environmentally sound conditions, to encourage the recycling of nutrients and organic matter through application of sludge on agricultural land. It has in parallel a common market objective[13]. The common market was an issue for sludge application in agriculture because inappropriate sludge use could raise doubts in relation to food quality in different Member States, thus potentially hamper free movement of goods.

The third group of Directives, **Packaging, Batteries and ELVs**, also attuned to a common market objective, are more clearly oriented towards **circular economy.** They make ample reference to recycling and waste prevention as well as to the five step waste hierarchy.

This categorization may help to better understand the functioning and inner harmony of the uncodified body of European waste law. PCB/PCT and sewage sludge have their main "raison d'être" in the pressure to prevent harmful effects for the environment or human health by its chemical properties. In addition to this, the Directives on Batteries, ELVs and Packaging are instruments attuned to the needs of a circular economy and they are already structured alike. Their need for a maximum of concordance with the requirements of the Waste Framework Directive is therefore much more obvious. For a better understanding of each single screened Directive a closer look to their main purpose and objectives is required.

Main purpose of each Directive

The main purpose of **Directive 86/278/EEC on sewage sludge** is to encourage the correct use of sewage sludge in agriculture and to regulate its use in order to prevent harmful effects on soil, vegetation, animals and humans. To this end, it prohibits the use of untreated sludge on agricultural land unless it is injected or worked into the soil. The Directive also requires that sludge be used in such a way that the nutrient requirements of plants and that the quality of the soil and of surface and groundwater is not impaired.

The Directive further imposes several requirements on the quality of sludge for use in agriculture, the monitoring of the quality of soil which is enhanced with sludge and limiting sludge application for certain purposes and during certain time periods. The main aim of these requirements is to ultimately limit heavy metal concentrations in soils.

The main purpose of **Directive 94/62/EC on packaging and packaging waste** can be better understood with a brief look into legislative history. The first EU measures on the management of packaging waste were introduced in the 1980s with the Directive

[13] This is spelled out in its recital 7.

85/339/EEC[14] on beverage containers. This Directive failed to bring about harmonisation of national policies.

Therefore Member States and economic operators requested the Commission to propose a comprehensive legislation with a general purpose to harmonise the measures taken at the Member State level for the management of packaging and packaging waste. As a result, the 94/62/EC Packaging and Packaging Waste Directive (PPW Directive) was adopted in 1994 with the aim to harmonise national measures to reduce the impacts of packaging and packaging waste to the environment and to safeguard the functioning of the internal market.[15] The PPW Directive with the **Single market Treaty Article as its legal base** set a **dual objective** in order to:

- **Prevent impacts on the environment** for all Member States and third countries (environmental objective); to this end it has provisions on re-use of packaging, prevention and recycling of packaging waste and other forms of packaging recovery as well as substance restrictions.
- **Ensure a good functioning of the Internal Market** without imposing obstacles to trade and causing distortions and restriction of competition within the EU (internal market objective). This shall be achieved mainly by the **Essential Requirements** defined for all packaging placed on the EU market. Essential requirements set rules through parameters on the composition of packaging, its re-usability and recoverability that all packaging put on the EU market has to fulfil. They therefore standardise what is marketable in the EU.

The main purpose of **Directive 96/59/EC (PCB/PCT)** is to implement the international PARCOM obligation contained in PARCOM Decision 92/3.[16] This implies to make PCBs subject of an inventory and to soundly dispose of them or to decontaminate PCB equipment before the end of 2010 (Article 3).

The (PCB/PCT) Directive replaced the old Council Directive 76/403/EEC of 6 April 1976, focusing on approximation of laws on PCB disposal. This old Directive proved to be insufficient to cope with the problems of safe disposal. The old Council Directive 76/769/EEC of 27 July 1976 on use restrictions for PCB included provisions on periodical review and transition towards a gradual ban on PCBs and PCTs.

The main purpose of **Directive 2000/53/EC on end-of life vehicles** is to ensure the appropriate management of the annually generated 8 to 9 million tonnes (Mt) of ELV waste in the EU.[17] This shall mainly be achieved by limiting the production of waste arising from ELVs and their toxicity, by increasing the rates of reuse, recycling and other forms of recovery of ELVs as compared to disposal and finally to ensure the appropriate treatment of waste in environmentally sound conditions. This perfectly fits into the objective of resource efficiency described in the Waste Framework Directive. It also uses the concept of extended producer responsibility by placing the responsibility primarily on vehicle manufacturers to

[14] Council Directive 85/339/EEC of 27 June 1985 on containers of liquids for human consumption OJ L 176, 6.7.1985, p. 18–21.

[15] Directive 94/62/EC on Packaging and Packaging Waste, as amended by Directive 2004/12/EC, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:01994L0062-20050405:EN:NOT.

[16] PARCOM. International Treaty on the phasing out of PCBs and hazardous substitutes.

[17] As to the quantities: BIOIS(2014), ex post evaluation of certain waste stream Directives, p. 107.

increase the share of components that can be recycled while Member State governments are required to create the necessary framework conditions.

The main purpose of **Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators** and repealing Directives 91/157/EEC[18] is the improvement of the environmental performance of batteries and accumulators and of the activities of all economic operators involved in the lifecycle of batteries and accumulators. These operators include producers, distributors, end-users and also operators involved in the treatment and recycling of waste batteries and accumulators.

To this end the Directives contains provisions on:

- the prohibition of hazardous materials used in batteries,
- information to the end users (labelling of batteries),
- collection targets and recycling rates and prohibition of the disposal in landfills or by incineration of waste industrial and automotive batteries,
- "producer responsibility" obligations.

It is already evident that this recent Directive also closely corresponds to the most pertinent concepts in the Waste Framework Directive, such as extended producer responsibility, resource conservation through setting collection and recycling targets, eco design through reduction of hazardous substances in new production. Moreover and in contrast to the other Directives, it also complements the landfill Directive 1999/31/EC by incorporating a landfill ban for industrial and automotive batteries and accumulators.

This Directive makes already reference to the thematic strategy on waste prevention and recycling developed under the 6th EAP. It is therefore the most modern and up to date piece of legislation among the 5 screened.

c. Most pertinent similarities and differences of the five Waste Stream Directives

It is one of the major advantages of a Fitness Check (i.e. a retrospective evaluation of a group of Directives in the same policy field) that it gives the opportunity to highlight relevant differences and communalities. This opens valuable insight into and understanding of systemic aspects of the policy field. Since the legislation screened here spreads over a time range of nearly 30 years, many differences can be expected, yet of varying relevance.

The legal basis

Not all Directives screened have the same legal base. The **PPW Directive** is based on ex-Article 100a EC (Internal Market/Maastricht). **The Sewage sludge Directive** is based on Art. 100 TEC (Common Market) and Art 235 TEC (a **residual** legal base for legislation influencing the achievement of Treaty objectives).

The Batteries Directive has, unlike the other Directives, **a dual legal base**, i.e. Art. 175 (1) (Environment/Nice), for the whole Directive as a general rule and Art. 95(1) (Internal Market/Nice) only for the provisions in Art. 4, 6, and 21 of the Directive. The ELV Directive

[18] OJL 266, 26.0.2006, p. 1-14.

is based only on Article 175 (1) (Internal market/Amsterdam). Whereas the PCB Directive is based on Art. 130s (Environment/Maastricht).

The Internal market legal base, now Art. 114 TFEU, has been chosen for the PPWD because packaging is particularly sensitive to Internal market barriers. Those shall be removed by positively defining the conditions to be met by packaging so that it can be freely marketed throughout Europe. Beyond this overall purpose, the legal base has importance for the fact that the Internal market legal base (Art. 100a/95 Amsterdam) allows Member States to **only introduce new national measures based on new scientific evidence** relating to the protection of the environment on grounds of a problem specific to that Member State arising after the adoption of the harmonisation measure. And such measures **can only be maintained** if they are not a means of discrimination. The environmental legal base instead allows Member States to **maintain or to adopt** more restrictive protective provisions.

Relation to waste hierarchy, extended producer responsibility, and waste prevention

The PPW Directive follows the waste hierarchy as set out in the 2008 WFD, through putting priority on waste prevention. Although the Directive predates the Waste Framework Directive 2008/98/EC, the waste hierarchy is mentioned as an objective in Art. 1(2) PPWD in the proper order of the later WFD. Separate Articles deal in a detailed way in particular with waste prevention, recovery and recycling as well as separate waste collection. The concept of extended producer responsibility is mentioned in Art 4 (1) second indent as a **"may be introduced" soft law requirement.**

The ELV Directive follows the same pattern and makes reference to the waste hierarchy in its Art. 1. with following specific Articles on prevention, re-use and recovery including recycling, as well as collection and treatment. The concept of **life cycle thinking** is not specifically addressed in both Directives.

The **Batteries Directive**, mostly due to the characteristics of this waste stream, instead of referring to the waste hierarchy in general, mentions in its objectives only collection, treatment, recycling and disposal of batteries. **Waste prevention is not mentioned**. Life cycle thinking already finds its place in Art. 1 and 5 of the Directive. Art. 5 in particular makes **reference to eco-design** in obliging Member States to promote the substitution of hazardous substances in batteries, such as mercury, cadmium and lead. Easy removal through design is also encouraged. **Extended producer responsibility** is broadly dealt with in Art. 8.

To some extent also the **Sewage sludge Directive** contains an early allusion to the waste hierarchy by encouraging the use of sewage sludge for its "valuable agronomic properties".

The **PCB/PCT Directive** in contrast to all the other screened instruments is solely an end of life Directive. Therefore none of the concepts mentioned before play a role nor should play a role and consequently are not taken into account.

The circular economy concept

A circular economy concept with its special emphasis on product design for recycling and durability and reparability, extended producer responsibility with its own collection schemes, prevention, recycling and recovery as a dominating objective is **only indirectly addressed** in different intensity across the screened Directives. It does not apply to the PCB Directive. This concept was a legislative novelty that came about only with the adoption of the WFD in 2008.

Therefore, naturally, it is not fully developed in any of the five Directives evaluated here and in the absence of the mainstreaming of life cycle thinking into these waste stream Directives it is not living up to standard of the WFD.

Both the **PPW Directive** and the **ELV Directive** include an element of "ecodesign" to reduce and control hazardous substances and facilitate reuse and recovery and avoid disposal of hazardous waste. **The ELV Directive** also encourages the use of recycled materials in new vehicles. **The Batteries Directive** prohibits certain actions such as landfilling or incineration of automotive and industrial batteries and accumulators and bans certain substances, thus it tries to keep raw materials in a closed loop of recovery. It includes "ecodesign" in allowing for the easier removal of batteries and accumulators from products and encourages new recycling technologies.

3. PROCESS

This retrospective evaluation (Fitness Check) was launched in 2012. Its objective and methodology are described in the mandate **Annex (1).** It has been carried out in parallel with the review of targets in the WFD, the Landfill Directive and the PPWD. Only the PPWD is subject to both exercises, although the overlap is rather limited (only as regards the recovery and recycling targets set out in Article 6). In order to ensure a maximum of consistency, a common inter-service group was established.

Taken together, the review of targets – which also undertakes a limited retrospective analysis of the three directives concerned (i.e. mainly of their targets) – and this Fitness Check provide a very comprehensive assessment of the performance of EU waste law.

Furthermore, this evaluation needs to be seen in the wider context of the **Regulatory Fitness and Performance Programme (REFIT)**. The first phase was launched by the Commission in October 2013. The purpose of REFIT is to systematically review EU legislation in order to:

- see if its aims are being met efficiently and effectively
- detect unnecessary regulatory burdens, gaps and inefficiencies
- identify opportunities for simplification
- enable the Commission to propose that Council and Parliament revise or repeal legislation where appropriate.

Retrospective evaluations and Fitness Checks are an integral element of REFIT, helping to prepare a sound basis for future revision of legislation by identifying what worked in the past and identifying the obstacles in cases where legislation may not have been as effective and efficient as possible.

Studies

There has also been considerable research on the primary effects of some of the Directives screened, notably in the two reports on coherence of waste legislation in 2009 and 2011. Both studies, which did not focus on the Directive on PCB/PCT and sewage sludge, cover to a large extent the evaluation questions posed here and provide in depth insight mainly to the extent of which the waste stream Directives are formally, and with regard to their content, materially consistent with framework waste legislation and waste related strategies.

In both studies a close look was taken to the Batteries, ELV and Packaging Directive, their interdependence with other waste legislation and principles, gaps, inconsistencies, effectiveness and efficiency as well as their coherence. Therefore, prior to this Fitness Check there was already comprehensive analysis of these three Directives as well as their implementation, their perception in Members States and by stakeholders available. Both studies were accompanied by ample stakeholder consultation and the results of these have been integrated in the final ex-post evaluation study.

A further specific ex-post evaluation study was commissioned at the beginning of 2013. The final report was delivered in April 2014.

Data limitations existed for the Batteries Directive, which made it more difficult to produce a fully comprehensive and detailed analysis of all aspects concerning its effectiveness and efficiency, given the relatively short time frame over which it has been in force. The Commission's first implementation report on this Directive is yet to be published.

Literature Review

The ex-post evaluation study is based on an extensive data collection. To this end a literature review was carried out, including existing evaluation reports, academic and research papers as well as the consultant's in-house database.

Consultation

This work was complemented by consultation of a wide array of stakeholders, targeting the main key stakeholders impacted by each of the Directives. Included were representatives from industry associations and federations, local and national authorities, NGOs producer responsibility organizations. Targeted questionnaires were sent out and face to face interviews were held to gather information from stakeholders.

A workshop was held on 4 November 2013 in Brussels with the aim of presenting the main findings of the draft evaluation report, and receiving stakeholder feed-back. Around 85 stakeholders from a wide range of sectors and public authorities were present to provide additional input. **European SME organizations were invited** to the workshop.

A further workshop, **specifically focusing on SMEs,** was held on 16 December 2013 in the context of a **discussion of the** WFD and its alleged burdens for SMEs. In relation to the five Directives screened no specific concerns had been expressed.

4. FOCUS OF THE FITNESS CHECK

The aim of the Fitness Check is to identify excessive burdens, overlaps, gaps, inconsistencies or obsolete measures which may have appeared over time since the Directives' adoption. This may allow conclusions as to what extent they are still fit for purpose.

In order to make this assessment, the Five Waste Streams Directives are checked for the following four parameters, further differentiated in sub-parameters. For further details as to sub-parameters, see **Annex 2.**

- **Effectiveness:** the extent to which the Directives effectively achieve their objectives. This includes the assessment of effective transposition and implementation which lies outside the structure of the legal instrument itself but which is intrinsically linked to effectiveness.
- **Efficiency:** the extent to which the Directives achieve their objectives in the most cost efficient way. Cost efficiency may depend on external factors (factors outside the Directive) or on internal factors (factors inherent to the provisions of the Directive, such as e.g. reporting obligations).
- **Relevance:** the extent to which the Directives still address the needs of protection of the environment and human health as well as the functioning of the internal market in a way that a regulation on European level is still needed and serves a useful purpose.
- **Coherence:** the extent to which the Directives are consistent within the policy system they belong to, in particular, whether waste stream legislation is consistent with framework legislation and any related EU legislation as well as overarching policy commitments relating to raw materials, resource efficiency and circular economy.

These four parameters applied throughout the ex post evaluation process have led to a thorough analysis of the EU added value of the Directives screened. It allows a more objective assessment as to whether the Directives have delivered the results initially expected. In case they have not, it provides answers why and which obstacles hindered the attainment of the objectives. It also answers whether the attainment of the intended objective was proportional to the costs this may have caused for all relevant actors in the process of implementation. It finally shows to what extend there is consistency between the individual instruments, their tools and their objectives, and the overall policy development over a longer period of time.

The analysis of each Directive **follows the same logic**. Starting from the definition of general needs that the individual instrument was meant to respond to, it defines the general objectives of the whole policy field, describes the specific aims, the means to realise these aims and the actually achieved output of the Directives. It finally analysis the broader effects of the Directives and what impact they have in particular in relation to **the objectives spelled out in the 7th EAP, notably:**

- Resource depletion and green-house gas emissions as well as circular economy.
- Application of life cycle thinking from production to end of life management
- Optimising the use of finite resources in a product based economy
- Producer responsibility as an instrument to better link waste regime and product regime
- Achieving a zero waste economy in which products are designed in such a way that they can be repaired, re-used as a whole or in parts, recycled and be reintroduced in the production cycle as new raw materials.
- Achieving full control over the out-phasing of hazardous chemicals in products and waste
- Giving full effect to the waste hierarchy that only exceptionally allows final disposal
- Giving full effect to waste prevention

As discussed above, this Fitness Check is also part of a wider waste review process (target review) in which the PPWD with its recycling and recovery targets is included. Some findings from this exercise related to the PPWD and its coherence in the overall waste policy context, notably the WFD, have allowed valuable conclusions to be drawn and fed into the target review.

5. STATE OF TRANSPOSITION AND IMPLEMENTATION OF THE FIVE WASTE STREAM DIRECTIVES

Before looking more closely into the findings under each heading of the evaluation criteria, an overview over the state of transposition and implementation of the Directives has to be provided, including aspects of overall policy coherence.

a. General observations

There is a difference to be made between **transposition and implementation**. Transposition is the formal act of translating Directives addressed to Member States into national law.

The legal transposition of the Directives has been analysed and described in depth in various conformity studies.

Implementation is much wider and concerns the totality of actual means (administrative, investment, infrastructure, process) applied in order to attain the Directives' objectives effectively. Implementation has to be effective. It is the final aim of transposition and can be checked by the Court of Justice of the European Union on a case by case basis in the context of judicial action. The Court applies thereby the *"effet utile"* principle testing whether Member States' implementation activity has had the necessary practical effect. The best designed law has no useful effect, if it is not properly implemented. **Implementation deficits** can be manifold, reaching from a lack of waste infrastructure (disposal facilities, waste collection, recycling facilities etc.) to a lack of enforcement capacity and the absence of sufficient controls and a deterrent sanction mechanism.

Implementation is of high economic importance particularly for the product related waste stream Directives. Its harmonizing effect creates a level playing field for economic operators; therefore it is a fundament for investment into infrastructure. Bad implementation leads to competitive distortion and hinders such investment.[19]

Implementation is intrinsically linked to effectiveness and therefore frequent reference to implementation will be made when discussing the different Directives in detail.

As the further analysis will show, the five screened Directives had a considerable effect in the individual Member States on the improvement of environmental conditions. E.g.: more Batteries, packaging and ELVs were collected and recycled. This lifted environmental pressure on atmospheric and soil pollution. The sewage sludge Directive helped saving green-house gases by diverting sewage sludge from landfills. It helped also fighting eutrophication of the marine environment through by opening alternative outlets for sewage sludge and it allowed the recovery of nutrients, in particular phosphorous. The PCB/PCT Directive tries to achieve the complete elimination of PCB.

It is a recurrent issue that some Member States already had the measures in place which were targeted by European waste legislation, while other Member States did not. The effect of

[19] Review of the Balance of Competences between the United Kingdom and the European Union Environment and Climate Change, February 2014; https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/279194/environment-climate-change-documents-final-report.pdf.

European legislation in both cases is the effect of **creating a level playing field for all actors in the internal market** as well as providing for an **approximation of living conditions** in environmental terms for citizens.

One of the conditions under which a European legal instrument may be adopted is the observance of the principle of subsidiarity. All Directives screened have at the time of their adoption clearly responded to a need for regulation on Community level, which was fully recognised by all stakeholders interviewed for this evaluation. The sewage sludge Directive since nearly 30 years from its adoption was never adapted, while Member States had developed their own set of much stricter conditions on national level. This raises the question why the EU didn't act to keep the Directive up to date and whether conclusions can be drawn with regard to subsidiarity.

b. Transposition

The transposition of all five Waste Stream Directives is in principle fully completed. As a general rule, the transposition of waste Directives is systematically checked by the European Commission after expiry of the transposition date on the basis of conformity checks prepared by external consultants. Non-compliance is checked on a case by case basis. There are currently a small number of residual infringement cases open relating to insufficient transposition of Directives screened. Insufficient transposition is therefore a marginal problem.

With regard to the individual Directives:

- For packaging there are two non-conformity cases,
- For ELV there is a non-conformity case for one Member State and another Member States is under assessment for not achieving the targets,
- For batteries there are non-conformity cases for four Member States. The Directive had to be fully transposed and implemented on 26 September 2008[20]. Transposition is fully completed,
- For PCB and sewage sludge there is full conformity.

c. Implementation

The timely attainment of existing targets is checked systematically and followed up on a regular basis. At the time of writing this report, there are no major implementation problems for the PPW, ELV, Batteries and sewage sludge Directive apparent (although the first implementation report for the Batteries Directive will only be available in 2014). The sewage sludge Directive is fully implemented in all Member States. **In contrast,** although progress towards elimination and proper disposal of PCBs has been quite significant, the 31 December 2010 deadline for the complete decontamination or disposal has not been met by most Member States to a large extent.

This open non-compliance by the majority of Member States is aggravated by the fact that conclusive inventories of PCB equipment are missing and make it near to impossible to assess

[20] See Annex B, in: BIOIS (2014) ex-post evaluation of certain waste stream Directives, p.307.

the distance to targets. Equipment containing >5dm3 PCB liquid is not properly inventoried. Where data are available a clear decrease in progress in decontamination can be observed.

Due to this implementation deficit, the Directive has not fully achieved its objectives.

6. FINDINGS OF THE FITNESS CHECK

This section sets out the detailed findings of the Fitness Check under the 4 evaluation criteria: **effectiveness, efficiency, relevance, and coherence**. Each section will be preceded by a short introduction summarising the overall findings.

It is not possible to view the 5 waste stream Directives like a single homogenous piece of legislation. There is certainly a common denominator, but each single instrument has in principle to be seen separately with its own specific objectives and means to reach its objectives.

6.1 EFFECTIVENESS

As further explained later on, all five Waste Stream Directives screened have undoubtedly proven to be effective instruments of European waste policy. The ELV, Packaging and Batteries Directive are instrumental to achieving the objectives of the **7th EAP**, the resource efficiency roadmap and the raw materials initiative as adopted by the European Commission or endorsed by the Member States. With the exception of the PCB Directive they all have in principle achieved the objectives they had been designed for. The PCB Directive, despite its full functionality as a legal instrument, could not fully deliver on the expected results due to a **persistent lack of implementation in Member States**. For the other Directives screened different parameters were identified which have a more or less important influence on effectiveness of the Directive. Effectiveness was screened under the following sub headings:

- **What progress has been made over time towards achieving the objectives (and, where applicable, targets) set out in the Directives in various Member States? Is the progress made in line with initial expectations?**

- **Which main factors (e.g. implementation by Member States, action by stakeholders, cooperation between producers and recyclers) have contributed to – respectively stood in the way of – achieving these objectives?**

- **Beyond these objectives, did the Directives achieve any other significant results e.g. have they helped ensure safer EU access to raw materials, reduced GHG emissions and/or spurred innovation?**

a. The PPWD

The PPWD was adopted as a response to the rapidly increasing quantity of packaging waste within municipal waste and the fact that uniform requirements for packaging were getting increasingly important for the functioning of the internal market for packaged goods. The PPWD from 1994 was inspired by the German Packaging Ordinance (Verpackungsverordnung) of the year 1991. It marks the transit to a producer responsibility system for packaging making packaging more environmentally friendly and ensuring a high level of material recycling. Considerable progress has been made towards both objectives of the PPWD, **to ensure a high level of environmental protection through packaging design**

and material recycling and **to preserve the functioning of the internal market**. This is shown by the following indicators:

While the total quantity of packaging waste remained almost stable between 2005 and 2011[21], recycling and recovery of packaging waste increased significantly[22].

The following graph reflects the recycling rates statistically achieved for packaging in 2011[23]:

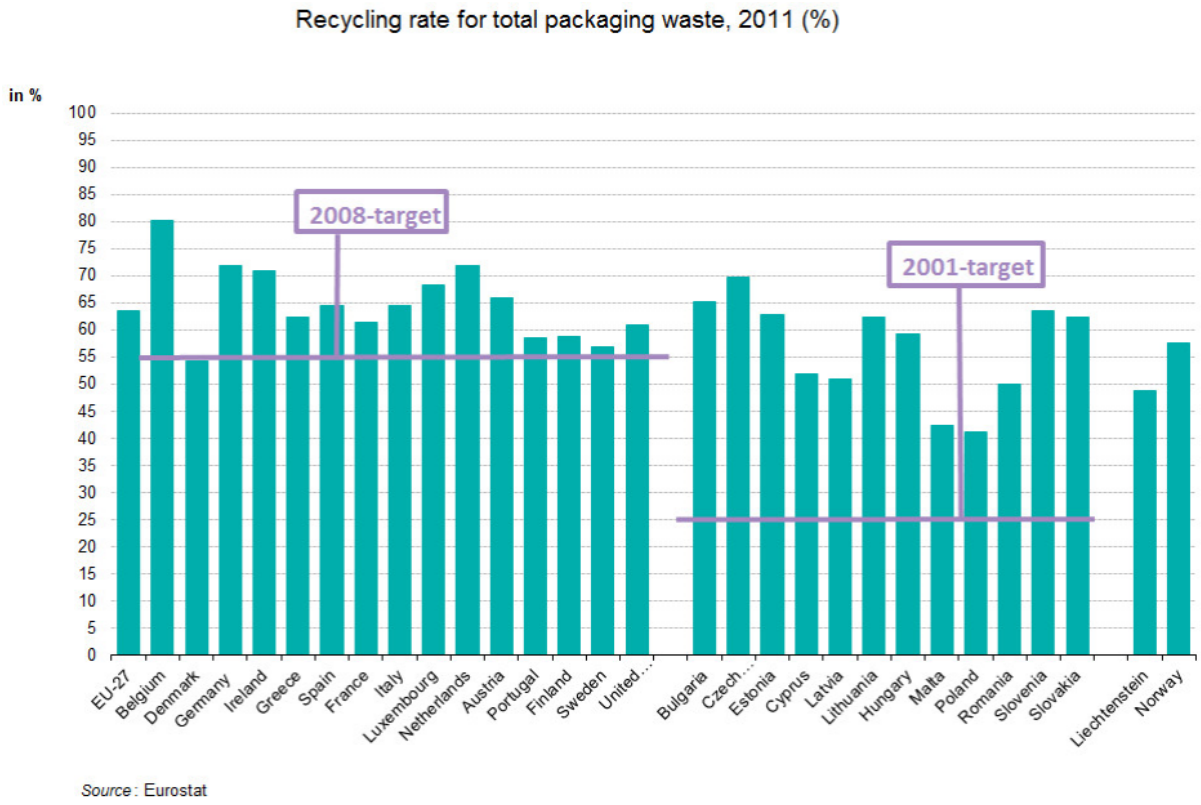

Figure 1 Recycling rate for total packaging in 2011

As can be seen from Table 1, considerable progress in recovery and recycling was achieved between 2005 and 2011:

21 See fig. 20 and 21 BIOIS (2014) ex post evaluation of certain waste stream Directives, p. 286/287.

22 See Fig. 23 and 24 BIOIS (2014) ex post evaluation of certain waste stream Directives, p. 289.

23 For data on the material-specific targets under the PPWD see Annex III.

Table 1: Overview of the implementation of the targets of the PPW Directive[24]

Target	Waste generation			Recovery			Recycling			Implementation Status in 2011
	2005	2011	Change	2005	2011	Change	2005	2011	Change	
Overall (Mt)	79	80.2	1.5 %	52.7	62	17.5%	43.1	51	18.3%	All expect Denmark which did not meet the recycling target marginally
Overall (kg/ per	160.4	159.4	-0.6 %	107.4	123.2	14.9%	87.6	101.4	15.8%	
Overall (%)				66.8 %	77.3 %	10.5%	54.6%	63.6 %	16.5%	
Paper and cardboard (Mt)	30.4	31.8	4.7%	25.5	29.1	13.9%	22.3	26.4	18.5%	Targets achieved in all Member States that have agreed to meet the target by 2011
Paper and cardboard (kg/ per	61.7	63.2	2.4%	51.9	57.8	11.4%	45.2	52.2	15.9%	
Paper and cardboard (%)				84.1 %	91.5 %	8.8%	73.3%	83%	9.7%	
Glass (Mt)	16.5	16.2	-2.1%	9.7	11.5	18.5%	9.7	11.5	18.3%	Targets achieved in all Member States that have agreed to meet the target by
Glass (kg/ per	33.60	32.10	-4.5%	19.80	22.90	15.7%	19.80	22.90	15.7%	
Glass (%)				58.9 %	71.3 %	12.4%	58.9%	71.2 %	12.3%	
Plastic (Mt)	14.1	14.9	5.9%	7.2	9.5	32.1%	3.5	5.1	47%	Targets achieved in all Member States that have agreed to meet the target by
Plastic (kg/ per	28.7	29.7	3.5%	14.6	18.8	28.8%	7.10	10.20	43.7%	
Plastic (%)				50.9 %	63.4 %	12.5%	24.7%	34.3 %	9.6%	
Wood (Mt)	12.7	12.4	-2.8%	7.2	8.4	16.1%	4.7	4.7	0.2%	Targets achieved in all Member States that have agreed to meet the target by
Wood (kg/ per	25.9	24.6	-5.0%	14.70	16.70	13.6%	9.50	9.30	-2.1%	
Wood (%)				56.6 %	67.7 %	11.1%	36.5%	37.7 %	1.2%	
Metals (Mt)	4.9	4.6	-6.0%	3.0	3.4	11.2%	3.0	3.3	11.3%	Targets achieved in all Member States that have agreed to meet the target
Metals (kg/ per	10.00	9.20	-8.0%	6.1	6.7	9.8%	6.1	6.6	8.2%	
Metals (%)				61.6 %	72.9 %	11.3%	61.1%	72.3 %	11.2%	

[24] Eurostat (2013) *Packaging waste statistics (env_waspac),* http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Packaging_waste_statistics.

Recycling targets have been an effective means spurring recycling efforts in the Member States. **A large number of Member States have over-achieved all targets and only very few are lagging slightly behind**. The overall *recycling* rates for 2008 (minimum 55% and maximum 80% recycling) have been achieved by all Member States with one exception. The overall *recovery* target for 2008 has been over-achieved by most Member States with the exception of five of the EU-12 that still lag slightly behind. **A number of Member States, such as NL, BE, DE, CZ and IE have even achieved much higher targets** which shows that the targets set by the Directive were not unrealistically high.[25] With this result, on the whole, implementation can be seen as satisfactory albeit not perfect.

It is worth noting, however, that some uncertainties exist about the exact figures reported by Member States in accordance Commission Decision 2005/270/EC[26]. Even though this Decision is relatively clear on what should be reported as 'recycling' (input to an effective recycling process or by default output of sorting plants in case of no significant losses[27]) some MS seem to consider the amount of waste *collected* for recycling as 'recycling'). In addition, some of the packaging waste entering a recycling process may subsequently still be incinerated. Moreover, despite Eurostat guidance, when reporting relevant data to the Commission Member States use different methodologies, data sources and strategies for verification and data checks.[28] Also, where Member States export packaging waste for recycling purposes (see figure 6 below), for instance to China, it is not always clear how much of that waste is actually recycled. Finally, some Member States achieve their targets by focusing their main efforts on the collection and treatment of Institutional, Commercial and Industrial (ICI) packaging waste, which is cleaner and more homogenous than household waste. Where this is the case, no clarity exists about the actual *household* waste fractions recycled.

[25] It should be noted that DE already had a packaging Regulation (Verpackungsverordnung) in 1991 which set the agenda for achieving high recycling rates of packaging waste and which served as a model for the later EU Directive on packaging and packaging waste. See: **Di Fabio,** Staatliche Gewährleistungsverantwortung für Systeme gesellschaftlicher Selbstregulierung, Rechtsgutachten für ALBA Group plc. & Co.KG, Februar 2014, S. 6. http://www.umweltruf.de/2014_Programm/news/news_druck.php3?nummer=1204.

[26] See: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32005D0270&from=EN

[27] It is worth observing that taking the actual *output* of the recycling process would provide an even more realistic picture of the recycling rates achieved.

[28] See EPR Data Verification Study prepared by Sismega and FFact of November 2013.

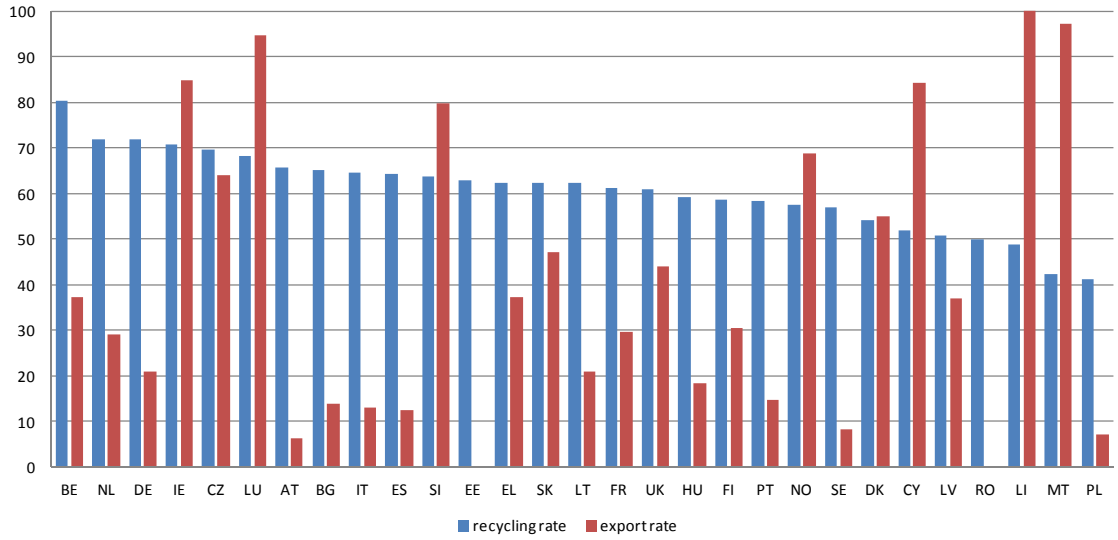

Figure 2: Overall packaging waste, recycling and export rates by Member State, 2011 (%)[29]

Where Member states failed to achieve their targets over a protracted period, this was on account of **lack of infrastructure and high dependence on landfilling, administrative and instructional drawbacks and inefficient source separation of municipal waste**.[30]

Effectiveness of the PPWD is largely influenced by the development of EPR schemes. They are the main driver for implementing the targets of the Directives. Such schemes have been developed in 25 Member States[31]. The effectiveness of the EPR schemes varies, however, significantly between Member States.[32]

Overall, the **implementation of EPR schemes, coupled with the use of economic instruments** (landfill taxes, bans, pay as you throw schemes) has been a **particularly effective** approach to meeting the recycling and recovery targets.[33]

29 Eurostat (2013), Packaging waste statistics, (env_waspac), http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_waspac&lang=en.

30 BiPro (2013) *Support to Member States in improving waste management based on assessment of Member States' performances,* http://ec.europa.eu/environment/waste/framework/pdf/Final%20Report%20_130507.pdf.

31 IEEP (2009) *A report on the implementation of the Packaging and Packaging Waste Directive 94/62/EC*, http://ec.europa.eu/environment/waste/reporting/pdf/Packaging%20Directive%20Report.pdf.

32 BIOIS (2013) Development of guidance on Extended Producer Responsibility (EPR), Background paper for the stakeholders workshop, http://epr.eu-smr.eu/documents/EPR_18sept_Workshop_BackgroundDocument.pdf?attredirects=0&d=1. For a full overview see: BIOIS(2012), Use of Economic Instruments and Waste management Performances – Final Report, http://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf

33 BIOIS (2011) Implementing EU Waste Legislation for Green Growth, http://ec.europa.eu/environment/waste/studies/pdf/study%2012%20FINAL%20REPORT.pdf.

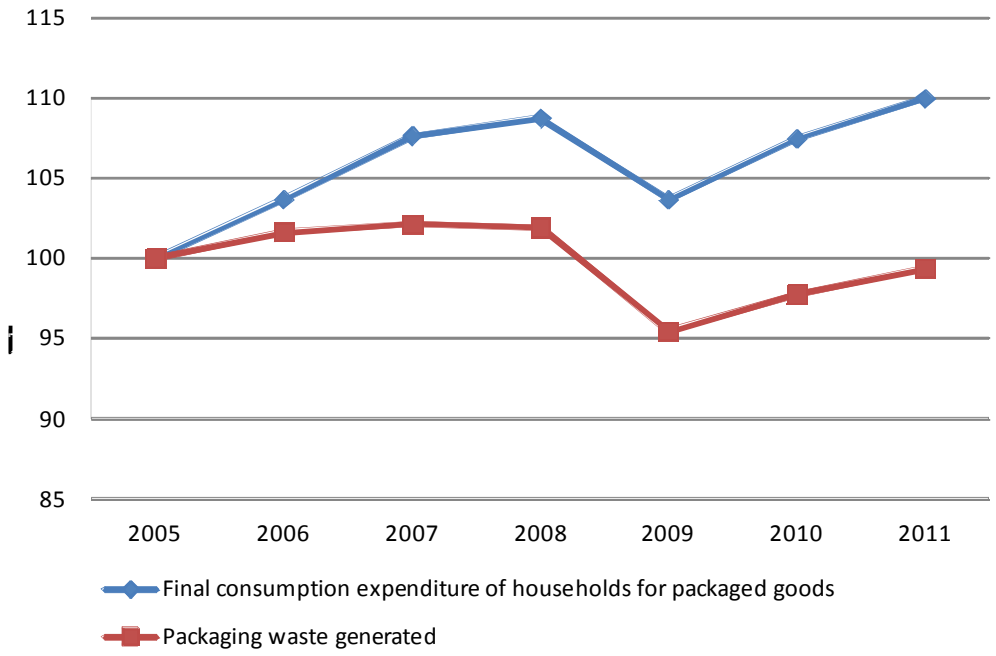

Figure 3: Final consumption expenditures in EU27, 2005-2012 (2005=100) [34]

In the Directive there are also provisions on packaging prevention and progress has been made since 2005 in particular by reducing packaging weight.[35] However, the absence of clear indicators is seen as an obstacle for packaging prevention. Initiatives for prevention, on Member State and company level, could be stepped up. This could for instance be achieved by more systematically and more clearly addressing prevention through more **elaborate essential requirements**[36].

The PPW Directive stipulates that "Member States may **encourage reuse** systems of packaging, which can be reused in an environmentally sound manner, in conformity with the Treaty". Despite the non-binding nature of this provision, most Member States have implemented a wide variety of provisions on reuse.[37] **Nevertheless, the market share of reusable household packaging is decreasing**.[38] This is a trend that may favour a smooth functioning of the internal market for packaging, as national reuse systems may in some cases raise questions from an internal market perspective. **However, it also runs against the waste hierarchy that favours re-use and in particular preparation for re-use for the sake of resource efficiency. Examples of good practice:**

34 Eurostat (2013), Final consumption aggregates (nama_co3_c) for the following goods: Food and non-alcoholic beverages, Alcoholic beverages, tobacco and narcotics, Clothing and footwear, Furnishings, household equipment and routine maintenance of the house, Telephone and telefax equipment, Audio-visual, photographic and information processing equipment, Newspapers, books and stationery.

35 See: Di Fabio, log.cit., for DE, p. 25 seq.

36 See Annex II of Directive 94/62/EC.

37 For examples, see: BIOIS (2014) ex post evaluation of certain waste stream Directives, p. 40 seq.

38 EIMPack (2011) *Economic Impact of the Packaging and Packaging Waste Directive – literature review*, http://eimpack.ist.utl.pt/docs/Literature%20Review_final.pdf.

Table 2: Good practices on packaging prevention[39]

Initiative	Achievements
Waste Prevention & Management Plan (Flanders)	Since 1995 the quantity of total residual waste (not concerning only packaging) has been reduced by 50%. The general of waste is stable since 2000. Landfilling is reduced to near zero and the vast majority of waste is recycled or incinerated.
Local Authority Prevention Demonstration Programme (Ireland)	The Programme identifies and supports waste prevention strategies at local level by providing funding and expert technical assistance.
Courtauld Commitment (UK)	Between 2005 and 2012, this voluntary agreement between major supermarkets and the Waste & Resources Action Programme (WRAP) resulted to a prevention of 2.9 million tonnes of packaging and food waste.

The PPWD has also **spurred innovation. For instance,** in pursuance of the resource efficiency objective **multi-layer packaging** was developed, using significantly less raw materials but increasing difficulties for recycling. This trade-off between a more efficient use of resource and difficulties for recycling needs to be addressed. It may be one of the reasons why a significant amount of household packaging waste is still incinerated. This runs counter to the waste hierarchy and could be addressed through more ambitious recycling targets and clearer provisions on eco-design and essential requirements. It must be noted, however, that multi-layer packaging currently only accounts for a limited share of total packaging and that a solution could also be sought in supporting innovation in recycling technologies and investment in collection infrastructure for such packaging.

The **essential requirements** on the composition and the reusable, recoverable and recyclable nature of packaging can be seen as an element of extended producer responsibility. **Their use is supported by industry** as they allow for technical solutions to reduce the amount of packaging and they are seen as the most appropriate means of safeguarding the free movement of packaging.[40]. Industry would however welcome more enforcement measures by the public authorities.

On the other hand, the existing essential requirements are formulated in a rather imprecise manner and give rise to **differences of interpretation across Member States**.[41] Also, only four Member States have introduced specific measures to monitor compliance with the

[39] European Commission, *Best practices on waste prevention*, http://ec.europa.eu/environment/waste/prevention/practices.htm.

[40] BIOIS (2014), ex post evaluation of certain waste stream Directives, p. 60

[41] As to specific weaknesses of essential requirements see: Arcadis (2009) *A survey on compliance with the Essential Requirements in the Member States*, http://ec.europa.eu/environment/waste/packaging/pdf/report_essential_requirements.pdf. The notorious confusion caused by the term "compostable" in relation to bio plastics may serve as an example.

essential requirements (UK, FR, CZ, BG).[42] A **strengthening of the essential requirements could considerably enhance the Directive's useful effect**.

There are, however, doubts about the way in which the Directive's essential requirements on biodegradable packaging are applied. There is a wide range of confusion as to what is biodegradable, bio-based and compostable. The term compostable used in the Directive refers mostly to plastics that are safe to use in industrial composting. (i.e. this is the definition in most major standards EN 13432[43], ASTM D6400[44] etc. which are intended to define industrial processing norms). These standards require most of the material to be converted into CO2 in a short period of time (at least 90% CO2 levels emitted by a decomposing reference cellulose sample within 6 months[45], and no more than 10% residue in mass within 3 months[46] for the EN 13432). This however does not correspond with the lay meaning of compost, which refers both to the process and the leftovers: a bulk of rich, organic material that on average would be around 30% of original weight and 15% of original volume for typical biowastes.[47]

Overall, the existing standards for biodegradability and/or compostability do not coincide with consumer perceptions, nor do they necessarily represent the best ecological solution. For example, the standard CO2 based definition for industrial compostability addresses the sole problem of reducing semi-eternal waste without taking into account that the material is almost totally converted into a greenhouse gas and contributing to global warming, while losing the energy recovery possibilities.

The main area requiring attention is that of biodegradable plastics. There are situations in which sorting or collection is difficult, or when the packaging can potentially contaminate plastic or bio-waste streams. [48] Examples include the use of, waste bags for the collection of bio-waste and the use of single-use or short-life bags.

As was acknowledged by stakeholders throughout the consultation process, the internal market objective has been achieved but remains a constant challenge e.g. when Member States try to exclude packaging from their territory for environmental reasons while this packaging suffices the requirements of the Directive.

This challenge is linked to re-usable packaging, such as beverage bottles. While the Directive encourages re-use systems of packaging, deposit and return systems for one way packaging may be problematic because they could in some cases conflict with the principle of free

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42 Arcadis (2009) *A survey on compliance with the Essential Requirements in the Member States*, http://ec.europa.eu/environment/waste/packaging/pdf/report_essential_requirements.pdf.

43 EN 13432:2000 Packaging is the harmonised European standard specific to packaging, linked to the PPWD. EN 14995:2006 Plastics is a more comprehensive version broadening the scope to use for non-packaging applications.

44 ASTM International. Standard Specification for Labelling of Plastics Designed to be Aerobically Composted in Municipal or Industrial Facilities. www.astm.org/Standards/D6400.htm.

45 British Plastics Federation. Packaging waste directive and standards for compostability. www.bpf.co.uk/Topics/Standards_for_compostability.aspx.

46 Biodegradable Products Institute. Summary page: "Standard EN 13432: Proof of compostability of plastic products." www.bpiworld.org/Default.aspx?pageId=190437.

47 Gomes, Nunes, Vitoria no, & Pedrosa, (2008) *Co-composting of Biowaste and Poultry Waste*. www.iswa.org/uploads/tx_iswaknowledgebase/paper25.pdf.

48 BIOIS (2013) *Analysis of the public consultation on the green paper "European Strategy on Plastic Waste in the Environment"*.

movement of goods.[49] However, measures to increase the re-use of packaging waste have been implemented in most Member States.[50] The progress in increasing recycling and recovery rates as well as measures on waste prevention have had a measurable influence on the reduction of greenhouse gas emissions and resource efficiency by diverting packaging from landfills and incineration.

It is obvious, however, that landfill diversion of packaging, more than 60% of which is plastic, cannot be only addressed by the Packaging Directive and its indirect effects. The consultation on the "***Green Paper on a strategy for Plastic waste in the environment***" has demonstrated a clear need and triggered a strong plea from plastic industry to establish a landfill ban for recyclable plastic[51] This aspect is already addressed by the parallel exercise of the target review in the 2014 legislative package on waste.

In conclusion from the foregoing, there are clear overall indications that the PPWD is a **strong driver for moving closer to a circular economy** with high recycling and recovery rates. EUROPEN and other stakeholders have confirmed this assessment throughout the consultation.

By and large the PPWD can be seen as **a success** as it has proven to be a strong lever for increased recycling and increased awareness among EU citizens of the value of waste.[52] It has also had **considerable positive effects with regard to saving of green-house gases[53] and technological development** of **packaging performance and separate waste collection.[54]** Finally it helped considerably to ease the **ongoing task** of ensuring the functioning of the internal market for packaging by defining standards applicable for packaging across the EU.

The Directive had significant indirect positive effects beyond its immediate objectives in terms of greenhouse gas reduction. **The level of packaging recovery and recycling achieved by 2004 corresponds to about 10 million tonnes of oil equivalent (Mtoe) and 25 $MtCO_2$-equivalent compared to a scenario where all packaging waste would be landfilled or incinerated.[55]** I It is estimated that of these reductions, 1 Mtoe and 3 MtCO2-equivalent is directly associated with the PPW Directive. More recent data on the overall reduction of CO2 emissions in the EU is not available, but the achieved CO2 reduction should be significantly higher when considering the enlargement of the EU that took place after 2004 and the overall improved performance in the treatment of packaging waste.

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49 Communication from the Commission (2009/C 107/01), *Beverage packaging, deposit systems and free movement of goods.*

50 IEEP (2009) *A report on the implementation of the Packaging and Packaging Waste Directive 94/62/EC*, http://ec.europa.eu/environment/waste/reporting/pdf/Packaging%20Directive%20Report.pdf.

51 BIOIS (2013) Green paper on a strategy on plastic waste in the Environment, evaluation, p.34-35.

52 EIMPack (2011) *Economic Impact of the Packaging and Packaging Waste Directive – literature review*, http://eimpack.ist.utl.pt/docs/Literature%20Review_final.pdf.

53 For more details see: BIOIS (2014) ex post evaluation of certain waste stream Directives, p.65.

54 EIMPack (2011) *Economic Impact of the Packaging and Packaging Waste Directive – literature review*, http://eimpack.ist.utl.pt/docs/Literature%20Review_final.pdf.

55 ECOLAS and PIRA (2005) *Study on the implementation of the Directive 94/62/EC on Packaging and Packaging Waste and Options to Strengthen Prevention and Re-use of Packaging,* http://ec.europa.eu/environment/waste/studies/packaging/050224_final_report.pdf.

Effectiveness in a nutshell

Significant progress has been made over time towards achieving the Directive's objectives. All Member States have statistically reached recovery and recycling targets, resource use and packaging production have witnessed a relative decoupling, but Member States' performance in recycling still varies significantly.

The Directive has been effectively transposed and the internal market objective is well reconciled with the environmental objective. **Problem areas for potential conflict in this respect are packaging re-use systems versus one way packaging systems**. Future legislation may have to consider being more assertive as to which way to go. A clearer political guidance may in future be needed as to what objective should prevail in this case.

While recycling and recovery targets have generally been met, there are some uncertainties about the exact figures reported by Member States in accordance Commission Decision 2005/270/EC.

Moreover, it appears that household packaging recycling **targets are mostly achieved with the more homogenous ICI packaging instead of household packaging**, making it difficult to measure achievements in household packaging recycling alone.

Packaging waste prevention could be achieved more effectively if it was not only described in general and non-binding terms but **if it was made obligatory and measurable**. So far packaging waste prevention was mainly achieved by increasing packaging efficiency through lightweight multi-layer packaging which is not commonly recycled. Through this innovation spurred by the Directive, over the past, a relative **decoupling of economic growth and packaging production was achieved by weight but not by quantity of packaging waste**. In future further weight reduction of packaging will not deliver sufficient results towards the needed absolute decoupling of economic growth and packaging waste generation. More effective measures will have to be looked for.

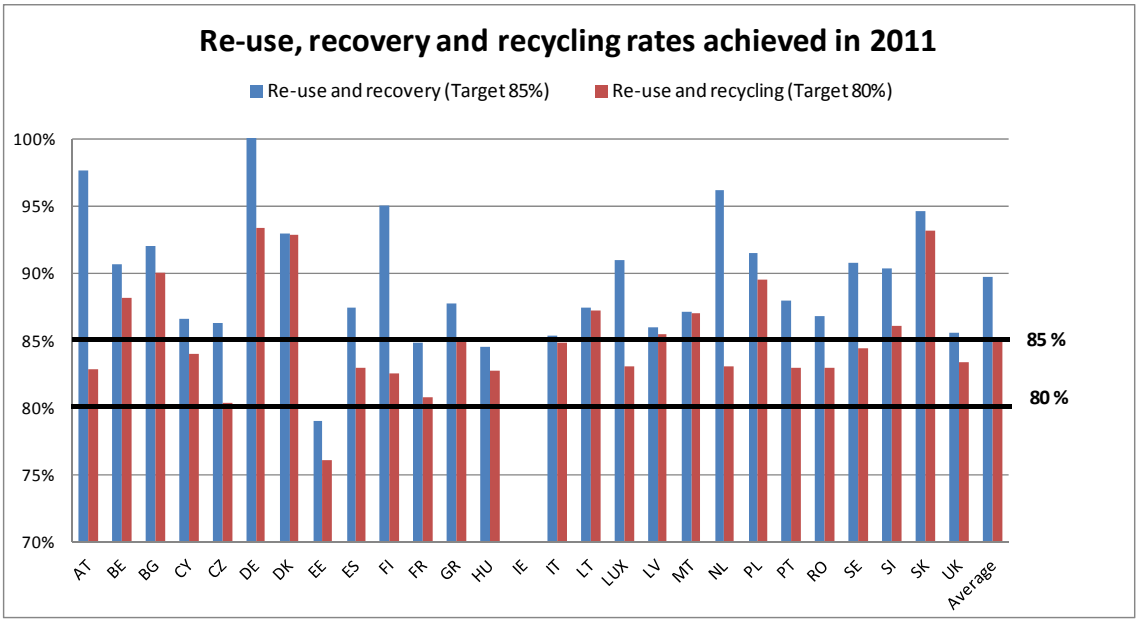
Other factors outside the Directive have helped attaining its objectives, such as landfill bans, PAYT schemes, EPR schemes, awareness raising activities as well as the development of communication channels between producers and recyclers.

Essential requirements are a key tool to improve packaging environmental performance. Yet, they are formulated in a very general manner and judged as difficult to implement. Implementation measures are scarce and guidance given to industry is mostly lacking. The CEN standards are the only formalised instrument for industry to prove compliance. Industry is generally happy with the relatively vague way in which essential requirements are formulated and judge CEN standards as sufficient. However, in order to boost circular economy, in future particular consideration might need to be given to strengthen essential requirements as a key tool to achieve better environmental performance of packaging.

Beyond its core objectives the PPWD has achieved through recycling and recovery considerable CO2 reductions, as well as considerable reduction of primary raw materials used were achieved. It has also promoted direct and indirect health benefits through the reduction of hazardous substances in packaging and reduced air emissions.

b. The ELV Directive

The ELV Directive was adopted in response to wide spread environmentally unsound ELV treatment in the EU with ELVs found abandoned or not properly decontaminated. Before the adoption of the ELV Directive little attention was paid to the presence of hazardous substances such as heavy metals or certain chemicals in car manufacturing. The ELV Directive has proven to be an **effective tool to phase out hazardous substances,** as specified in its Annex II, from ELVs. [56] These hazardous substances have been almost completely removed from vehicles. In addition, Eurostat data show that Member States are on good track to reach the 2015 targets for **re-use and recycling** as well as for **re-use and recovery, provided post shredder technology is used to the necessary extent**. **In 2011**, 23 Member States achieved the target set for **reuse and recovery from 2006**, while 25 achieved the reuse and recycling target. Both targets were met ahead of time already in 2011, the targets for re-use and recovery by 4 Member States and for re-use and recycling by 11 Member States.[57] It can be seen as an indication of a good calibration of recycling targets that 4 Member States already in 2011 had achieved the 2015 re-use and recovery target. This demonstrates clearly that **targets are achievable**, where they were not achieved this is due to factors outside the Directive, such as a lack of political will and insufficient infrastructure.



[56] Öko-Institut (2010) *ELV Directive Annex II: analysis of costs and environmental benefits of heavy metals ban, and proposal for better regulation*, available at www.acea.be/images/uploads/files/%C3%96ko_Institut.pdf.

[57] Eurostat data. Ireland did not report for 2011.

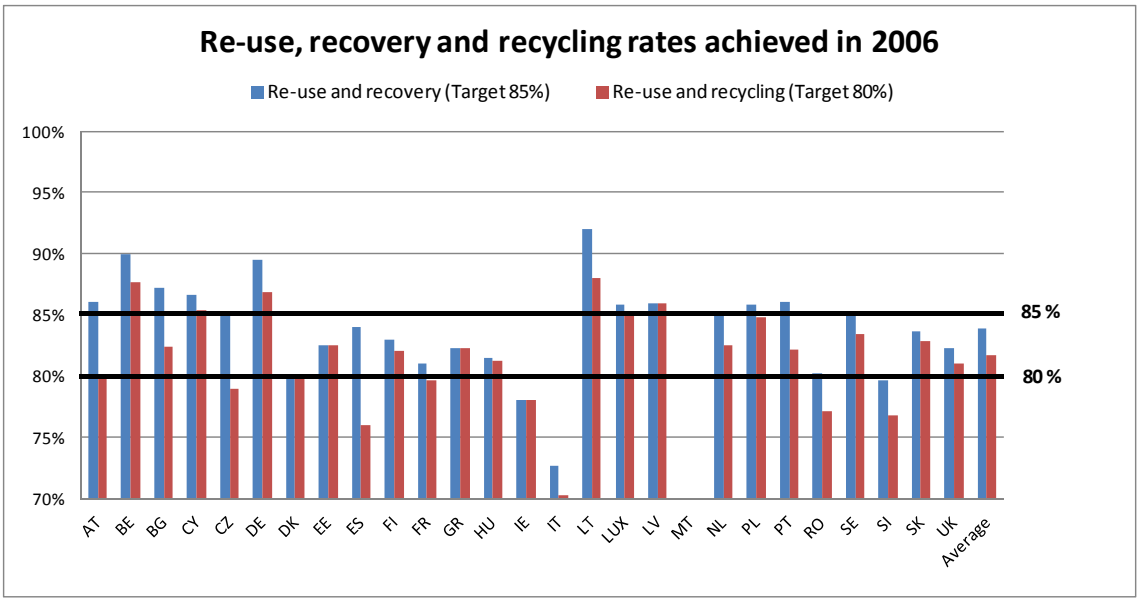


Figure 4: Reuse, recovery and recycling rates achieved in 2006 and 2011

Despite these encouraging results, some **doubts remain about the reliability and comparability of statistics across Member States**, notably because of the use of different reporting systems and calculation methods.[58] For **instance, the use of plastic streams obtained by post-shredder treatment in a blast furnace is counted as recycling by some Member States and "thermal recovery" by others**.[59] The picture is further blurred through the number of free riders not reporting on recycling and other recovery or the quality of such operations.[60]

The **number of authorized facilities has increased** significantly in some Member States in recent years, in pursuance of compliance with the Directive. For instance, in Belgium 48 Authorized Treatment Facilities (ATFs) were listed in 2005, while there were 120 in 2010. In Finland over the same period, the number of ATFs increased from 60 to 235 and in the UK from 732 to 1 750.

Two major challenges remain. The collection and treatment of ELVs by illegal operators and the illegal shipment of ELVs are still important according to the various stakeholders interviewed during the course of the ex-post evaluation study. This issue is of concern as it may make it more difficult for some Member States to achieve the 2015 targets, and in addition it may impact on the environmental benefits of the Directive. The Correspondents' Guidelines No 961 on shipment of waste vehicles can contribute to better control of illegal

58 Detail are regulated in the Commission Decision 2005/293/EC on the monitoring of the reuse/recovery and reuse/recycling targets set out in Directive 2000/53/EC. DG ESTAT has also developed a guidance document on how to report on recycling and recovery targets.

59 European Parliament (2010) *End-of-life Vehicles: Legal aspects, national practices and recommendations for future successful approach*; the Commission Guidelines for Reporting seem not to have changed that situation much; for stakeholder suggestions to improve the current situation see: BIOIS (2014), ex-post evaluation of certain waste stream Directives p. 112/113.

60 BIOIS(2013) *Development of Guidance on Extended Producer Responsibility (EPR).*

61 The **Correspondents' Guidelines No 9** on shipment of waste vehicles have been adopted by the waste shipment correspondents in 2011. These Guidelines define criteria for the differentiation between

exports of ELVs inter alia by clarifying the distinction between waste vehicles and used vehicles. Further cooperation and coordination between Member States may improve the follow up of deregistered and exported vehicles including issuing a certificate of destruction in case of a final deregistration of a car. So far there is no uniform practice in all Member States.

This problem to distinguish between ELVs and used cars, makes the monitoring of the Directive difficult. There is evidence for a **considerable gap in a number of Member States between ELVs dismantled and ELVs deregistered**. In 2008 4,1 million ELVs were revealed as of unknown whereabouts.[62] This may be attributable to "illegal exports" of ELVs falsely declared as car for re-use, or it may point to a **functional problem in the Directive not properly defining second hand vehicles and ELVs**.[63] Some stakeholders have called this absence of a definition of "ELV" a birth deficiency of the Directive.[64]

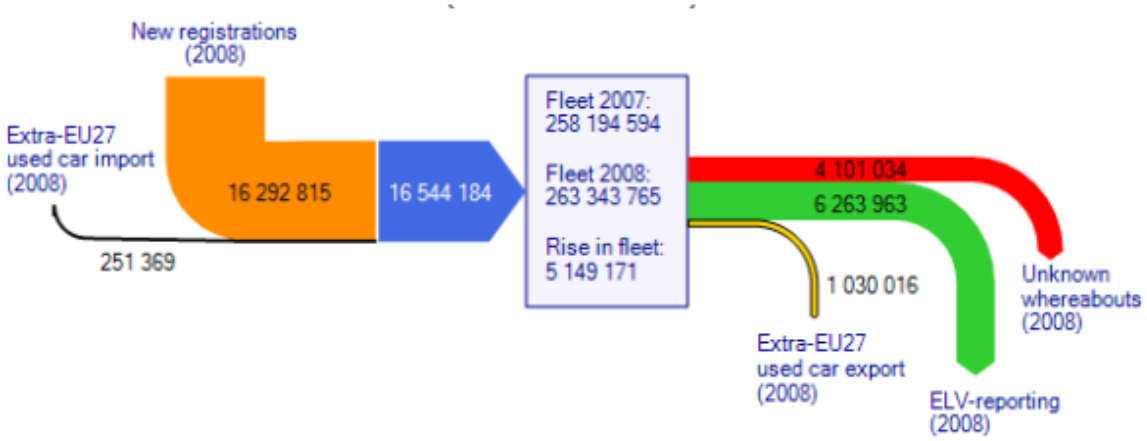


Figure 5: Vehicle entries and exits of the EU 27-fleet, 2008[65]

The problem was confirmed by IMPEL (European Network for Implementation and Enforcement of Environmental Law). **To enhance effectiveness of the legislation** they proposed amendments to the Directive to further **distinguish used cars and ELVs**.[66] The phenomenon could be explained with private exports, illegal shipments[67], disposal or long term garaging. **At present the tools in the Directive do not provide for full transparency.**

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second-hand vehicles and waste vehicles that is a broader scope that the ELV scope, and therefore, these Guidelines include ELVs (http://ec.europa.eu/environment/waste/shipments/guidance.htm).

62 Oko-Institut et al. (2011) *European second-hand car market analysis*, European Commission.

63 In this sense Christa Friedl and Ulrich Leunig (BDSV), Recycling Magazin 08/2012, p. 35. He deplores in particular a discrepancy between the statistical evidence and the reality of bad implementation as well as constructive faults of the Directive itself.

64 In this sense Christa Friedl and Ulrich Leunig (BDSV), Recycling Magazin 08/2012, p. 35.

65 Öko-Institut et al. (2011) *European second-hand car market analysis*, European Commission.

66 For IMPEL suggestions, see: BIOIS(2014) ex-post evaluation of certain waste stream Directives, p.115 with reference to the "correspondent's guidelines No 9 on shipment of waste vehicles".

67 European Parliament (2010) *End-of-life Vehicles: Legal aspects, national practices and recommendations for future successful approach*.

In addition, according to a study led by BIO Intelligence Service in 2010,[68] a high volume of ELVs is treated in non-legal or unauthorized treatment facilities in the EU.

More generally, there was agreement among stakeholders that for stepping up effectiveness of the legislation increasing **co-operation among Member States was needed to ensure tracking and follow-up of de-registered and exported vehicles**.

While due to the significant number of vehicles of unknown whereabouts there is some doubt as to whether the Directive has fully satisfactorily attained its objective of reducing environmental impacts, the **Directive has spurred innovation**. According to stakeholders, **the vehicle treatment sector is now widely regarded as being more efficient, professional and sustainable** as a result of the Directive. Stakeholders fully acknowledged that the ELV Directive did not cause unnecessary bureaucracy and that it is not in conflict with the goal of an internal market[69], a fear that had been expressed shortly after the adoption of the Directive.

Despite the described circumstances, stakeholders agreed that the Directive had with no doubt **significant environmental benefits in saving resources through re-use, recycling and recovery,** this again corresponding to savings in green-house gas emissions. The most obvious success is the reduction of hazardous substances in ELV.

The Directive has also **spurred technical innovation in production of new cars[70], making them less polluted with hazardous substances, and it has also improved treatment technology significantly increasing recycling and recovery** rates. The ELV dismantling sector has moreover expanded and professionalised, creating employment and economic growth.[71]

Effectiveness in a nutshell

The Directive has proven highly effective in preventing waste from vehicles, increasing re-use, recycling and recovery and ensuring that ELVs are treated in environmentally safe conditions. **Four hazardous substances identified in the Directive have been almost completely removed from vehicles** with the exception of lead and most Member States are on track towards reaching the 2015 targets, for re-use, recycling and recovery. This has, beyond the Directive's immediate objectives, **significantly reduced greenhouse gases**, saved raw materials and spurred innovation, making car manufacturing more environmentally friendly. **Given that the ELV market is a global market, European green standards set by the ELV Directive have a significant influence on car manufacturing internationally**. Moreover, high ambitions to recycle more non-ferrous ELV parts have led to the

68 BIOIS(2010) *Etude de la gestion de la filière de collecte et de valorisation des véhicules hors d'usage dans certains pays de l'UE.*

69 Reinhardt, W.A. (2005) *Drive towards compliance, Recycling end-of-life vehicles in an enlarged EU,* available at www.acea.be/images/uploads/etr/SDOC0823.pdf.

70 Konz, R.J. (2008) *The End-of-life Vehicle (ELV): The road to Responsible Disposal*, Minnesota Journal of International law (Vol.18), available at: http://www.law.umn.edu/uploads/BX/fw/BXfwZTM0VoxN2BtOQ7E2Vg/Konz-Final-Online-PDF-03.30.09.pdf.

71 GHK and BIOIS(2006) *A study to examine the benefits of the End of Life Vehicles Directive and the costs and benefits of a revision of the 2015 targets for recycling, reuse and recovery under the ELV Directive*, DG ENV, http://ec.europa.eu/environment/waste/pdf/study/final_report.pdf.

development of more sophisticated post-shredder technology. The Directive also had a significant in creating employment in the growing ELV dismantling sector.

Despite this success, there is a somewhat **systemic problem with statistically missing ELVs**, letting assume a flourishing business with illegal shipments and collection and treatment of ELVs by illegal operators, potentially jeopardising the Directive's environmental objective. Further work may be needed in better implementing the Correspondent's guidelines on shipment of waste to better differentiate between ELVs and used cars. Further cooperation and coordination between Member States may improve the follow up of deregistered and exported vehicles including issuing a certificate of destruction in case of a final deregistration of a car.

Some doubts remain about the reliability and comparability of statistics across Member States due to different reporting systems and calculation methods, which may benefit from further harmonisation.

c. The Batteries Directive

The Batteries Directive was adopted as a response to increasing concern about the spreading of portable electronic equipment such as portable radios, handhelds, mobile phones and many more consumer electronics causing concern about the proliferation of portable batteries and their potential for contaminating the environment. The Directive also responded to concerns about battery chemistry relying on heavy metals and chemicals whose introduction in the environment should be closely controlled or which should be substituted. There is some indication that effectiveness is impacted by **implementation that is not fully satisfactory**. Nevertheless, the Directive had, and continues to have, **significant positive environmental effects.**

All Member States have introduced collection schemes, the use of hazardous substances in batteries has been limited, the **collection of portable batteries** has improved since 2007 and nearly all Member States have achieved the 2012 target on collection of portable batteries[72]. Landfill and incineration of industrial and automotive batteries are in principle prohibited[73] and recycling efficiency targets for portable batteries were introduced. All producers must be registered, use BAT and participate in collection schemes.

The effectiveness of the Directive is to be measured against its three objectives to **restrict hazardous substances (mercury and cadmium) in Batteries**, to provide for **collection and recycling** schemes and to ensure that **consumers are properly informed** to make an informed choice and to effectively participate in separate collection. Consumer's participation is one of the most **critical success factors** for this Directive.

The **restriction of hazardous substances in Batteries** has led to a constant monitoring during which, according to stakeholders, occasional **violations of the limits of hazardous**

[72] EPBA (2013) The collection of waste portable batteries in Europe in view of the achievability of the collection targets set by Batteries Directive 2006/66/EC and Stibat.

[73] Art. 14 Dir. 2006/66/EC.

substances, mainly in Asian import products, were detected[74]. However, systematic data collection does not take place and it is currently not known what quantities of non-compliant batteries can currently be found on the market. Member States' inspections were reported as infrequent and unstructured.[75]

The Directive has certainly achieved **very high collection rates for automotive and industrial batteries** and also the collection of **portable batteries improved** significantly since 2007[76]. Stakeholders raised doubts whether **the 2016 collection target** of 45% of portable batteries was feasible.[77] 7 Member States, however, had achieved this target already in 2012 which according to stakeholders, indicates that **implementation measures might need to be stepped up**, such as setting up a higher density of collection sites and increasing consumer awareness.

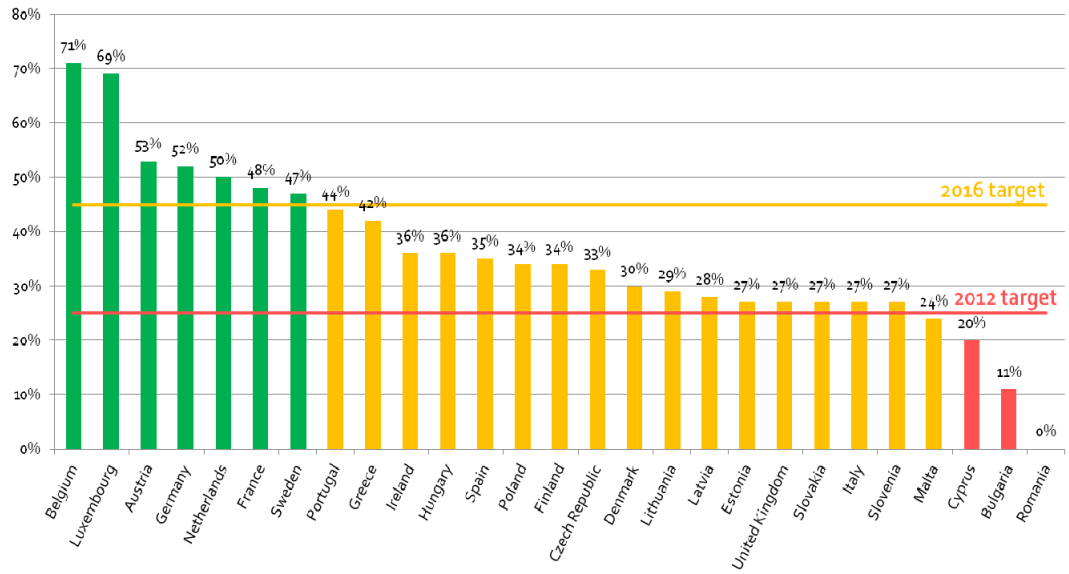

Figure 6: Portable batteries collection rates in the EU Member States in **2012** (2011 where indicated)[78]

Low collection rates have been observed for different types of portable batteries and the collection of **button cells is still a problem**[79]. **Consumer awareness is a key success factor**

74 *Recycling* magazine "Battery Directive : Time limit expired". www.recyclingmagazin.de/rmeng/news_detail.asp?ID=11090&MP=2&MODE=205&NS=1.

75 BIOIS(2014) ex-post evaluation of certain waste stream Directives, p. 149.

76 EPBA (2013) "The collection of waste portable batteries in Europe in view of the achievability of the collection targets set by Batteries Directive 2006/66/EC" and Stibat; EBRA study "10 years of battery recycling in Europe" October 2008; this refers to lead acid batteries, representing currently 90% of industrial batteries but also NiCd batteries, NiMH and Li-Ion batteries.

77 BIOIS (2014), ex-post evaluation of certain waste stream Directives, p. 155.

78 EPBA (2013) The collection of waste portable batteries in Europe in view of the achievability of the collection targets set by Batteries Directive 2006/66/EC and Stibat.

79 BIOIS (2014) ex-post evaluation of certain waste stream Directives, p. 156.

for effective batteries collection and recycling.[80] This concern was shared by a great number of stakeholders and it is plausible for small portable batteries which can easily arrive in the waste bin if consumers are not sufficiently informed about the potential hazards of battery chemistry. **Consumer awareness is exclusively an implementation problem**.

The existence of the **Battery Directive as such already caused better awareness** also among EEE producers of the potential hazards of improper battery disposal and of the need to give more ample information to users of electronic equipment. A rather frequent occurrence of **wrong capacity labelling had been observed**. This can only be eradicated by better implementation. Wrong labelling in relation to substance restrictions was observed occasionally.

One structural problem that was found to negatively impact on implementation relates to a certain ambiguity in the Directive's **definition of portable batteries**. It was observed that **weight–based portable batteries collection schemes favored the collection of lead-acid batteries thus** leading to a statistical distortion of collection rates and disturbing the monitoring process. Lead acid batteries are put on the marked as industrial, but are often collected as portable.[81] **The majority of stakeholders suggested** that portable, automotive and industrial batteries should be clearly differentiated in the Batteries Directive to secure the consistency and comparability of collection rates across the EU.

Effectiveness of the Directive is also impacted by the high rates of illegal exports of WEEE containing batteries. 41% of WEEE arisings are assumed to be improperly treated or illegally shipped.[82]

The Directive had significant effects on the reduction of green-house gas emissions and it has significantly increased awareness among battery producers and importers as well as consumers.

Effectiveness in a nutshell

The Batteries Directive is the youngest of the five screened Directives and the first Commission three-annual implementation report covering the Directive will only be published in 2014. Visibly, good progress was made towards achieving its objectives of separate collection and recycling, consumer awareness and substance restrictions for heavy metals in batteries. It is now fully transposed into national law.

[80] A 2010 survey conducted by BEBAT and Lielens in Belgium, which had the highest collection rate in 2007 of 54% showed the following distribution of consumers: 18% throw waste batteries away, 9% stock them, 18% sort but do not return and 55% do return. It is worth noticing that these rates are applicable mainly for primary batteries because, as mentioned above, consumers regard primary batteries as the main object for recycling and not all of them are aware that rechargeable batteries need to be collected and recycled as well. This shows that consumer awareness raising needs to be stepped up significantly.

[81] BIOIS(2014) ex-post evaluation of certain waste stream Directives, p. 156.

[82] Commissions staff working paper SWD(2013) 268 (impact assessment accompanying a proposal to strengthen inspections and enforcement of Regulation (EC) No 1013/2006 on shipments of waste, July 2013).

Consumer awareness is a crucial success factor for the implementation of the Directive, in particular for separate collection, which varies strongly across Member States.

While collection rates for automotive and industrial batteries are high, **small portable batteries, despite of significant increase, are too often not collected.** Member States may find it difficult to attain the 46% collection target for 2016. **For some portable battery types the collection rate is below 25%. This is a serious issue deserving closer analysis.**

Some statistical uncertainty can be expected due to a number of factors, such as: accounting of batteries incorporated in EEE, **ambiguity in the definition of portable battery and the collection of lead acid batteries as portable in some Member State's collection schemes.** This may inflate collection rates by weight, while significant numbers of small batteries may not be properly captured and unfold a negative environmental effect. There is **room for optimising portable batteries collection and statistical refinement to better reflect the real collection rates of portable batteries**.

Violations have been observed on limits of hazardous substances as well as substance labelling requirements for portable batteries.

Effectiveness largely depends on appropriate compliance monitoring by national authorities, in particular on limits for hazardous substances a capacity labelling for imported batteries.

d. The PCB Directive

The PCB Directive was adopted in response to the need of adequate disposal because PCBs pose a significantly high risk for the environment and human health. Existing disposal paths, such as landfill and municipal waste incineration were increasingly seen as not an option for environmental and health reasons. It also was a logical response to the prohibition of marketing PCBs with the mid-term vision to entirely phasing them out of the environment. Unlike the other Directives screened in this exercise, the PCB Directive has a single focus on the elimination of PCBs. Effectiveness has to be measured against this sole objective. No aspect of resource efficiency, circular economy and green-house gas mitigation has any relevance in the context of this Directive. The Directive implements the International PARCOM Decision 92/3[83] to dispose of PCBs subject to an inventory by 2010 at the latest.

Although progress towards elimination and proper disposal of PCBs has been quite significant, a majority of Member States let the 2010 deadline for complete decontamination and disposal lapse and comprehensive EU wide data on historic disposal as well as inventories of PCB containing equipment are missing. The non-compliance with the Directive's 2010 deadline may generally be a bigger problem for the EU-12 and Croatia, but it is also a problem for the EU-15. For example: Spain had in 2010 not disposed of 33.000 tons. EDF France only in 2010 counted over 70.000 transformers containing PCB and organized a big clean-up operation. The Netherlands have no exact inventory of PCB equipment. The current study could not find out the true dimension of the problem. But estimates from 2005

[83] Ministerial Meeting of the Oslo and Paris Commission of 21-22 September 1992.

indicate that the remaining quantity of PCB-containing oil is 350 kT, containing about 50 kT of pure PCB, with the total gross weight of the equipment at 1.1 Mt.[84]

The study to support this Fitness Check could not identify any deficiencies in the set-up of this legislation to be responsible for this Directive **largely not having attained its objectives**. This is, and stakeholders are unanimous, due to the **lack of implementation of the Directive**. To explain this implementation gap, Member States have invoked legally irrelevant practical arguments, such as economic problems, illegal handling and robbery of PCB equipment, privately owned equipment discovered after 2010, lack of incineration facilities, legal and communication problems.[85]

Without the Member States providing comprehensive data and full inventories of relevant PCB containing equipment, the progress needed to achieve the target cannot be reliably judged.

Nevertheless, the Directive had created a strong incentive for Member States to start an effective PCB disposal policy which has led to mitigating the problem but which needs to be followed up by consequent enforcement policy.

Effectiveness in a nutshell

The **objective of decontamination and disposal of obsolete larger PCB equipment until 2010 has not been met by all Member States**, despite significant progress in particular in the EU 15. By and large the Directive's objective has not been entirely met, due to **insufficient implementation by Member States**.

There are no recent and sufficient data available allowing an assessment of the level in terms of achievement of environmentally sound disposal and decontamination compared to an established inventory of sources of equipment containing PCB/PCT.

Infringement proceedings may need to be initiated.

The Directive had a tangible effect on awareness and developing expertise in the field of PCB waste.

e. The Sewage sludge Directive

Sewage sludge is a "by-product" of urban waste water treatment. With strongly increasing numbers of urban waste water treatment plants in many Member States, sludge waste quantities rose to an extent that finding a proper outlet became urgent. Predominant disposal

84 CLEEN (2005) *EuroPCB: inventory PCB enforcement in Member States – Part I, Final,* October 2005.

85 For the bizarre justification given by Member States see further: BIOIS (2014) ex-post evaluation of certain waste stream Directives, table 19, p.214.

routes such as marine dumping and eutrophication along coastal areas and also landfilling of sludge posed increasing environmental problems. As noted in the Explanatory Memorandum accompanying the Commission proposal[86], the Sewage Sludge Directive was proposed to a) promote the use of sewage sludge in agriculture by stressing its agronomic values, and b) to specify the precautions necessary for its proper use against a background of expected increasing arisings from waste water treatment installations. At the time of its adoption, there was already a tradition in some Member States to recycle sewage sludge on agricultural land, because sludge is rich in nutrients, particularly phosphorus and nitrogen[87]. However, since sludge also contains hazardous substances such as heavy metals, a **precautionary approach needed to be taken**[88]**.** Sludge use in Europe needed to be based on minimum requirements to promote its agronomic use and provide for appropriate precautions**.** Any risk of agricultural production growing on land of a Member State not applying precautionary standards had to be avoided. There are currently no infringement procedures for bad implementation pending.

There is no doubt that the Directive has **fully attained its initial objectives.** The Directive has no recycling targets, the objective is rather to stimulate good environmental practice in increasing use of sewage sludge in agriculture. All Member States apply **good agricultural practice** when spreading sludge to agricultural land and all Member States have set heavy metal limit values often way above those of the Directive. At the same time, the Directive has never been adapted to technical and scientific progress **with regard to heavy metal limits in sludge and soil**.

Sewage sludge is widely used on agricultural land in Europe[89], but there is a wide variety among Member States as regards the quantity of sludge used. Some Member States have adopted stricter limit values for contaminants than those contained in the Directive. Some have also added some new contaminants. **Several Member States consider sludge risky to apply to agricultural land and have even banned its use**, while others use it widely and are still improving sludge management.[90]

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86 COM(82) 527, 10.9.1982.

87 In 1982, the Commission estimated the following break down for sludge outlets in the 12 Member States which were at that time part of the EEC: 45% landfilled, 7% incinerated, 19% dumped at sea, and 29% used in agriculture. The Commission in the Explanatory Memorandum remarked that, "The figure of 29% for the amount of sewage sludge used in agriculture is low considering that sludge is of considerable use to soil as a source of organic matter containing phosphorus and nitrogen. The use of sludge in agriculture needs careful appraisal as to the kind of treatment required and the quantities that may be spread".

88 The limits and use restrictions contained in the Commission proposal were underpinned by the conclusions and main findings of a Concerted Action on the treatment and use of sewage sludge (COST Project 68).

89 In 2009, around 48% of dry sludge solids generated in the EU 27 were spread on agricultural land; Eurostat data (ENV_WW_SPD) for EU-28 for 2005-2010; data missing for 2005 for Denmark, France, Croatia, Austria and Portugal; data missing for 2010 for Estonia, Greece, Latvia, Portugal and Finland. http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/dataset?p_product_code=ENV_WW_SPD.

89 Milieu (2010) *Environmental, economic and social impacts of the use of sewage sludge on land*, Final Report, http://ec.europa.eu/environment/waste/sludge/pdf/part_i_report.pdf.

90 For a more detailed overview see: BIOIS (2014) ex-post evaluation of certain waste stream Directives, p.349, table 30.

The Directive was earmarked for revision for more than 10 years, which has proven difficult, since no solid risk assessment has to date been made. It was recently removed from the Commission work programme.

The Directive had a **positive impact on stakeholder awareness** and has helped improving sludge treatment technology, including the recycling of nutrients, such as phosphorous. Sludge quality has improved over the years through better control of industrial emissions with the effect that heavy metals are generally less present in sludge than in the past.

It indirectly had an impact on the avoidance of greenhouse gas emissions by diverting sludge from landfills. It may also have delivered a sizeable contribution to resource conservation where it has substituted or complemented the use of mineral fertilizers.[91]

Since most Member States are stricter with their limit values for contaminants in sludge and since the adoption of the Directive sludge quality has improved through generally higher environmental standards, it is no longer obvious that the Directive in its current form still responds to an actual need as an instrument of waste management. On the other hand, there are new challenges for example from the impact of nano materials and micro plastic on sludge quality. The Directive may, on the other hand have its justification as an instrument of soil protection.

Effectiveness in a nutshell

The Directive has been **effective in ensuring that heavy metals in soil and sludge do not exceed the limit values**. Insofar initial expectations have been fully met. Most Member States apply today by far stricter limit values for heavy metals in sludge and soil. These were complemented in a number of Member States by quality assurance standards, such as the safe sludge matrix in the UK, codes of practice and enhanced cooperation between governments and stakeholders.

Sludge use in agriculture is a highly contentious operation and a number of Member States have banned the use of sewage sludge in agriculture, while others use it to well over 50%. The Directive in its present form is clearly outdated.

6.2 EFFICIENCY

The aspect of efficiency shall show whether the Directives screened have attained their objectives at reasonable costs. What is reasonable is subject to a high margin of discretion and it is therefore not surprising that in the absence of clear guidance and efficiency methodology there is no systematic information available as to what degree environmental

[91] For the depletion of the finite resource phosphorous, see: Plant Research International (2010). Sustainable Use of Phosphorus. Retrieved 13 February 2014 from www.fertilizerseurope.com/fileadmin/user_upload/publications/statistics_publications/Stat_website.pdf

Directives are efficient. Especially i**n the product related Directives (PPWD, ELV, Batteries) cost efficiency aspects play an important** role because they can be adequately taken into account within the different stages of the life cycle of a product, such as the product design, separate collection and recycling technology phase.

It has to be kept in mind that environmental Directives should primarily create benefits for human health and the environment and should enable society to be living well within the limits of the planet, paraphrasing the title of the **7th EAP**. Before reaping these benefits there will inevitably be costs for business and administration. For instance, substance restrictions require investment in research for substitution; landfill bans close the cheapest outlet for waste disposal in favour of more expensive ones, increasing recycling rates requires public investment in collection infrastructure as well as private investment in R&D for search of more sustainable products etc.

It has also to be born in mind that cost effectiveness cannot be reasonably seen as an absolute parameter. Cost effectiveness of environmental legal instruments can only be an indicator for the most economic legal instrument among those which have the same environmental effect. Any other interpretation would give way to a bottom race for the cheapest measure with less environmental protection.

Environmental legislation has, as demonstrated in previous sections, been a major driver for investment into new technology, in the automotive sector, the packaging industry, battery technology and waste management technology in general. This has **created economic growth and employment opportunities** over decades and will continue to do so. Previous studies have shown that full implementation of European waste legislation by 2020 would have a potential of creating overall around 400.000 new jobs and even more all the indirect investment effects e.g. in machine manufacturing industry, taken into account.[92]

Environmental legislation should however be designed in such a way that it strikes an optimal balance between protection of the environment, generation of economic welfare and lowest possible associated costs. The following section will demonstrate that the screened Directives are cost efficient.

- **What are the costs and benefits associated with the implementation of the Directives in various Member States? If there are significant cost differences between Member States, what is causing them? Can any costs be identified that are out of proportion with the benefits achieved?**

- **What good practices in terms of cost-effective implementation of the Directives in MS can be identified e.g. use of economic instruments such as cost-effective producer responsibility schemes, product policies?**

- **Can any specific provisions in the Directives be identified that make cost-effective implementation more difficult?**

- **Have the Directives been kept fit for purpose through regular adaptation to technical and scientific progress?**

[92] BIOIS, Implementing EU waste legislation for green growth, 27 November 2011, http://ec.europa.eu/environment/waste/studies/pdf/study%2012%20FINAL%20REPORT.pdf.

a. The PPWD

Costs associated to the implementation of the Directive are initial setup costs[93], capital expenditure and ongoing costs for collection, recycling as well as set up costs of EPR programs. Some Member States introduced specific taxes, such as a packaging tax in DK and NL, landfill taxes in a great number of Member States, deposit and refund systems.[94]

All cost relevant measures mentioned are **attuned to increasing preparation for re-use, re-use and recycling rates**. Benefits from recycling are savings in raw materials and their extraction, savings in CO_2 emissions, diversion from landfill and savings on landfill infrastructure. Stakeholders agreed that the treatment of packaging waste up the waste hierarchy, predominantly through recycling, was on the whole economically **more advantageous than landfill of waste with its associated final loss of raw materials.** It should be born in mind that efficiency of fulfilling the obligations under the PPWD is linked to recycling and recovery infrastructure for which to function economically there needs to be an economy of scale. **Cost advantages through export of packaging waste outside the EU and therefore shortening the available amounts of recyclable waste in the EU can in some cases be an obstacle to an efficient implementation of the PPWD.**

A wide range of EPR schemes have been introduced across MS which cause different levels of cost for consumers and producers. Their cost-benefit is influenced by factors the Directive has no bearing on, such as the actual level of sophistication of collection infrastructure, the extent to which separate collection of packaging is actually carried out, supported by citizen's involvement, population density, geographic location, enforcement regimes and local labor costs.[95] Other European law has also an influence on cost efficiency. Pursuant to Art.11 WFD, as of 2015 all **Member States have to have separate collection schemes in place for paper and board, glass, metal and plastic**. This can be expected to have a positive influence on the total amount of waste collected for recycling as well as on the actual higher yield of separately collected waste in the EU.

There is still potential to extend EPR to full cost coverage for collection and disposal on **non - recyclable material, which is presently not done**. This would create a strong incentive for prevention and design for recycling and therefore increase recycling efficiency.[96]

The Commission is currently carrying out a study on EPR to further explore how EPR could be strengthened in existing legislation particularly with a view to cost efficiency. EPR schemes differ greatly in efficiency. High costs do not necessarily correlate to efficient packaging recycling.

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93 EIMPack (2011) Economic Impact of the Packaging and Packaging Waste Directive – literature review, European Investment Bank, Universidad de Lisboa.

94 For the effectiveness of packaging taxes see: *Report on the implementation of the packaging and packaging waste directive 94/62/EC* (IEEP and Ecologic, 2009).

95 Remote and sparsely populated regions will generally be more difficult and expensive to collect from. For cost efficiency of collection systems, see: EIMPack (2012) *Economic Impact of the Packaging and Packaging Waste Directive. The Economics of the Recycling of Packaging Waste: The Case of the UK*, study commissioned by the European Investment Bank.

96 More in-depth analysis of cost-recovery and transparency of EPR schemes can be found in chapters 4.2 "Cost coverage and true cost principle" and 4.4 "Transparency and control" in the parallel study "Development of Guidance on Extended Producer Responsibility (EPR)".

Cost effectiveness of the Directive depends again to a great extent on how the Directive is implemented in different Member States.[97] E.g. **"pay as you throw" schemes**[98] turned out to be highly effective for increased separate waste collection, but they are initially costly to implement. Member States are free to decide which measures to apply. A Directive is only binding in as far as it defines objectives and targets. In practice, however, "pay as you throw" schemes are a strong incentive for separate collection at the source and minimization of waste for final disposal. Properly applied, **they save landfill capacity** and therefore avoid unnecessary investment into end of pipe infrastructure.[99]

Costs of collection and recycling vary greatly between Member States**,** explained by the wide range of collection options (different vehicles, collection frequency, recycling containers etc.) and material processing. A crucial factor in that context is the **optimizing of collection systems and sorting** of collected waste. Some Member States are more advanced than others and have higher yields at lower costs, depending on the technology used but also on **citizen's awareness**.

Table 3: Costs of collection and recycling of household packaging waste in the UK (EUR, values based on the currency conversion in 2008: GBP 1 = EUR 1.05)

Collection system	Collection only cost of recycling		Net cost of recycling (including sorting and recycling/processing)	
	Urban	Rural	Urban	Rural
Kerbside sort	83.31 – 137.90	89.22 – 162.18	26.10 – 78.04	32.05 – 102.45
Single stream co-mingled	64.63 – 84.39	71.40 – 136.55	96.97 -108.64	103.74 – 160.81

An increasingly important factor for cost efficiency, not influenced by the Directive, will be the development of **prices for virgin raw materials in comparison to costs of producing recycled raw materials of a similar quality.** Recycled secondary raw materials were in a recent study found to be between 16% and 61% cheaper than virgin materials.

Table 4: Comparison of market prices of virgin and recycled material (2011 prices)[100]

Material	Virgin material (€/tonne)	Recycled material (€/tonne)	Price Recycled material / Virgin material (%)
Glass	52 – 59	12,5 – 34	24% - 58%
Paper-cardboard	717 – 776	115 – 136	16% - 18%
Aluminium	1 719 – 1 774	650 – 1 080	38% - 61%

97 For more information on the use of economic instruments, see: BIO Intelligence Service (2012) *Use of economic instruments and waste management performances,* http://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf.

98 Here to be understood as a system in which the waste producer (household) pays per Kg of the waste for final disposal combined with other factors linked to the use of disposal service.

99 See BIOIS(2012), Use of Economic Instruments and Waste management Performances – Final Report, http://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf, p. 86 - 89

100 BIOIS(2011) *Awareness and Exchange of Best Practices on the Implementation and Enforcement of the Essential Requirements for Packaging and Packaging Waste.*

Steel	394 – 630	160 – 180	41% - 29%
HDPE Plastic	990 – 1 200	245 – 280	25% - 23%
PET Plastic	1550 – 1 700	390 – 475	25% - 28%

This gap is expected to even widen in the future through costs savings by improved recycling technology on one hand and a further increase of raw materials prices on the other. By setting **recycling targets the Directive creates an incentive for Member States to increase revenues from separately collected materials.** The example of **BE shows that between 2005 and 2012 material revenues could steadily increase** while producer's green dot contributions could be considerably lowered.[101]

When considering efficiency, it should be born in mind that the PPWD is not only a waste management instrument, but also an instrument to ensure the smooth functioning of the internal market for packaging. By harmonizing packaging standards the free movement of packaging in the whole territory of the EU is safeguarded. In case of absence of such harmonization packaging industry would be confronted with individual Member State systems causing considerable costs and uncertainty seriously jeopardizing the free movement of goods.

Figure 5: Increased revenue from collected materials lowered the Green Dot tariffs in Belgium, 2012 (EUR million)[102]

Costs efficiency is also largely driven by other **external factors** such as price volatility of crude oil for plastic manufacturing, the predominant packaging material. Other factors are: technical innovation in sorting technology, the **application of green public procurement** to increase demand and also producer policy to green products by increasing recycling content.

Cost efficiency in recycling also differs by material and by a combination of material and process. Metal and glass recycling are relatively simple processes with a very long tradition of recycling. They undoubtedly have always been a profitable business while plastic recycling is a relatively new operation and dependent on critical separate collection due to the high contamination potential when plastic is collected co-mingled.[103] It is also more strongly

101 For a more detailed picture see Fig. 22 BIOIS study, p.68.

102 Fost Plus, annual report 2012.

103 The price of glass waste sold to the market was not provided due to confidentiality. As an approximation, the price of 14.57 EUR/tonne of glass sold in Liege (Belgium) was applied.

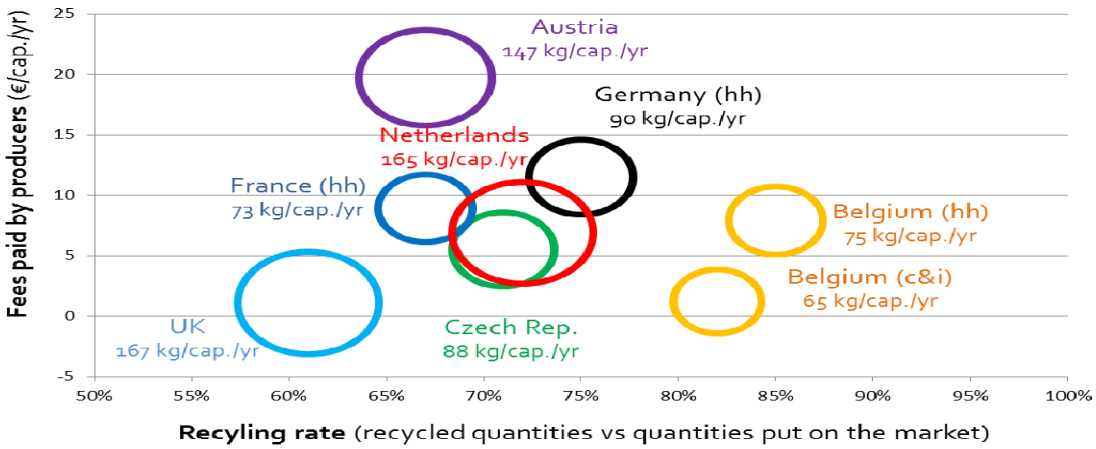
influenced by volatile raw materials prices. In so far **product design and separate collection are crucial success factors and strongly influencing cost efficiency**.

Efficiency of the PPWD depends largely on economic instruments. They are most present in EPR schemes in which ideally the revenue from the sale of materials and the contributions to the **EPR programme** should cover the costs of waste packaging collection and recycling. Their efficiency differs greatly between Member States.[104]

The data obtained for producer fee schemes show huge ranges of fees per tonne of packaging material placed on the market in the Member States. Fees charged for paper range from €8.37 in Romania to €175 in Germany; fees for glass range from €4.80 in France to €260.93 in Lithuania; fees for wood range from €0.40 in Finland to €80 in Poland; fees for aluminium range from €7.26 in Romania to €573.10 in the Netherlands; fees for steel range from €3 in Finland to €282.18 in Sweden; and fees for plastic range from €20.54 in Romania to €1,296 in Germany.

Attempts to link the fees paid into producer fee schemes with the packaging recovery/recycling performance in the Member States have not shown any conclusive patterns. Some 'cheap' schemes demonstrate high levels of recovery/recycling (notably Belgium and Luxembourg) and some 'expensive' schemes demonstrate low levels of recovery/recycling (notably Estonia and Poland)[105]

Figure 6: Cost effectiveness of EPR schemes on packaging (2010 or 2011) [106]



104 For an overview, see: BIO Intelligence Service (2012) Use of economic instruments and waste management performances; BIOIS (ongoing) Development of Guidance on Extended Producer Responsibility (EPR).

105 BIOIS (2012) Use of economic instruments and waste management performances, p. 6

106 BIOIS (ongoing) *Development of Guidance on Extended Producer Responsibility (EPR).*

Deposit and refund systems but also landfill taxes have a strong influence on efficiency of the PPWD. As a rule of thumb, **the higher the landfill tax/incineration tax, the higher the potential profit margin for packaging recycling**.[107]

Another important **cost efficiency driver could be the Directive's essential requirements**. This view is shared by a large number of stakeholders. Due to their **currently imprecise formulation and poor enforcement** they have failed to unfold their full potential of reduced costs and increased environmental benefits.[108]

Several **examples of good practice in Member States relate to separate waste collection**, **EPR schemes and high quality recycling.** Ireland established with success in 2004 a Marked Development Group to remove barriers for recycled plastic, paper and compost. The development of guidelines is under preparation. Available evidence shows that optimized separate waste collection systems have led to the highest overall recycling rates in Europe, with the caveat of statistical uncertainty.

Several industry representatives pointed out that the recycling of glass, paper and metals has been practiced for a very long time, because it is profitable. They suggest that even without the PPW Directive, these recycling activities would have continued. The same is observed for the Essential Requirement of waste minimisation. In this context, industry claims that even without the Essential Requirements, cost reduction motifs would lead to packaging minimisation. [109]

The most referred to provisions are thus the recycling targets, the Essential Requirements and the economic instruments (as translated into EPR schemes), particularly in relation to the administrative burden of proving what stakeholders consider would have been done anyway.

These remarks on provisions that raise doubts about cost-effectiveness are based on the assumption that without these provisions and its administrative burden, the markets would act in exactly the same way, reaching the same level of efficiency and environmental benefit, as with these provisions. This touches the economic theorem of the 'invisible hand' or the self-regulating potential of the free market, driven by cost reduction and competition.[110] Anecdotal evidence shows however that the self-regulating effect only occurs when real or perceived individual benefits can be achieved for the market players. Price fluctuations in crude oil, in paper, metals of plastics can significantly influence the attractiveness of recycling. For technically recyclable products where no market exists for the recycled materials (e.g. red coloured PET bottles) no incentive for recycling would exist. In addition, marketing strategies

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107 See for more details the study: EIMPack (2012). Economic Impact of the PPWD. The Economics of the Recycling of Packaging Waste: The Case of the Romania. Study commissioned by the European Investment Bank.

108 See in particular two studies on essential requirements: BIOIS(2011) Awareness and Exchange of Best Practices on the Implementation and Enforcement of the Essential Requirements for Packaging and Packaging Waste; Arcadis (2009) A Survey on compliance with the Essential Requirements in the Member States.

109 BIOIS (2011) *Awareness and Exchange of Best Practices on the Implementation and Enforcement of the Essential Requirements for Packaging and Packaging Waste*, http://ec.europa.eu/environment/waste/packaging/pdf/packaging_final_report.pdf.
Arcadis (2009) *A survey on compliance with the Essential Requirements in the Member States*, http://ec.europa.eu/environment/waste/packaging/pdf/report_essential_requirements.pdf.

110 Smith Adam (1759), *The Theory of Moral Sentiments*.

and the perceived as well as the imposed consumer demands could prove to be stronger than the need for packaging limitation at the minimum level of consumer acceptance.

The lack of harmonisation of policy instruments throughout the European Union and the freedom of Member States to implement diverging economic instruments may jeopardise cost efficiency. The following key problems were identified:

- Cherry-picking as to in which Member State a product is put on the market, e.g. related to unequal enforcement of the Essential Requirements;
- Statistical and target compliance problems in case of small domestic markets and large cross border shopping of inhabitants;
- Diverting statistical methods to prove compliance with recycling targets which could lead to competitive advantages.

When provisions in the PPW Directive lead to adding administrative burden to both authorities and industry for measures that would equally be taken without legal obligation, these provisions can be considered obsolete or hindering cost-effective implementation. It is however challenging to identify these measures for which cost reduction, competition and other market dynamics would, on a continuous basis and without quality loss, succeed in reaching the same results as through imposing legal targets and obligations.

It is easier to pinpoint shortcomings in the legal framework that distort the level playing field or the functioning of the internal market rather than to identify superfluous provisions. The PPW Directive differs in a substantial way from other recycling directives in its 'new approach' structure which identifies targets **but which does not focus on policy instruments to be applied**. This is especially the case for EPR and other economic instruments.

Efficiency in a nutshell

The **efficiency of the PPWD Directive with its recovery and recycling targets** depends to a great deal on factors outside the Directive itself. **It plays a paramount role whether low end disposal options are made expensive**. Recycling is more economically advantageous than lower end waste management options. Since the Directive has stimulated increased packaging recycling, it has worked towards a cost efficient waste management solution. Where low end disposal options are made cheap, e.g., through low landfill gate fees or none at all, or where financial incentives are given for incineration classified as renewable energy source, recycling will be less economically viable.

Where gate fees are high, and EPR schemes provide for waste being separately collected and where recycling yields high quality secondary raw materials such as metal, glass, paper and plastic, the **Directive makes packaging waste management a cost efficient operation**. Conversely, in Member States where these conditions are not met, an economic opportunity is lost. Economic instruments such as EPR schemes which are good practice, PAYT schemes and landfill taxes provide a strong economic incentive to divert packaging waste towards recycling, thus increasing the Directive's cost efficiency. The same accounts to high end separate waste collection which achieves higher recycling yields and helps make the Directive to generate cost benefits.

EPR schemes differ greatly across Europe in terms of efficiency, but they are an essential tool to increase packaging recycling and to make it a cost efficient operation. Their cost efficient functioning is a crucial element of packaging recycling, and hence for the attainment of the Directive's objectives.

Another crucial **element with a high potential for improvement are the essential requirements**, in which design for recycling could be more clearly incorporated and enforced, thus increasing recyclability of packaging and **reducing costs while achieving higher yields of secondary raw materials**. New technologies, such as plastic multi-layer packaging, while producing less packaging by weight, jeopardise recycling. Another risk for efficient packaging recycling stems from the use of biodegradable packaging and oxo-degradable packaging, which may both put efficient mechanical recycling at risk.

b. The ELV Directive

The automobile industry recognizes that the Directive has clearly environmental benefits through standards set for depollution, dismantling and treatment as well as the reductions of hazardous substances.[111] Also the economic benefits are recognized. Although the requirements to be met by the Directive have caused high initial costs and required significant investments from car manufacturers (removal of hazardous substances, eco-design) this is compensated through the **recycling of high value materials**.[112]

Economic benefits result from:[113]

- Incentives for innovation in vehicle design and ELV treatment,
- Standardized rules of ELV treatment in an internal market,
- The reduction of abandonment of vehicles and hence the cost to the public sector of having to collect, store and organize disposal. In 2001, the number of abandoned vehicles in the UK was 223 500. In 2008, this figure was 48 500,[114]
- The reduction of waste disposal costs (associated with avoided landfilling of Car Shredder Residue, the remainder of ELV material). [115]

In 2006, the UK Regulatory Impact Assessment estimated that the Directive would yield annualized benefits valued at GBP 21 million (EUR 30 million) between 2007 and 2025.[116]

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111 GHK and BIOIS(2006) *A study to examine the benefits of the End of Life Vehicles Directive and the costs and benefits of a revision of the 2015 targets for recycling, reuse and recovery under the ELV Directive*, DG ENV, http://ec.europa.eu/environment/waste/pdf/study/final_report.pdf.

112 See further to economic benefits of ELV treatment tin a circular economy: Remanufacture, refurbishment, reuse and recycling of vehicles: Trends and opportunities Prepared with support from The Scottish Government, Final Report June 2013, Reference No J2432/OPT/001/12.

113 For a complete thorough cost-benefit analysis of the ELV Directive see: GHK and BIOIS (2006) *A study to examine the benefits of the End of Life Vehicles Directive and the costs and benefits of a revision of the 2015 targets for recycling, reuse and recovery under the ELV Directive*, DG ENV, http://ec.europa.eu/environment/waste/pdf/study/final_report.pdf.

114 UK Defra (2008) Reported numbers of abandoned vehicles, archive on data.gov.uk: http://archive.defra.gov.uk/evidence/statistics/environment/waste/wrabanvehicles.htm.

115 GHK and BIOIS (2006) *A study to examine the benefits of the End of Life Vehicles Directive and the costs and benefits of a revision of the 2015 targets for recycling, reuse and recovery under the ELV Directive*, DG ENV, http://ec.europa.eu/environment/waste/pdf/study/final_report.pdf.

The need to achieve the 2015 re-use and recovery and re-use and recycling target[117] will, according to industry stakeholder, open new opportunities for investment into environmental technology and increased efficiency of the Directive. However, it will require significant **investment into post shredder technology.**[118] This should, in turn, reduce the amount of waste to be landfilled, thus reducing landfill costs. As a result of improved economies of scale, the **technology is expected to be cost efficient.**

Despite high targets, cost efficiency has been achieved, but concern has been raised that a possible increase of the targets could eventually put the current cost benefit balance at risk.[119]

Risk for cost-effectiveness of the Directive has been seen mostly in **external factors**, such as the market for spare parts and metal. Any volatility of these external factors may make ELV treatment less profitable. Cost efficiency can furthermore be heavily affected by the size of the country. ELV recyclers do not achieve economies of scale in small countries and would find it difficult to invest in heavy post shredder technology themselves. For example, in small countries like Malta, a more cost efficient option (making use of the single market in which waste for recovery can be traded as a commodity), could be to ship ELV waste for recovery to other Member States where the conditions allow for an economy of scale.

Other risks for the fragile cost-benefit balance stem from a high variability of various country interpretations and implementation of the Directive, which creates uncertainty for the industry.[120] Critics of the Directive also mention the reporting burdens for Member States. Reporting to the Commission every three years gives too little flexibility. Data useful at an earlier stage may be irrelevant after three years. In addition, with these reports, the Commission is not only relying on the trustworthiness of Member States but also on the facilities that provide the facts and figures. If these facilities do not communicate information on time, the Commission cannot assess the Directive and make the necessary adjustments.[121] Such shortcomings may, however, be unavoidable.

Fulfilling Annex II[122] requirements as well as reporting obligations was **identified as burdensome and cost generating** by some stakeholders. Annex II has been reviewed 6 times since the Directive was adopted which has inevitably led to certain costs of adaptation. On the other hand, the **Directive has been kept up to date thanks to regular review of the technical Annex II adapting the Directive to material exemptions for Lead, Cadmium,**

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116 GHK and BIOIS (2006) *A study to examine the benefits of the End of Life Vehicles Directive and the costs and benefits of a revision of the 2015 targets for recycling, reuse and recovery under the ELV Directive*, DG ENV, http://ec.europa.eu/environment/waste/pdf/study/final_report.pdf.

117 Art. 7, 2b Dir. 200/53/EC.

118 BIOIS(2014) ex-post evaluation of certain waste stream Directives, p. 122.

119 EAA (European Aluminium Association); see for costs through increased plastic recycling: Coates et al. (2007), Assessing the economics of pre-fragmentation material recovery within the UK.; and for glass recycling: OVAM (2013), Technical and economic assessment of recycling routes for automotive glass; see further for unproven benefits through higher targets: ADEME (2003) *Economic study of the management of ELV*.

120 See the proactive approach by paying premiums to dismantlers taken in the NL: EPR case study on ELVs in the Netherlands. In most Member States due to the positive residual value of ELVs, no fees need to be paid by producers, leaving the economic risk of dismantling solely with dismantlers.

121 Konz, R.J. (2008) *The End-of-life Vehicle (ELV): The road to Responsible Disposal*, Minnesota Journal of International law (Vol.18), available at: www.law.umn.edu/uploads/BX/fw/BXfwZTM0VoxN2BtOQ7E2Vg/Konz-Final-Online-PDF-03.30.09.pdf.

122 Material exemptions for lead, cadmium, mercury, chromeVI.

Mercury and ChromeVI.[123]

France has called for an agreement on a common methodology at the EU level on how to calculate the performance of Post-shredder technologies as they greatly influence the achievement of the targets.

Efficiency in a nutshell

The ELV Directive is an efficient tool providing multiple environmental benefits at costs that are clearly outweighed by the Directive's environmental and economic benefits.

Costs for car industry for complying with the Directive were significant for removing hazardous substances from vehicles and for recyclers developing the technology necessary to meet the ambitious recycling targets. In parallel the **need for recyclability stimulated R&D to enable achievement of high recycling rates**. **Car manufacturers acknowledge that the Directive contributed to making car manufacturing in the EU (and even beyond) a more efficient, innovative and more sustainable industry.**

Good practice varies from one country to another depending on the context. Good practice applied in a number of countries (Germany, Spain, Finland, Italy, the Netherlands, Poland, Portugal, Slovakia and the UK) is the payment of premiums for bringing back an ELV to increase the amount of ELV collected.

Strict environmental legislation such as landfill bans and landfill taxes are essential elements for an efficient ELV Directive.

ELV **recycling now concentrates on increasing the recycling efficiency for non-ferrous ELV parts, such as plastic**. **New post shredder technology** was developed to recycle also higher quantities of the non-ferrous shredder light fraction.

A further innovative technological boost can be expected through the increased use of advanced non-ferrous materials which at present are difficult to recycle.

Claims about less cost-effective provisions have been made in relation to the frequency of revisions of Annex II and as regards Member States implementation reports. Administrative burdens are experienced by manufacturers who have to prove frequently that no alternatives exist to the remaining hazardous substances used in vehicles, and by Member States who are required by the Directive to report from April to April, instead on a calendar year basis.

c. The Batteries Directive

The Directive is seen by stakeholders as an efficient tool to protect the environment at reasonable costs.

Depending on the individual battery chemistry, recycling is profitable as long as metal prices are high. When battery chemistry is not based on metals, recycling is not likely to be

[123] *For an analysis made by Öko-Institut to improve Annex II, see:* Öko-Institut (2010) *ELV Directive Annex II: analysis of costs and environmental benefits of heavy metal ban, and proposal for better regulation*, www.acea.be/images/uploads/files/%C3%96ko_Institut.pdf.

profitable.

Profitability and therefore cost efficiency depends more than in other Directives much on external factors**.** Country size and number of batteries placed on the market (economy of scale), structure of the **collection scheme and consumer awareness strongly influence efficiency** and are outside the control of the Directive. **EPR schemes** vary widely in terms of cost efficiency and effectiveness between Member States including EEA.[124]

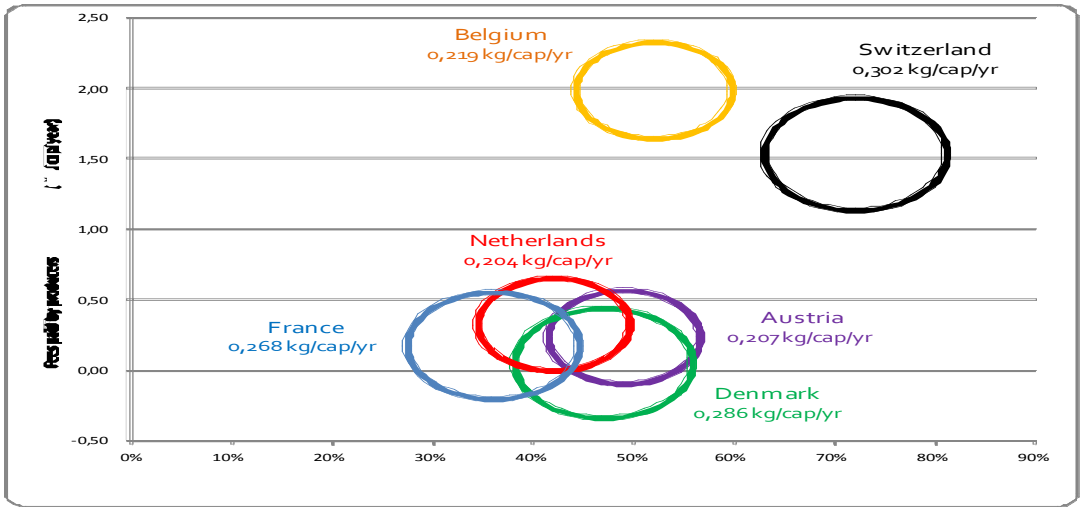


Figure 7: Cost effectiveness of EPR schemes on batteries (2010 or 2011)

Implementation impacts greatly on costs. During the consultation no relevant provisions in the Directive could be identified that make cost effective implementation difficult. One question outside the control of the Directive concerns **competing collections schemes**. Stakeholders indicated that such competition could **lower the costs** but also incentivize a **"cherry picking" behavior** by concentrating collection on profitable batteries automotive and industrial batteries and **leaving less profitable ones such as e.g. alkaline manganese, zinc carbon and non-cobalt lithium batteries** aside.[125] In the case of the last mentioned portable batteries the value of recovered materials does not cover the costs of collection, sorting, transportation and recycling. These are covered by producers through collection scheme fees and transferred to consumers through increased prices. Lower costs through competing collection schemes are not necessarily more cost effective, if they impact on environmental protection and lead to a race to the bottom when it comes to choosing disposal and recovery options[126].

Efficiency in a nutshell

[124] For costs of portable batteries collection schemes see table 26, BIOIS(2014) ex-post evaluation of certain waste stream Directives,

[125] BIOIS(2014), ex-post evaluation of certain waste stream Directives, p. 176.

[126] recycling of zinc primary and lithium rechargeable batteries with low added value electrode materials such as manganese dioxide or iron phosphate is unprofitable at current prices. Recovered value for Li-ion batteries based on MnO2 is just EUR 200 per tonne, see : BIOIS(2014), ex-post evaluation of certain waste stream Directives, p. 184.

The environmental benefits of the Directive outweigh the costs of its implementation. This accounts for substance labelling and the restriction on heavy metals. Spending on public awareness through collection and compliance schemes is a cost, but it considerably increases efficiency in collection.

Collection costs differ greatly across Member States and collection of some battery types is more cost efficient than of other. This could pose a future threat to the cost efficient operation of NiCd recycling plants. Double charging for WEEE collection and batteries incorporated in WEEE creates unnecessary costs for producers and consumers. Recycling costs depend on battery type and not all recycling can be profitable, in particular in case of portable batteries. Portable battery recycling remains an ongoing challenge for economic reasons

Waste battery collection **mechanisms vary greatly across Member States, however competitive collection schemes seem to result in lower costs.** Fees and penalties are used as a financial incentive for battery producers to collect batteries, but their success is yet to be fully established. Setting of minimum requirements on frequency and spending for consumer awareness leads to better awareness.

The Batteries Directive has been kept fit for purpose through regularly updated amendments since it came into force in 2006.

d. The Directive on PCB/PCT

PCBs are highly toxic and mutagenic. Exposure of humans and animals to PCB in the past has resulted in health problems and fatalities. Therefore in this context, the safe disposal of PCB wastes also has economic benefits through avoided health care and environmental clean-up costs.

Costs for PCB disposal are relatively high, but compared to the long term health hazards PCB disposal addresses, they may be considered relatively low, but in any case unavoidable. PCB is hazardous waste and is usually destroyed under high temperature in hazardous waste installations. It is virtually impossible to differentiate and attribute the investment costs relative to PCB disposal only as such installations deal with a range of chemicals. PCB disposal doesn't make hazardous waste disposal infrastructure more costly. Proper elimination of PCB inevitably causes very high costs, with figures ranging from 50-1500 €/ton depending on factors such as concentration and source[127]. Other but minor cost factors are government costs for reporting and establishing an inventory and keeping it up to date. Finally there are inspection costs, which are generally high because they are personnel intensive.

The Directive itself has no influence on these cost factors, as they solely depend on the implementation of the Directive under the responsibility of the Member States. Once the decision of destruction is taken on Member State level the follow up costs are rather uniform.

Since there is also no reasonable alternative to PCB destruction, there is no room for balancing costs and benefits.

No provisions in the Directive have been identified that can be held responsible for

[127] Figures compiled by BIOIS: 1) Liquid PCB from few ppm to pure PCB: 50-500 EUR/tonne, 2) Capacitors: depending of the size: 500-1 300 EUR/tonne, 3) Transformers: depending on material type: 600-1 500 EUR/tonne, Table 29, p. 346. See further BIOIS study Table 18, p.225.

unnecessarily augmenting costs.

Efficiency in a nutshell

The PCB Directive causes high operative costs, but it is still **efficient, since these costs are outweighed by the environmental and health benefits from elimination of PCBs.** Elimination costs are relatively high by nature and no other more cost efficient way of elimination than the one described by the Directive could be identified. **No provisions could be found that make cost efficient implementation more difficult.**

Good practices can be seen in subsidies for decontamination of transformers, adequate training and major enforcement actions, which have taken place in a number of Member States such as the Netherlands and Sweden, where owners of the equipment rather than the government are responsible for disposing of PCBs as required by the Directive.

Costs are higher in Member States where there are no appropriate incineration facilities.

Given the Directive's purpose to implement the ban on / restriction of the use of PCBs, no relevant adaptation of the Directive related to technical and scientific progress has occurred

e. The Sewage Sludge Directive

The Directive dating from 1986 may at the time of its adoption have been a cost effective instrument because it provided for simple rules to define minimum requirements for the land spreading of sludge. This was in the first instance the cheapest possible way to get rid of sewage sludge and already only for that reason cost effective. The objective back then, and still valid today, was to ensure a proper recovery of nutrients and organic matter contained in sewage sludge, while minimizing potential negative drawbacks due to contaminants and pathogens.

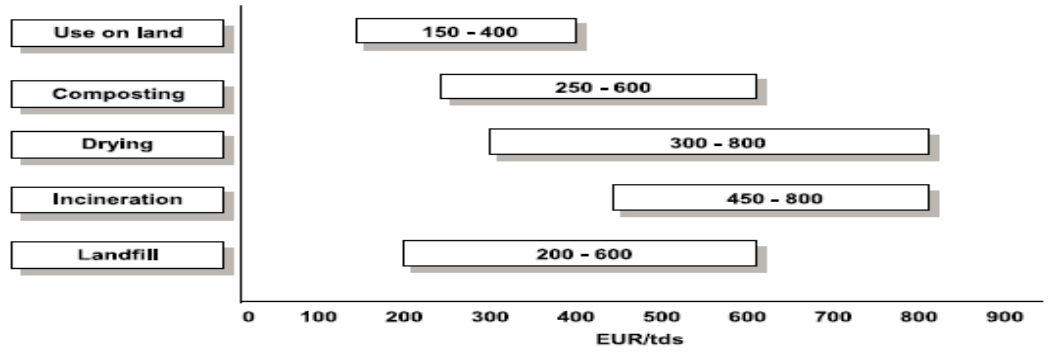


Figure 8: Sludge treatment and disposal costs (EUR/tDS (tonnes of dry solid))[128]

Despite the burdens of regularly testing the level of contaminants in sludge and soil, such testing is still considered by many Member States and stakeholders as the most cost effective solution of handling sewage sludge from urban waste water treatment. In the meantime, all Member States have adopted legislation on land spreading of sewage sludge with

[128] WRc, Hall Jeremy, Ecological and economical balance for sludge management options.

precautionary levels for sludge and/or soil stricter than the Directive required. The main costs related to the application of sludge on agricultural land stem from the treatment of sludge (by wastewater facilities) in order to meet the sludge quality standards set by the Directive.[129] Cost savings result from the substitution of commercial fertilizers by sewage sludge. [130]

Finally, estimates indicate that 45% of the EU-15 total of 9 Mt (dry matter) of sewage sludge is used in agriculture. If this route were lost, to be replaced by incineration, the cost would be of the order of EUR 650 million per year. [131]

The ex-post evaluation study highlighted that in future even stricter standards, such as pathogen removal, not even foreseen in the Directive, would need to be applied and that this may inevitably increase the costs for the agricultural outlet so that water utility companies might reassess the financial viability of land spreading[132].

Efficiency in a nutshell

Where Member States apply sewage sludge in agriculture, they have set their own even higher precautionary levels of sludge contaminants such as heavy metals. In these cases costs are obviously seen as outweighed by economic benefits, compensating for saving chemical fertiliser and disposal costs.

There are no specific provisions in the Directive that make cost-effective implementation more difficult,

Main cost factors are sludge conditioning costs differing between Member States' own standards.

The attempted review of the Sewage Sludge Directive in 2010 revealed many uncertainties and inconclusive results and so far no major revisions or amendments have been proposed.

6.3 RELEVANCE

The available evidence clearly shows that all five Directives screened are important elements of European waste policy. They are the operational instruments to give effect to the broader environmental policy objectives as laid down in Art. 191TFEU. They are the crucial elements to achieving sustainable resource use through a circular economy approach and key tools for the protection of human health and the environment. Moreover, three of them, the ELV, Packaging and Batteries Directive also are instrumental to achieving the objectives of the **7th EAP**, the resource efficiency roadmap and the raw materials initiative as adopted by the European Commission and endorsed by the Member States. The Raw Materials Initiative is one of the most important priorities to be pursued in short term and mid-term. The ELV, Batteries and Packaging Directive will be of particular relevance to attain the objectives of this initiative. Most of them have an important role to play for the functioning of the internal market, particularly evident in the case of ELV, Batteries and Packaging Directive. All

129 For more details see: BIOIS(2014), ex-post evaluation of certain waste stream Directives, p. 241.

130 As to costs savings by using sludge instead of commercial fertilizer, see detailed references in: BIOIS(2014), ex-post evaluation of certain waste stream Directives, p. 244 seq.

131 Milieu (2010) *Environmental, economic and social impacts of the use of sewage sludge on land,* http://ec.europa.eu/environment/waste/sludge/pdf/part_iii_report.pdf.

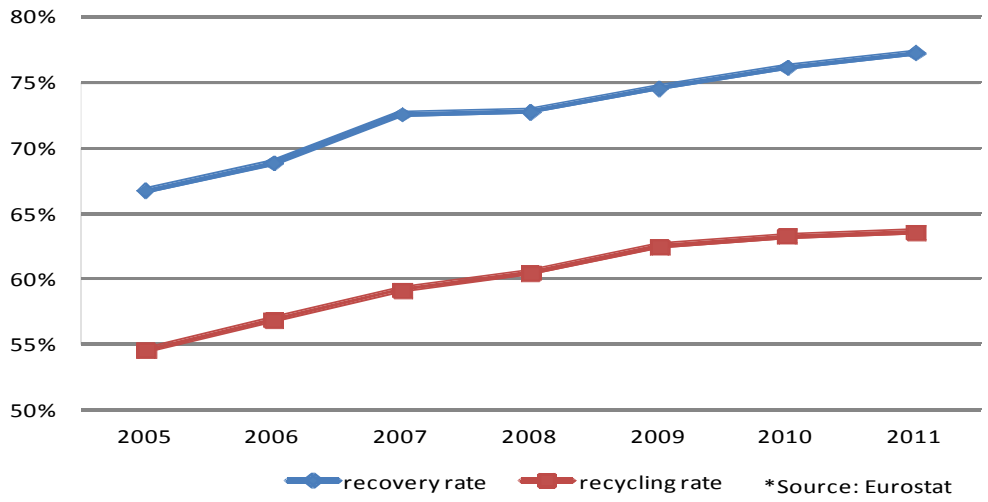
132 WRc, Hall Jeremy (2012) *Ecological and economical balance for sludge management options*.

Directives responded from the beginning to a need for more and better recyclability, higher rates of collection and recycling and recovery in general, and also to decreasing use of hazardous substances. In that sense they were already at the time of their adoption systemic elements of a circular economy concept.

- **Do the issues addressed by the Directives still match current needs and do they continue to require action at EU level?**
- **Are factors influencing end-of-life impacts (such as eco-design) sufficiently integrated into the Directives?**
- **Are the EU waste stream Directives consistent with Community policies on resource efficiency and raw materials and do they cover all relevant waste streams or are there gaps in the present EU waste legislation?**
- **Are there any gaps where further EU waste legislation is required to achieve the objectives set out in the Resource Efficiency Roadmap?**

a. The Packaging Waste Directive

The PPWD addressed a total quantity of generated packaging waste of 80.2 Mt in 2011[133]. The trend from 2005 to 2011 was a relative stability with paper and wood slightly rising. In the same time period overall recycling and recovery of packaging across all materials increased from 54,6% to 63% for recycling and from 66,8% to 77,3% for recovery. The ultimate goal of saving scarce natural resources requires finally a decoupling of economic growth and waste production. The PPWD has certainly contributed towards achieving this objective. Redesigning packaging to use less resources and increasing recycling and other recovery have led to a significant reduction of packaging disposal while more packaging was put on the market.



[133] BIOIS(2014), ex-post evaluation of certain waste stream Directives, p.48.

Figure 9: Recycling and recycling rates of packaging material EU-27 2005-2011 (% of waste generation)[134]

Therefore the **PPWD has continuing relevance in a still increasing packaging market** to break the link between an increasing GDP and growing packaging waste quantities.

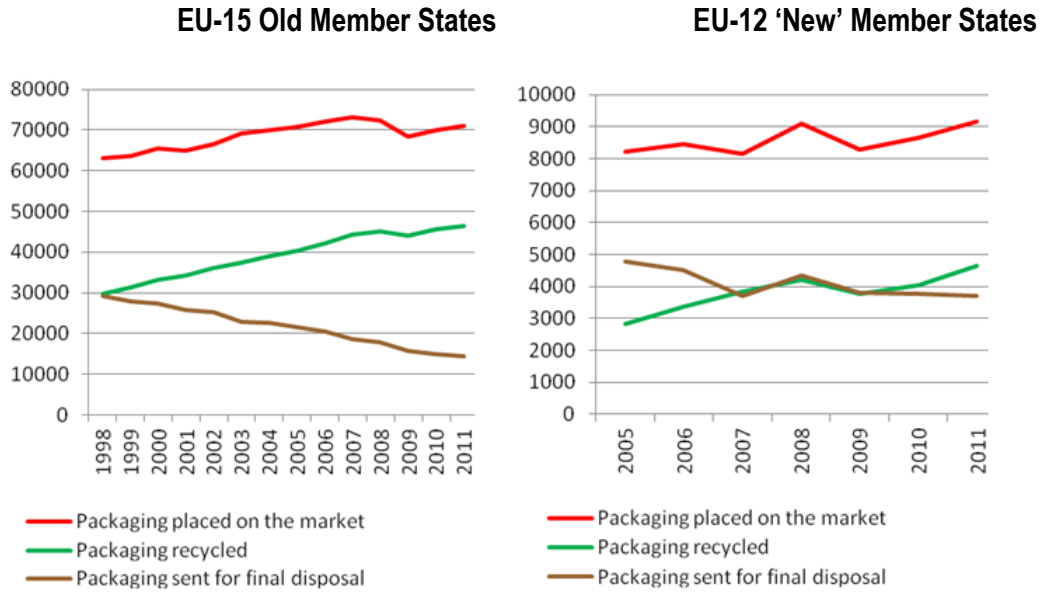


Figure 10: Source: EUROPEN 2014

There is evidence that, **particularly as a result of inadequate separate collection, the quality of material collected for recycling often still leaves to be desired.** A significant share of recycling is achieved today through clean and homogenous ICI packaging waste and further increase of recycling rates would require **increased recycling of mixed household packaging waste, consisting of small and often contaminated items**.[135] So far legislation has only looked **into quantitative aspects of recycling. There may be reasons to further consider qualitative aspects**, in order to avoid that increased recycling rates will be fulfilled by increased "downcycling" of contaminated small scale mixed household packaging waste.[136] This is particularly evident in the case of **plastic packaging recycling**. In future recycling markets are expected to constantly grow.[137] This will require sufficient input material. **Optimizing separate collection is therefore of key importance**. Furthermore, some new packaging materials, such as multi-layer packaging, can be more difficult to recycle

134 Eurostat (2013), Packaging waste statistics, (env_waspac), http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_waspac&lang=en.

135 EIMPack (2011) *Economic Impact of the Packaging and Packaging Waste Directive – literature review*, http://eimpack.ist.utl.pt/docs/Literature%20Review_final.pdf.

136 In this sense (BIOIS) 2014, ex-post evaluation of certain waste stream Directives, p.95.

137 Eunomia (ongoing) *Targets review project: Appendix 1 – consultation on the review of European waste management targets*, http://www.wastetargetsreview.eu/shopimages/Targets_Review_Project_Summary_Consultation_Results.pdf.

and pose new challenges to recyclability. In relation to continuing relevance stakeholders shared the view that more **consideration should be given to recyclability**, to separate collection covering all households and better sorting technology.

Stakeholders agreed that continued action on EU level is required. The Directive`s **essential requirements would be the place where rules could be set for packaging design**, for instance, to provide for **single polymers or a limited number of compatible polymers** in plastic packaging to significantly increase plastic recyclability and decrease incineration of plastic. Also, further attention may need to be paid to the use of hazardous substances in packaging[138] while taking account of existing EU legislation. Further strengthening of recycling targets together with stricter requirements for separate collection and **packaging design can only be incentivized across all Member States by regulation on EU level.**

The potential role the Directive can play in stepping up action to **combat littering should also be examined, especially as regards plastic packaging.** Plastic packaging is among the most prominent items responsible for plastic marine pollution.[139] Through its focus on prevention, recycling, and other recovery of plastic packaging waste the Directive could be an important driver for marine pollution prevention.[140]

Essential Requirements are the specific tool in the PPWD to address **design for recycling**. They have however been criticized as **vague and difficult to enforce as well as being badly enforced in practice.** Moreover, they may also require some trade-offs to be made. For instance, while packaging shall be manufactured that the packaging volume and weight be limited to a minimum, packaging shall also be designed in such a way as to permit its recycling. Light weight can often only be achieved through multi-layer technology and such complex material is difficult to recycle, Moreover, the Essential Requirements put recycling and other recovery on equal footing. This is not satisfactory since the waste hierarchy gives clear preference for recycling. Since design for recycling is a key factor for waste prevention further steps could be taken towards the improvement of this instrument. EUROPEN believes that essential requirements should stay as they are, but they should be better enforced. Stakeholder views on the role of the PPWD in eco design were split, ranging from an approach of leaving it to packaging industry to gradually improve design (EUROPEN) to a strictly regulatory approach (OVAM).

Standards defined for biodegradability of packaging have not been very helpful and have caused much confusion by not sufficiently clearly differentiating between biodegradability and compostability, as demonstrated by the requirements for biodegradable packaging in Annex II, 3d of the Directive.

Packaging is included in the parameters identified by the Ecodesign Directive[141] but the Directive focuses on energy-related appliances (except vehicles) and other energy-using

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138 As proposed by the European Parliament as part of the amendments it adopted to the Commission proposal on plastic carrier bags (COM/2013/0761 final) in April 2014.

139 European Commission (2013) *Integration of results from three Marine Litter Studies*, http://ec.europa.eu/environment/marine/pdf/Integration%20of%20results%20from%20three%20Marine%20Litter%20Studies.pdf.

140 IEEP (2013) *How to improve EU legislation to tackle marine litter*, www.seas-at-risk.org/news_n2.php?page=625.

141 Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32009L0125:EN:NOT.

products (e.g. insulation). The promotion of eco-design in the WFD as an example of prevention measures is vague. The PPWD could contribute more to resource efficiency if the essential requirements were formulated more precisely and coherently with the waste hierarchy.

The Directive is largely **consistent with EU policies on resource efficiency and raw materials.** It does, however, not give strong enough priority to recycling over energy recovery and therefore there is room for increasing consistency. The Resource Efficiency Roadmap requires waste to be treated as a resource and calls for an absolute decline of waste generated per capita by 2020 and for transforming **waste recycling to an economically more attractive option**.[142] The PPW Directive responds to these requirements by setting **targets per material** and **promoting the decoupling of economic growth and packaging generation**.[143] A **relative decoupling (only)** has been achieved between packaging market growth and waste production while waste arisings remained rather constant. **This was possible through a relatively strong increase in recycling and recovery**, a view that the packaging industry fully shared during the consultation. Although this can be concluded from statistical evidence, **some caution should be applied as to what has really been recycled**. Figures may be misleading to some extent since the statistics count already as recycled what has been **collected for recycling** as already mentioned under "effectiveness". According to stakeholders from German public waste utilities only part of what was collected for recycling in the context of the green dot system is actually recycled. Despite the progress made to respond to the need to resources scarcity, the Directive could be considerably improved through more clearly formulating the Essential Requirements and more clearly integrating ecodesign principles, in order to provide adequate incentives to address resource efficiency during the design phase as well as on other stages of the life cycle of products.[144] It must also be born in mind that too strong a focus on recycling risks undermining prevention and reuse, which are even more important from a resource efficiency perspective.

To achieve better resource use, stakeholders highlighted in particular the **need for more investment into infrastructure for separate collection, sorting and treatment as well as full enforcement of legislation**. This should be accompanied by **measures to increase recyclability**, to be achieved through better packaging design using the Directive's essential requirements.

Stakeholders also pointed to a potential **trade-off** between resource efficiency and technological development creating **light weight packaging**. Such packaging uses less material but it makes recycling more difficult. This trade off should also be balanced by improved design which could be achieved through further European regulation.

Relevance in a nutshell

The PPW Directive has remained largely relevant over time and the issues it addresses continue to justify action at EU level: it contributes to the functioning of the internal market and to the achievement of environmental objectives by promoting preventive measures, reuse

142 EUROPEN (2013) *Packaging Waste Management is Increasingly Resource Efficient - EU Data Shows*, www.europen.be/download_protected_file.php?file=231.

143 European Commission (2010) *Commission Staff Working Document accompanying the Communication from the Commission on the Thematic Strategy on the Prevention and Recycling of Waste*, http://ec.europa.eu/environment/waste/pdf/Commission%20Working%20Doc.pdf.

144 BIOIS(2011) *Study on coherence of waste legislation*, http://ec.europa.eu/environment/waste/studies/pdf/Coherence_waste_legislation.pdf.

systems and recycling and recovery. Member States achieve higher recycling and recovery rates and thus recovery has to deal with increasingly less suitable waste fractions.

Implementation of the PPW Directive would benefit from improved separate collection and a higher **quality of recycled materials**, as the market of recycled materials is growing, quality standards may be needed in order to avoid contamination and downcycling.

Overall, factors that influence the end of life impacts are not integrated sufficiently in the PPW Directive. Ecodesign principles are only defined in a broad and general way through Essential Requirements and they are difficult to implement and to enforce. **Consideration may be given to strengthen ecodesign requirements through more concrete Essential Requirements.**

The recycling, prevention and reuse of packaging and/or packaging waste have **led to significant savings or natural resources through the relative decoupling that has been achieved.** Thus it has contributed to the objectives of the Resource Efficiency Roadmap and Raw Materials Initiative by promoting the decoupling of economic growth and packaging waste generation. **Yet, material savings have also created obstacles for recycling through the design of certain types of multi-layer packaging**. A more direct uptake of life-cycle principles in the PPW Directive may allow a more complete exploitation of the potential for resource efficiency.

However, certain issues exist that may indicate gaps in the current legislative framework. The decoupling of the generation of packaging waste from economic growth is only relative and the **re-use of household packaging is decreasing.** In addition, an approach to the prevention of packaging waste entirely based on weight may lead to a focus on producing light-weight packaging. Such a purely weight-based approach could create a disadvantage for packaging materials that are heavier but not necessarily less environmentally-friendly. Similarly, light-weighting can affect the lifespan or cause spillages of packaged goods and especially food products, leading to a loss of resources.

b. The ELV Directive

There is a clear need for continued action on end-of-life vehicles (ELVs) in the EU. The EEA estimated the number of ELVs arising in the EU-25 to be about 14 million in 2010, compared to 12.7 million in 2005[145] which need to be managed appropriately.

The ELV Directive responds to this need and the high number of ELVs put on the EU market every year demonstrates a continuous need to recycle and to improve recycling efficiency. In addition, **the pending issues of missing ELVs, still requires action at EU level**. There is

[145] ETC/RWM (2008) quoted in the European Parliament study (2010) *End-of-life Vehicles: Legal aspects, National practices and recommendations for future successful approach*.

also a potential to increase the impact of the Directive by widening its scope to all motor vehicles. Given the benefits of the Directives and the progress made by the industry, the ELV Directive seems to be the right instrument to ensure ELV waste is treated appropriately.

Where Government **intervention was directed more towards enforcement and audits**, as done in the UK, Portugal, Sweden or France, progress was made towards identifying and eradicating illegal treatment operation and ensuring collection and treatment by authorized operators.

All stakeholders shared the view that the ELV Directive is the right instrument to ensure that ELV waste is treated appropriately and that **it was the crucial driver for any progress made towards proper ELV treatment and eco-innovation in car manufacturing**. Research and development in car manufacturing have led to phasing out nearly all hazardous material in cars and it has an effect beyond the EU because European standards are to be observed for all exports into the EU.

The ELV Directive has remained up to date. Yet recent advances in materials management and technologies could have implications for the ELV Directive in future. **Nanomaterials, for example, are currently not addressed while increasingly used in cars, e.g. in paint coating.** Such new materials cannot always be easily identified by car dismantlers and may need more attention in future. Plastics are increasingly used in cars to make vehicles lighter.

In this sense there is potential for the Directive to further **integrate eco-design** to make a more focused and more effective contribution to the resource efficiency strategy and the **7th EAP,** a view that was supported by most stakeholders**.** More focused provisions on eco-design could be put in the Directive, as already done in the WEEE Directive.[146]

The Directive itself does not address eco-design directly, but the **Directive's requirements on reusability, recyclability and recoverability have forced car industry to integrate ecodesign into their processes** and it has helped that he automotive industry is Europe's largest investor in R&D[147]**.** Eco-design is further enhanced through Directive 2005/64[148] that requires new vehicles to demonstrate reusability and/or recyclability of at least 85%, and reusability and/or recoverability of at least 95% by weight, as measured against the international standard ISO 22620. Through these eco design measures the amount of waste per vehicle seems to be decreasing. The car industry achieved a 4.8% reduction of waste between 2005 and 2007.[149]

146 WEEE has clear provisions on eco design.

147 See for example, www.automotivecouncil.co.uk.

148 Directive 2005/64/EC of the European Parliament and of the Council of 26 October 2005 on the type-approval of motor vehicles with regard to their reusability, recyclability and recoverability and amending Council Directive 70/156/EEC, OJ L 310, 25.11.2005, p. 10–27.

149 ACEA: www.acea.be/news/news_detail/production_car_makers_reduce_environmental_impact/.

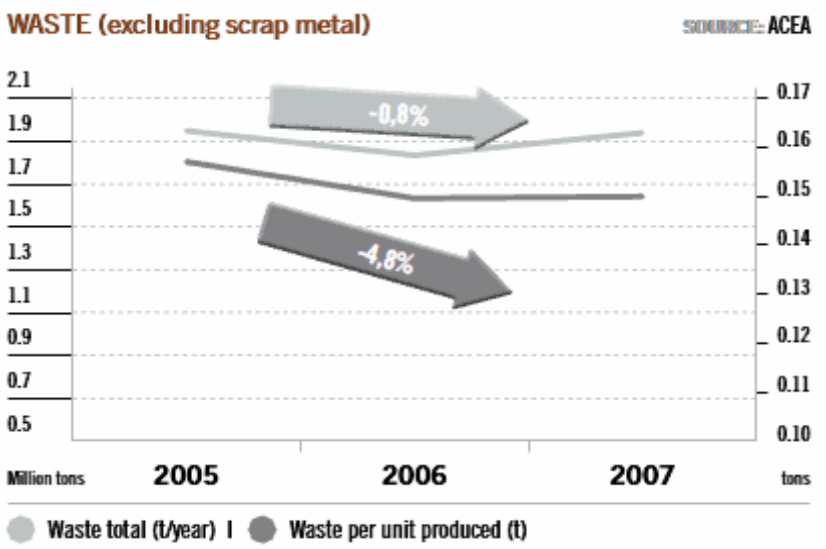

Figure 11: Amount of waste produced by the car industry in total and per vehicle (scrap metal recycled and used as a secondary raw materials is not included)

There are tangible effects in limiting hazardous substances in cars as shown in a study conducted by the Oeko-Institut.[150]

Stakeholders expressed a need for increasing co-operation between producers and recyclers in order to achieve better recycling and resource use. An effective measure could be to indicate the parts that are not suitable for recycling as well as the location of vehicle parts containing hazardous substances or rare earth. As a first step into that direction, manufacturers have already implemented an International Dismantling Information System (IDIS)[151] to communicate data on vehicle composition to treatment facilities.

The Directive fully corresponds to the resource efficiency requirements[152]. Car industry is now seen as more efficient and sustainable as a direct consequence of the Directive. **Stakeholders consider the very ambitious targets to be on the right level.**

Questions have been raised about the **relatively limited scope of the Directive:** it only covers vehicle designated as category M1 or N1 defined in Annex IIA to Directive 70/156/EEC and three wheel motor vehicles as defined in Directive 92/61/EEC. Thus, for instance, larger trucks (and other means of transport) are not covered by the Directive.

Other relevant aspects that the Directive may not yet sufficiently address relate to material technology development, such as increased use of plastic and carbon in production of light vehicles, use of nano-materials and introduction of electric cars. **Such innovation happens fast and will create new challenges** which will affect treatment of vehicles.

150 Öko-Institut (2010) *ELV Directive Annex II: analysis of costs and environmental benefits of heavy metals ban, and proposal for better regulation*, available at www.acea.be/images/uploads/files/%C3%96ko_Institut.pdf.

151 For more information on IDIS, visit www.idis2.com.

152 EEA Report (2011) *Resource Efficiency in Europe, Policies and approaches in 31 EEA Member and cooperating countries.*

More attention should be paid in future to **avoid quantity recycling in favour of quality recycling**. In that context some stakeholders highlighted that **more attention needed to be paid to recycling of rare earth present in a growing number of electronic components built into cars.** Furthermore, a number of stakeholders suggested **including specific recycling targets for raw materials** covered by the EU Raw materials initiative.[153]

Further attention must be paid to the recyclability of increasing amounts of plastic used in cars. As in the case of the PPWD, the **trade-off between resource efficient technologically advanced materials and their recyclability should be more specifically addressed.**

Finally the ELV Directive has gained international relevance, which could be expected because car manufacturing is for an international market. It has provided the basis for the development of a new **UNECE regulation on the harmonisation of recyclability requirements for motor vehicles**[154] that is expected to enter into force in the next few months. Future revisions of the ELV Directive will thus have an international impact.

Relevance in a nutshell

The evaluation of the relevance of the Directive shows that the ELV Directive has remained relatively up to date. New challenges may arise from the use of new materials, such as nano-materials and plastics or carbon light weight elements and the **increased attention paid to critical raw materials** in the context of the EU raw materials initiative. ELVs are an important waste stream for several of the 20 critical raw materials included on the EU list.

For example, a number of the stakeholders consulted in the course of the ex-post evaluation study saw a need to recycle more rare earths. Recyclers ask manufacturers to communicate more information on the presence of these materials in vehicles (as provided for in Article 15 of the WEEE Directive).

Should electric mobility become more widely spread, car and battery manufacturing will need to be more closely linked in the future because batteries will then be an integral part of a car and represent an important part of its composition both functionally and by weight. This will have an effect on calculating recycling figures and the need to do more high-end battery recycling.

In addition, the introduction of complex electronic systems and composite materials in modern vehicles poses significant technological challenges in maintaining the overall reuse, recycling and recovery rates of ELVs.

153 2013 Report from the European Commission to the European Parliament on the Implementation of the Raw Materials Initiative: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2013:0442:FIN:EN:PDF.

154 UNECE's (United Nations Economic Commission of Europe) draft regulation on recyclability of motor vehicles is available at http://www.unece.org/fileadmin/DAM/trans/doc/2012/wp29/WP29-157-05e.pdf.

While the ELV Directive has played a key role in moving towards more resource efficient car manufacturing in Europe, there are serious risks for effective operation of the Directive through **implementation deficiencies leading to illegal shipment and illegal treatment of ELVs as well as a significant number of ELVs of unknown whereabouts.**

Eco design could be more consequently integrated into the ELV Directive, e.g., no plastic should be used in ELVs that cannot be fully recycled. New materials such a carbon parts make vehicles lighter and more energy efficient, put they pose particular challenges for recycling. Producers could be incentivised to communicate the amount of recycled material used in cars where feasible.

c. The Batteries Directive

Batteries continue to be put on the market every year in fast growing quantities and in a considerable chemical variety. The uncontrolled disposal of batteries is a tangible hazard for human health and the environment. Addressing battery waste management on European level helps achieve overall high collection rates and eradication of uncontrolled disposal.

The Batteries Directive addresses resource efficiency and raw materials policy, but with a rapidly growing battery market, there may be some need for adaptation.

EU legislation on batteries is not only an **important driver for resource efficiency through collection and recycling,** but also an important instrument to control sanitary aspects of battery waste. The **proliferation rate of portable batteries** - nearly every citizen is holder of a number of batteries with a short life cycle– represents a high potential risk of chemical pollution through uncontrolled discarding into household waste or nature.

The Directive is highly relevant but its useful effect depends critically on good implementation. Stakeholders signaled implementation problems caused by **insufficient monitoring in some Member States, but also by ambiguities in methods and definitions** specified in the Batteries Directive.

Some lead acid batteries initially put on the market as industrial type **can be collected as portable**. Since they are very heavy and count against the collection rate for portable batteries by weight, this may in theory show a statistical fulfilment of collection targets, while in practice lighter batteries containing rare raw materials may not be sufficiently collected. Stakeholders suggested the introduction of a **weight limit on portable batteries to avoid such a possible statistical distortion.**

Concerns were expressed about **collection targets for portable batteries not differentiating between chemistries.** Collection schemes focus on the collection of certain batteries with positive value of recovered materials **while the ones with scarce materials or hazardous substances might be landfilled**. It is important to ensure that targets are not achieved through the better treatment of the easiest target (portable primary batteries) at the expense of losing

scarce materials (such as Co, Ni and rare earth elements: La, Ce, Pr, Nd) and polluting the environment with hazardous substances.[155]

Some stakeholders have also suggested that in the future, collection targets should rather be expressed as a ratio of the **amount of batteries "available for collection" instead of, as is currently the case, as a ratio of the amount of batteries "put on the market".**

The Batteries Directive only differentiates three battery chemistries for the recycling efficiency criteria: Lead-acid batteries – 65%, NiCd batteries – 75% and "other batteries" – 50%. Recycling efficiency targets do not distinguish between different chemistries beyond the Lead-acid and NiCd. Some preliminary data suggest that a 50% recycling rate is not technically possible for all battery chemistries (especially for emerging ones) and that recyclers are able to claim a 50% recycling rate while valuable or hazardous substances are disposed.[156]

The Directive marginally addresses eco design requirements in Art. 5. The Directive's mandate to increase environmental performance of batteries is highly relevant to increase resource efficiency and could be expanded to cover eco design more broadly. Art. 11, recently amended, addresses only the **design for removability of batteries**. Stakeholders argued that easy recyclability should become a mandatory design requirement in the Directive.

The growing use of Lo-Ion batteries in electric vehicles (EV) is not yet properly addressed. A rapid expansion of the world Lo-Ion Battery market is expected by 2015.[157] For this category of batteries re-use rules would be useful, as they will still have 80% capacity at the end of life of an EV. Further challenges will need to be addressed stemming from the lack of recycling facilities.[158]

There could be room for more specifically addressing eco-design in Art. 5 and Art. 11 of the Batteries Directive.

Relevance in a nutshell

The evaluation of the relevance of the Batteries Directive indicates that since its adoption in 2006 it remains relatively up to date. However, some technical advances could have

155 As an example, for a mixture (50% each in weight) of portable Li-ion and NiMH batteries, the required recycling target is 50%. In a recycling process (Option 1) where the 'less noble' elements are recovered as oxides (slag), and the 'more noble' elements are recovered as a metal alloy, the recycling rate is much higher than the required target (up to 70%). The oxygen that is in the Li-ion batteries will be accounted as recycled as it forms compounds with Mn, Al etc. Mn, Al, Li and the REE's will also be accounted although they are 'downcycled' (they are used for a low end application).In another recycling process (Option 2), if the less noble elements are recovered in a form that would allow high end applications (e.g. when Li and the REE's are recovered as carbonates), the recycling efficiency would be lower (around 62%).

156 BIOIS(2014), ex-post evaluation of certain waste stream Directives, p. 187.

157 L'ADEME (2011). *Etude de la second vie des batteries des vehicules electriques et hybrides rechargeables*.

158 *Avicenne Energy (2010) The worldwide Battery market 2011-2025; BIO study on behalf of ADEME (2010) Etude du potentiel de recyclage de certains métaux rares; Aswin Kumar. Waste Management World. The Lithium Battery Recycling Challenge. www.waste-management-world.com/articles/print/volume-12/issue-4/features/the-lithium-battery-recycling-challenge.html.*

implications for the future. While current substance labelling requirements are appropriate and sufficient**, additional labelling by battery chemistry types can improve their sorting and contribute to efficient recycling**.

The Batteries Directive does not sufficiently integrate factors that influence treatment of end-of-life batteries. Therefore, ecodesign and removability issues could be addressed more thoroughly.

In addition, it has been argued that the current **methodology for recycling efficiency does not fully adhere to the Batteries Directive goals**, particularly for the recycling of Li-ion batteries, as 50% recycling efficiency target does not guarantee the recycling of hazardous and scarce materials.

There are some further adaptations that could be made to achieve objectives of the Resource Efficiency Roadmap, particularly concerning the second hand use of batteries and refining recycling efficiency targets.

d. The PCB Directive

PCB is a Persistent Organic Pollutant and carcinogenic and mutagenic. It accumulates in cell tissue and has in the past caused incidents of food chain contamination.[159] Since PCB equipment is widely spread worldwide, including in Europe, the Directive is of ongoing relevance. This view is unanimously shared by stakeholders, who asked the Commission to continue its enforcement efforts.

Progress towards elimination and proper disposal of PCBs has been quite significant. However, the elimination deadline for large PCB equipment to be decontaminated or disposed of by 31 December 2010 at the latest was not met by most Member States.

Implementation efforts need to be considerably increased and they **should focus on monitoring Member States in meeting their obligations**. Since only a few Member States complied with the 2010 deadline urgent action is needed to enforce the application of this Directive.

The existence of PCB-contaminated equipment is especially an issue in newer Member States.[160] Additional enforcement measures and incentives may be needed to close current implementation gaps. **Closing the data gap is a particular priority.**

Finally there is an issue on PCB in open applications (as pesticide extenders, sealant, carbonless copy paper, industrial oils, paints, adhesives, plastics, flame retardants) which might still be present in specific waste fractions or in specific stocks in industry and household applications. The Directive does not address such open applications although the POP Regulation prescribes waste treatment restrictions. The Directive has further potential

[159] For a number of illustrative examples in Europe, see: http://en.wikipedia.org/wiki/Polychlorinated_biphenyl#Belgium.

[160] BIOIS(2014), ex-post evaluation of certain waste stream Directives, p. 12, p. 215.

relevance insofar as it should be a driver for looking for a more proactive approach comparable with the one taken towards asbestos removal.

Another aspect where potential relevance could be improved relates to including targets and deadlines for equipment with < 5 dm^3 PCB liquid, and for equipment with concentrations of <50 ppm PCB. Furthermore, transition measures are lacking for equipment > 5 dm^3 for new Member States or for Member States entering the EU after the deadline of 2010.

Relevance in a nutshell

The Directive is still highly relevant, although the deadline for the elimination of large PCB equipment (2010) under the Directive was not met by most Member States. Despite significant progress towards elimination many Member States still have to reach the 2010 target. Therefore, rather than setting lower limits for PCB-containing equipment, efforts should instead be focused on enforcement and assisting Member States to eliminate the PCB equipment covered by the 2010 deadline. The existence of PCB-contaminated equipment is also still an issue in the EU (particularly in open applications such as pesticide extenders, sealant, carbonless copy paper, industrial oils, paints, etc.), **justifying the continued relevance of the Directive – at least in the medium term. This is especially the case for newer Member States (e.g. Bulgaria, Romania and Croatia).**

Aspects of resource efficiency and eco design have no relevance in the context of this Directive.

Additional enforcement measures and incentives may be needed to close current implementation gaps that have been identified in the Directive. Recent strategies such as the 7th EAP and the resource efficiency roadmap put a particular focus on that aspect.

e. The sewage sludge Directive

Since the Directive is nearly 30 years old and since its requirements have been surpassed by Member States with stricter and more frequent controls of more parameters than foreseen in the Directive, the aspect of **ex-post cost effectiveness and efficiency has become a hypothetical question**. A majority of stakeholders, however, supports the continued existence of a separate legislative instrument on sewage sludge as a guaranteed level of minimum requirements, despite of identified areas where it may not fully match current needs and realities.

For decades the use of sludge in agriculture has been a highly controversial issue in Europe. It is a fact that sewage sludge can contain all thinkable hazardous substances that can arrive in the public sewer. Sludge contains regularly heavy metals and pathogens. **Land spreading of sludge therefore inevitably leads to the accumulation of heavy metals in agricultural soil**[161] and the process of hygienisation (neutralisation of pathogens) is also a critical energy

[161] See FAO on the application of sewage sludge in agriculture making reference to a UK study (Carlton-Smith, 1987) showing increase in heavy metal concentration in experimentally sludge spiked soil. http://www.fao.org/docrep/t0551e/t0551e08.htm#TopOfPage.

consuming process. The accumulation of heavy metals in soil may happen within limits considered as safe today, but **safety limits today may be seen as unsafe with growing scientific knowledge about soil and flora interaction**. Mainly for these reasons Member States are split over the use of sludge. **What is considered still being safe practice by some is considered unnecessary soil pollution by others**.[162] Member States policy on sludge differs greatly from banning the use of sludge to applying much stricter limit values than the Directive foresees and introducing new additional limit values for pathogens. **A proper and full risk assessment on European level has never been undertaken for sewage sludge.**

Sewage sludge is still widely used in agriculture in many Member States. **The Directive has not been revised since its adoption in 1986.** Since many Member States apply stricter limit values on heavy metals in sludge and/or soil than prescribed in the Directive, this raises **doubts as to the relevance** of the Directive in its present form concerning the limits for heavy metals in sludge. This is further underlined by the fact that there is a wide discrepancy between precautionary levels set in national legislation way above those of the Directive and that all Member States apply an agricultural practice to avoid groundwater contamination.

There are neither any complaints about bad implementation or bad application of this Directive, nor are there any infringement cases pending.

For 10 years a revision of the Directive was on the Commission work programme, but since a proper risk assessment on European level had never been made, it was impossible to find any common ground for a revising the Directive.

The European Commission is currently **working towards a revision of the Fertilizer Regulation 2003/2003**[163]. One of the options under consideration is to include heavy metal limit values in an annex to the Regulation[164]. This raises the question whether sewage sludge meeting these requirements could, for its fertilising properties, not be more adequately covered by the planned Fertiliser Regulation.

Several stakeholders stated that for assessing future relevance it is important to assess links between the SSD and the Fertilizer Regulation, in particular how sewage sludge and sludge products will fit into the future Regulation.

The Sewage Sludge Directive as well as the PCB Directive **cannot sensibly be screened under the aspect of integrating eco design** because both Directives do not relate to deliberately generated products but to residues that need to be disposed of.

Sewage sludge contains, however, **phosphorous which is a scarce resource**. The use of sewage sludge in whatever way **can therefore make a** relevant **contribution to resource conservation**. This resource can be re-introduced into the ecosystem by land spreading or it can be extracted by newly developed technologies such as mono incineration allowing for the phosphorous to be extracted from the ashes. This technology is already successfully used in some Member States. The developing of this technology was a side effect of the sludge

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162 For the current level of disagreement as to what should be regulated by the Directive and how, only see the stakeholder discussion on contaminants, reflected in: BIOIS(2014), ex-post evaluation of certain waste stream Directives, p. 258 seq.

163 Regulation EC No. 2003/2003, OJL 304, 21.11.2003, p.1.

164 Centre for Strategy and Evaluation Services, Evaluation of Regulation (EC) 2003/2003 relating to Fertilisers: Final Report, November 2010. http://ec.europa.eu/enterprise/sectors/chemicals/files/fertilizers/final_report_2010_en.pdf.

Directive. Phosphorous recovery was specifically highlighted by half of the stakeholders with different suggestions for method and technology.

Any future decision about the SSD should take into account new technologies developed to recover phosphorous through mono incineration from sewage sludge.

The land spreading of sewage sludge has also some relevance under the aspect of **resource conservation,** but it is still primarily an operation of eliminating sizeable quantities of sewage sludge. **Precautionary considerations have to be balanced against aspects of resource conservation.** Since there is no comprehensive risk assessment available for the use of sewage sludge in agriculture, opinions among Member States about the hazard potential of sewage sludge are split and all Member States have adopted their own national and stricter precautionary measures.

The sewage sludge Directive is the only piece of EU legislation that is explicitly dedicated to the protection of soils in the European Union. Such protection is offered by the limits for heavy metals in sludge and soil to which sludge may be applied; by treatment requirements and by use restrictions. All these elements allow the recovery of organic matter. Apart from costs of incineration of sludge it would not contribute to maintaining soil organic matter levels.

Relevance in a nutshell

The Directive in its current form is clearly outdated but still considered relevant by a number of stakeholders. Opinions between Member States are sharply split on this point. Only a small number of stakeholders felt that sewage sludge management could in principle be integrated into other EU legislation.

Areas where the Directive may not fully match current needs include: the limited scope of the Directive (which addresses only the agricultural use of sludge), and the lack of provisions on quality assurance and adequate monitoring. Additional contaminants/substances in sludge have been identified that could be monitored. Current limit values on heavy metals are clearly outdated and much stricter in most Member States' legislation.

The Directive is consistent with the Roadmap to a Resource Efficient Europe as it diverts nutrients back into agricultural soil. Sludge is nevertheless also a sink of contaminants and no matter how low heavy metal content or organic pollutant content may be, its constant application will inevitably steadily increase background levels of these contaminants in agricultural soil.

6.4 COHERENCE

The aspect of coherence was already subject of two previous studies which have been taken into account for the ex-post evaluation study underlying this staff working paper. These previous studies have particularly focused on the wider EU legislation aspect of coherence. The findings are further extended and screened under the specific evaluation questions.

- **To what extent do the Directives satisfactorily complement other parts of EU waste law, especially the Waste Framework Directive, and coherently reflect**

conceptual changes such as the five step waste hierarchy, life-cycle thinking and resource efficiency?

- **Can any specific inconsistencies and unjustified overlaps e.g. in terms of definitions and key concepts, across the Directives concerned and between them and other parts of EU waste law (especially the Waste Framework Directive) be identified?**

- **Is there any scope for aligning key aspects across the Directives concerned, e.g. legal base, provisions related to export?**

- **Can any obsolete provisions in the Directives be identified?**

a. The PPWD

There is in principle coherence between the PPWD and the WFD as well as other waste legislation and policies. **Some points requiring attention have been identified with regard to concepts relating to resource efficiency, including the waste hierarchy, life cycle thinking and certain definitions. EPR is subject to both Directives and in need of further alignment as well as further development in both Directives. There was broad support for the PPW Directive to become legally based on the producer responsibility principle.** EUROPEN cited the OECD definition of producer responsibility as the preferred approach, as an EU harmonised definition of EPR was needed.[165]

Several stakeholders provided proposals for minimum requirements for EPR schemes, including ACE, Eurometaux, EUROPEN and Municipal Waste Europe. FEAD and VKU suggested that producers should be made responsible in the context of eco-design as well, thereby stimulating them to design less hazardous products that are easier to dismantle and can be recycled in a qualitative and cost-efficient way. However, according to the German VKU, in practice the producer and retailer obligations comprise solely the financing of collective systems for the organisation of the take-back and recovery of specific waste streams.

Revision of Article 8 of the WFD may in future be needed providing for more transparency on costs and material flows as a key element of ensuring the effectiveness of PROs and their achievement of the aim of increasing recovery rates.

The PPWD addresses the five-step waste hierarchy in a non-binding way (recital, Art. 4 and 5) as well as life-cycle thinking (Art. 10).[166] Yet, some fine tuning might be necessary. The Court in case C-309/02 Radlberger/Land Baden Wurttemberg[167] found that the PPWD did not sufficiently clearly establish a hierarchy between re-use and recycling. This should be reason

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165 *"an environmental policy approach in which a producer's responsibility (physical and financial) for a product is extended to the post-consumer state of a product's life cycle. There are two features of EPR policy: (1) the shifting of responsibility (physically and/or economically, fully or partially) upstream toward the producer and away from municipalities, and (2) to provide incentives to producers to take environmental considerations into the design of the product."*

166 CEN (2010) *Packaging - Report on criteria and methodologies for life cycle analysis of packaging,* CEN/TR 13910:2010.

167 http://curia.europa.eu/juris/liste.jsf?language=en&num=C-309/02.

enough to clarify in a future revision that the waste hierarchy is fully applicable to all waste stream Directives, including the PPWD.

Stakeholders concluded that the WFD's reference to resource efficiency and raw materials should be expressly integrated into the PPWD and other waste stream legislation.

The PPWD definitions have not been amended since its introduction in 1994 (with the exception of a precision of a definition of packaging). Disparities with WFD definitions exist and should not be tolerated since they may be a source of confusion. There should be full alignment of relevant definitions including **"prevention", "recycling" and "recovery".**

There was a very clear opinion expressed by stakeholders that the separate targets in the Waste Framework Directive and the PPWD should be maintained. The main argument was that the packaging specific targets in the PPWD have had proven benefits for the increase of recycling activity and **separate statistics on household packaging waste and on commercial and industrial packaging waste established only under the PPWD, would in future be needed**. Producer Responsibility organisations (PRO) in particular pointed out that **separate targets increased transparency** and were **necessary to motivate industry to drive and finance improved performance.**[168]

Inconsistencies were seen in the allegedly too vague reference to EPR in Art.7 PPWD. The incoherent approach taken to producer responsibility between the recycling Directives is already recognised, and this has not been improved with the introduction of an article on producer responsibility in the 2008 WFD.[169] **There was broad support for further refining and legally anchoring this aspect in the Directive**. It was suggested to introduce also eco-design requirements via EPR which would be consistent with Art. 8 of the WFD and it is an obvious need to improve coherence.[170]

The scope for **aligning the PPWD and other Directives** is limited. As regards **the legal base**, industry stakeholders want to keep the Internal Market legal base and no obvious reasons were identified to suggest that a change in the legal base might make a major contribution to coherence or any other parameters screened. However, the continuing rise and development of the EU's resource efficiency agenda is likely to increase potential conflicts between the single market and environmental objectives, particularly in relation to prevention and reuse activities. The beverage packaging deposit system and free movement of goods are one example.[171]

No obsolete provision could be identified, except for the **maximum recycling rates by weight set in the Directive**. Such limitations did not make sense to major stakeholders and are lacking reasonable explanation.

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168 See for further discussion, BIOIS (2014), ex-post evaluation of certain waste stream Directives, p. 91seq.

169 IEEP (2009) *Coherence of Waste Legislation – Assessment of lessons learnt from the EU "Recycling Directives"*.

170 See for further discussion and details, BIOIS (2014), ex-post evaluation of certain waste stream Directives, p. 91 seq.

171 European Commission (2009) *Communication from the Commission — Beverage packaging, deposit systems and free movement of goods* (2009/C 107/01).

Coherence in a Nutshell

The PPW Directive is broadly coherent with other EU waste policies, but there is room for a formal alignment of certain provisions and definitions with the Waste Framework Directive (WFD) and other EU waste legislation.

One key inconsistency is that the PPW Directive is not legally based on the producer responsibility principle, as are other recycling Directives. Also, there is a partial overlap between the packaging waste targets in the PPW Directive and the WFD's household waste recycling targets.

The legal base between the PPW, ELV and Batteries Directives differs, depending on whether their objectives are predominantly internal market- or environment related.

The three product related Directives screened here also present some differences regarding their approaches to exports and targets.

Apart from the recovery/recycling targets (currently subject to an ongoing targets review), the PPW Directive is relatively up to date.

Making essential requirements more concrete and more easily enforceable would increase coherence with the resource efficiency concept.

b. The ELV Directive

Like for the PPWD, there is, **in principle, coherence between the Directive and other waste law, notably the WFD.** Some adjustments might have to be made with regard to concepts relating to resource efficiency, including the waste hierarchy, life cycle thinking and certain **definitions.** This was also clearly highlighted during stakeholder consultation**.**

The definitions of "producer" and "placing on the market" are defined in the Batteries Directive, while the ELV Directive defines "producer" differently from the Batteries Directive and does not define "placing on the market at all. The PPWD does not define both terms.[172] The **concept of producer responsibility** is clearly addressed and described in the WFD but **only indirectly expressed in the waste stream Directives**.

The definition of "recycling" in Art. 2 (7) differs from the WFD. The definition in the **WFD excludes** from recycling "reprocessing into materials that are to be used as fuels or for backfilling operations", while **this is not excluded by the ELV Directive**. This difference in definition creates confusion for Member States and discrepancies in how they calculate recycling rates.

The study on waste coherence[173] suggests for the waste stream Directives **referring to the WFD for all aspects that are common** such as definitions, waste hierarchy, producer

[172] See for a need to streamline these definitions horizontally through the recycling Directives: BIOIS (2011) *Study on Coherence of Waste legislation*, European Commission.

[173] BIOIS (2011) *Study on Coherence of Waste legislation*, European Commission.

responsibility, resource efficiency and resource conservation, life cycle thinking". This would facilitate subsequent legislative reviews and improve coherence and readability of legislation.

Some stakeholders have pointed to a perceived problem of **double counting of batteries for the calculation of recycling targets under both the ELV and the Batteries Directive.** Lead acid batteries used in cars are weighted as part of the end-of-life vehicle and counted towards the ELV recycling targets.[174]. These batteries are then removed from the ELV and handed to a battery recycler, for further treatment. Under the Batteries Directive they are counted towards the battery recycling efficiency target[175]. Most stakeholders do not see this as an overlap as it is clear to them that the batteries count as 100% in the recycling target for the ELVs as they are handed for further recycling.

Some industry representatives have also complained that amendments to Annex II (restriction of hazardous substances) are too frequent and take place at different intervals compared to revisions under the REACH Regulation thus increasing administrative costs for industry[176]

There may be a potential for aligning some key aspects. The Batteries Directive requires **"equivalent conditions" for treatment of waste exported outside of the Community.** The ELV Directive does not contain such a provision, but it is reflected in Commission Decision 2005/293/EC, laying down detailed rules on the monitoring of the reuse/recovery and reuse/recycling targets set out in the ELV Directive.[177]

Some stakeholders called for setting targets for the whole recycling value chain, including collection and recycling and prosed to link the ELV Directive via references better to WEEE 2012/19/EU, RoHS 2, 2011/65/EU, the POPs Regulation 850/2004 and the Directive on hazardous substances 1272/2008/EC. This would help ensuring that POPs waste from ELVs can be removed prior to shredding, thus avoiding contamination of shredder output.[178]

The Directive is up to date, but some stakeholders prosed to review the "free take back provision" and incentivise last owners to bring their vehicle to certified facilities. It was also highlighted that the Directive's Annex I should be screened for obsolete provisions.[179]

Coherence in a Nutshell

The ELV Directive is coherent with the environmental objective of the Waste Framework Directive (WFD) and the 7th EAP as well as other strategies on raw materials and resource efficiency. There **is room for formal alignment with certain provisions, such as on extended producer responsibility, and definitions in the WFD**. For instance, the definition of recycling in the WFD excludes from recycling "reprocessing into materials that are to be used as fuels or for backfilling operations", while this is not excluded in the ELV Directive.

174 Commission Decision 293/2005, OJ L 94, 13.4.2005, p. 30

175 Commission Regulation 493/2012, OJ L 151, 12.6.2012, p. 1

176 Interview with Michel Baumgartner, EUROBAT.

177 Commission Decision 293/2005, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2005:094:0030:0033:EN:PDF.

178 BIOS(2014), ec-post evaluation of certain waste stream Directives, p. 135.

179 This relates to the non-recyclability of dashboards that have to be removed provided they are recycled in the shredder process, see: BIOS(2014), ec-post evaluation of certain waste stream Directives, p. 136.

This difference in definitions creates confusion for Member States and discrepancies in how they calculate recycling rates.

In addition, there is **potential to align the ELV Directive with the WFD definitions and definitions in the PPWD and ELV Directive of "producer", "producer responsibility" or "placing on the market" to ensure full consistency**. The difference in definition makes comparison of data between Member States difficult, as recycling may mean different things to different MS.

The legal base differs across the ELV, Packaging and Batteries Directives. The three Directives also have different approaches to exports and targets, but best practices could be transposed to other Directives.

The ELV Directive seems to be relatively up to date with no provisions that appear obsolete. However, **there may be a need to review the "negative value" concept due to the rising price of materials**.

c. The Batteries Directive

As for the PPWD and the ELV Directive, there is, **in principle, coherence between the Directive and other waste law, notably the WFD**. Some adjustments might have to be made with regard to a legally binding reference to the waste hierarchy, life cycle thinking and certain definitions.

As to the waste hierarchy, **"re-use" is not mentioned in the Directive**. Industry has reported that there are increasingly cases of battery re-use. Therefore the re-use could be specifically addressed as an objective of the Directive[180]. This could be complemented with **defining incentives for the marketing of reusable batteries.**

Another incoherence is that the **Directive focuses on end of life**, thus **not sufficiently integrating the life-cycle concept.** The Directive addresses Battery design with regard to removability, **but a life-cycle approach would have to consider a full range of design aspects, pertaining to durability, recyclability and toxicity.** In addition the establishment of quantitative targets, as already lined out in the chapter on effectiveness, means that smaller batteries with critical rare raw materials may not be recycled. Therefore stakeholders **suggested adding qualitative targets** to quantitative targets.

For batteries **overlaps were raised by some stakeholders in relation to the ELV Directive**, as batteries fall under the scope of both Directives. This was presented as potentially burdensome for car industry. The car industry expressed a **preference for counting waste batteries from vehicles only under the Batteries Directive** which is more detailed and adapted.[181] However, this preference is challenged by the batteries recyclers.

As regards **inconsistencies**, the **different definitions of "recycling" in the WFD and the Batteries** Directive are potentially problematic. A comparison between the two definitions in

[180] Reuse and Second Use of Batteries, RECHARGE, June 2013. See also: See www2.toyota.co.jp/en/news/13/01/0123_1.html.

[181] BIOIS(2014), ex-post evaluation of certain waste stream Directives, p. 183.

the two Directives shows clearly a more logical and more comprehensive and differentiated definition in the WFD. There are no reasons why the WFD definition should not be used unaltered in the Battery context. There is also a **difference in the definition of "treatment"** with a clear definition in the WFD and a clumsier wording in the Batteries Directive.[182] It is not known whether such inconsistencies have caused an actual problem of interpretation, but discrepancies in definitions should in any case be avoided.

Furthermore, the **definition of "producer"** differs between the Batteries Directive and the WEEE Directive, which complicates the enforcement of the two pieces of legislation, especially when it comes to Internet sales. According to the current definitions, dealers are not obliged to register EEE sold over the Internet but are obliged to register batteries incorporated in these EEE, which **leads to confusion and misreporting**. Stakeholders suggested to have harmonised definitions of "producer", "distributer", "placing on the market" and "making available on the market" in all Waste Directives.

Industry stakeholders have identified Art. 21 on capacity labelling for portable primary batteries as a problematic **provision because capacity depends highly on use patterns which cannot be foreseen**. This is confirmed by three studies.[183] It has therefore been suggested to look into other performance-based labelling options.

Coherence in a Nutshell

The Batteries Directive is coherent with relevant strategies and the Waste Framework Directive (WFD). There is, however**, room for formal alignment with certain provisions and definitions in the WFD.** There is room for improving consistency with the five-step waste hierarchy, life cycle thinking and resource efficiency. No significant inconsistencies were identified between the Batteries Directive and ROHS or REACH. The Batteries Directive does not have any obsolete provisions.

Doubts were raised as to the need of capacity marking of primary batteries, which depends largely on the use patterns and therefore has little practical significance.

d. The PCB Directive

The PCB Directive is a standalone instrument with a very specific purpose of protection of human health and the environment, which does not raise coherence problems. Resource efficiency and circular economy aspects are obviously out of the scope of the Directive.

182 For a synoptic overview of different definitions in the EFD, Batteries Directive and WEEE Directive see: BIOIS(2014), ex-post evaluation of certain waste stream Directives, Table 26, p. 317.

183 BIO (2010), *Study on Elements for an Impact Assessment on the Capacity Labelling of Portable Primary Directives in the context of the Batteries Directive*, ec.europa.eu/environment/waste/batteries/pdf/battery_report_june2010.pdf and BIO (2008), *Establishing Harmonised Metholds to Determine the Capacity of all Portable and Automative Batteries*, ec.europa.eu/environment/waste/batteries/pdf/battery_report.pdf; CENELEC (2012), *Feasibility Study on Labelling and Efficiency of Primary Batteries*, ec.europa.eu/environment/waste/batteries/pdf/CENELEC%20feasibility%20study.pdf

There is no relevant overlap with other legislation, including REACH. Both instruments complement each other, with the PCB Directive dealing with the elimination of PCBs, and REACH covering the placement on the market. As to the POP Regulation that also applies to PCBs and which translates the Stockholm Convention into EU law, there is some overlap, but the more detailed PCB Directive, notably its 2010 deadline for the destruction of certain PCB equipment, goes beyond the POPs Regulation.

There are certain aspects under the Stockholm Convention and the PCB Directive that could be aligned, including the deadline for proper disposal of equipment containing PCBs and the limit values of PCB-containing equipment.

A specific matter of incoherence can be seen in the fact that the PCB Directive shows large deficiencies in implementation. Most Member States have not kept the 2010 deadline and have demonstrated a relatively astonishing lack of urgency to fulfil their obligations under the Directive. Infringement proceedings have not been launched yet but have to be envisaged in a relatively short time.

e. The Sewage Sludge Directive

The Sewage Sludge Directive regulates the use of sewage sludge on agricultural land under certain defined precautionary conditions. **Like in the case of the PCB Directive, modern waste policy concepts, such as life cycle thinking, EPR, circular economy, have no function in a non-product related Directive.**

On the other hand, the second objective of the Directive, to bring organic matter back to agricultural soil, whilst minimising environmental and sanitary drawbacks, fits into the concept of the waste hierarchy, to **favour recovery over disposal**. In so far **there is coherence between the sewage sludge Directive and the WFD**.

The different practice in Member States and regions of banning or using sludge in agriculture may have an impact on the internal market. So far no evidence could be found that the internal market for agricultural products had been really affected by the fact that at present there is a large variety of sludge applied in agriculture in Europe. There are stakeholders who believe that sewage sludge should not fall under the definition of waste under the WFD, but Member State authorities do not agree with this view with reference to the precautionary principle.

Inconsistencies or overlaps with other legislation do not exist, in particular not with regard to the urban wastewater treatment Directive 91/271/EEC. The upcoming revision of the F**ertiliser Regulation** may **in future require a re-assessment of the sewage sludge Directive**. Depending on the scope of the revised Regulation, it must be ensured that there are no contradictions or overlaps between the two instruments. Whatever option should be considered in the future, it should be seen in the light of the future revised fertiliser Regulation.

Coherence in a Nutshell

This non-product related Directive fits into the concept of waste hierarchy, but **following the precautionary principle other modern concepts such as life cycle thinking, EPR and**

circular economy, play little role. While the Directive is predominantly an instrument of sanitary waste management, it also has a resource conservation aspect by defining sanitary conditions under which the reintroduction of organic matter and nutrients into agricultural soil can be done without jeopardising human health and the environment.

There could be scope for alignment with the urban waste water treatment Directive and possibly the forthcoming new Fertilizer Regulation, but that depends on a decision about the future fate of this Directive.

7. CONCLUSION

This section summarises the main findings of the Fitness Check identifying gaps, inconsistencies, overlaps and areas for improvement.

7.1 GENERAL ASSESSMENT

The screening of five waste stream Directives for their relevance, effectiveness, efficiency and coherence clearly demonstrated that these Directives are examples of meaningful European Law making. As the analysis has shown, there are very few outdated provisions or inconsistencies.

Without pre-empting any possible future decision, the Directive on Sewage Sludge may be the only exception raising doubts about its relevance in its present form. In almost 30 years, the standards and requirements set up in the directive have never been revised or updated. Not surprisingly, most Member States have left the precautionary minimum standards of the Directives far behind and are enforcing bans, stricter limit values on heavy metals and in some cases additional limit values for pathogens. In any case, it seems logical to ensure coherence and avoid overlaps to postpone any future decision on the review the sewage sludge directive until the adoption of the new fertilizers regulation**.**

The legislation screened here, covers nearly 30 years of European law making in the field of waste. It has evolved from comparatively simple precautionary legislation (Sewage Sludge Directive 1986) to a highly technical legislation (Batteries/ELV). It has also seen a paradigmatic shift from looking at waste as an end of pipe residue to be disposed of with a minimum of harm to the environment and human health to considering waste as a valuable resource to be re-used, recycled or otherwise recovered. This context is most clearly addressed in the **7th EAP.** It is remarkable, and clearly documented in this evaluation, that the Directives screened were by and large well designed in order to respond in the best possible way to rapidly developing requirements during nearly 30 years of environmental law making.

European waste legislation is rather complex due to the technical nature of the issues it addresses, but also due to the fact that **waste policy has to fit into the requirements of the EU Internal Market.** There was broad overall agreement between industry stakeholders NGOs and Member States that the body of law screened here, by and large corresponds to what are standards of smart regulation.

European waste law looks however rather kaleidoscopic. Perhaps the most striking feature is the **co-existence between framework legislation and waste stream specific legislation.** In recent years, and as shown by this evaluation, it has become more and more

apparent that **a parallel development of framework legislation and waste stream legislation can create tensions**. Such tensions relate to the relatively static elements of legislation, such as definitions, concepts of EPR, life cycle thinking and resource efficiency as well as calculation methods for targets. Such **static elements and principles should be developed coherently across all the Directives of a certain sector and not in parallel following different speeds of development.** For instance, there is no reason why the definition of "recycling" should differ between any of the Directives, or why the five step waste hierarchy, an essential element of the new WFD, should not be referred to in all waste stream Directives.

The evaluation has also shown that the Directives are the **fruit of constant dialogue between the European law maker and stakeholders. This continuous dialogue has helped keeping the instruments up to effectively responding to environmental problems and to ensure a consistent interpretation of their requirements**. **Technical adaptation committees** meeting regularly and discussing upcoming problems as well as preparing comitology decisions are instrumental to this end. Moreover, stakeholder views, including SMEs, are sought for at the very early stage of preparation in law making, the stage of impact assessments.

The present evaluation also provides an indication to the debate on administrative burden and implementation costs. While some pieces of EU waste law have been criticized as containing unnecessarily burdensome provisions[184], it is increasingly recognised that **waste legislation is supporting economic development**. **Economic growth, job creation and innovation are also driven by environmental standards laid down in legislation**. This is, as recent studies demonstrate, particularly true for the waste sector. To develop new technology for recovery of waste, new economic models and product design requirements to make a circular economy with close to zero waste a reality, there must not only be a green vision but also rules set through **legislation, providing above all a level playing field for economic actors, incentives for innovation and security for investment**. The importance of a level playing field is particularly evident in the case of the ELV, packaging and batteries. Uniform standards for in internal market are a prerequisite for smooth and efficient intra-community trade.

The existing **European waste legislation is already providing this stimulus through the setting of ambitious targets with the view to increasing savings of raw materials and improving technology to help generating and stabilising this process.**

Overall, this Fitness Check demonstrates a good **regulatory performance of the legislation screened while indicating the routes to further improving it.**

The EU added value of all the five Directives screened was looked at under the different evaluation questions in more detail. Besides the already mentioned need for European industry to find a level playing field of competitive conditions through harmonised European law, there are also other aspects to consider: Most obviously in the case of packaging, uniform European rules avoid being exposed to environmental standards differing between 28 Member States, increasing administrative burdens and insecurity of compliance. Environmental law has indirectly set product standards in recent years, e.g. in the PPWD, ELV and Batteries

[184] See in particular the comments made by SMEs in the TOP 10 exercise conducted by the Commission in 2013.

Directive, all of which require recyclability, specified limitations on hazardous content or functionality, recycling and /or recovery targets as well as the observation of specific waste treatment requirements. These end-of life standards have had a repercussion on how cars, packaging and batteries are designed and will continue to do so. Every producer, importer or retailer active on the European market therefore has a reliable framework of rules to follow which is important for planning investment into infrastructure as well as R&D. Most obviously in the car industry the ELV Directive with its hazardous substances restrictions has triggered innovation which also helps marketing European cars on the international market. In turn, international car manufacturers having to comply with European rules for export, apply directly European environmental standards. In the case of the Sewage Sludge Directive and the PCB Directive the EU added value comes more from the aspect of creating an EU wide safer environment.

7.2 SPECIFIC ISSUES CONCERNING GAPS, INCONSISTENCIES, OVERLAPS AND AREAS FOR IMPROVEMENT

The foregoing analysis has revealed a number of aspects that may in future require attention, either as part of any up-coming revision of these Directives or as part of "soft law" or enforcement actions. These include the following:

a. Legal basis – stricter national provisions

With regard to the five Directives' legal basis **only for the PPWD has a potential problem has been identified.** The Directive is based in its totality on 114 TFEU (ex-Art. 95 TEC), the Internal Market legal base. This makes it virtually impossible for Member States to apply stricter national provisions**.** Should the Directive be based on Art.192 TFEU (ex-Art 176 TEC), Member States could take more stringent measures under Art. 193 TFEU.

There was, however, agreement among all stakeholders (Member States, industry, NGOs) that **there is no obvious need to change the legal base of the Directive or to introduce a double legal base as in the Batteries Directive.** There seems to be more general support to address any tensions from the PPWD Directive's dual objective of protection of human health and the environment as well as the functioning of the internal market through a revised legal text, rather than through change in the legal base of the Directive.

b. Scope of the Directives

The question about the scope of the Directives has some relevance in particular for the PPWD. This Directive relates to end-consumer, commercial and industrial packaging waste. **Its recycling targets consequently also relate to consumer and commercial waste**. There is therefore some overlap with the recycling targets for household/municipal waste under the WFD which may also include household and (some) commercial packaging waste.

This issue was considered also in the waste target review 2014. Stakeholders agreed that this limited overlap was not a problem in itself and saw the effectiveness and the coherence of the PPW Directive better ensured in maintaining its status as the overriding piece of legislation relating to packaging and packaging waste, thereby retaining household and non-household waste within its scope.

c. Eco-design

Eco-design requirements play an increasingly important role for waste prevention and resource efficiency, but they are only vaguely or not at all addressed in the waste stream Directives evaluated here. In order to ensure full consistency with the 7th EAP, the resource efficiency roadmap as well as the raw materials initiative and the WFD, eco-design requirements could be a future candidate for further consideration in any future work towards a more general alignment of waste stream Directives.

d. The waste hierarchy

The waste hierarchy is a **binding principle of the WFD** and one of the cornerstones of waste legislation with far reaching consequences for resource efficiency and waste prevention. There is confusion as to what extent the waste hierarchy is also binding in the context of the waste stream Directives.

However, the 3 product related Directives and also the sewage sludge Directive make reference to the waste hierarchy in one way or other, without referring to it as a binding principle of waste legislation.

In addition, the **Batteries Directive does not focus on waste prevention**. This is a major shortcoming that could be addressed at the occasion of the next revision of the Batteries Directive. But it would also be important to mainstream the waste hierarchy adequately into the waste stream Directives.

Differences exist in the product related waste Directives in relation to provisions **on collection, recovery, recycling, re-use and waste prevention (except for batteries)**. Such differences, as highlighted in the chapter on effectiveness, are a potential source of confusion and uncertainty.

e. Targets

There is a considerable variety of different targets in the waste stream Directives.

Provision	PPW	Batteries	ELVs
Action	**Recycling**: Member States to ensure that specific materials from all packaging placed on the market to be recycled	**Collection**: Member States to ensure collection rates based on sales figures (products placed on the market over the last three years) **Recycling**: Member States to ensure that recycling processes meet recycling efficiency targets	**Reuse and recovery**: Member States to ensure that economic operators achieve a minimum percentage for all end-of-life vehicles by an average weight per vehicle and year **Reuse and recycling**: Member States to ensure that economic operators achieve a minimum percentage by an average weight per vehicle and year
Target for collection	No explicit target	• 25% (2012) • 45% (2016)	No explicit target
Target for reuse	None (but a specific article)	None	2006: • 85% (reuse and recovery) • 80% (reuse and recycling) 2015: • 95% (reuse and recovery)
Target for recycling	• 55% overall target • 60% of glass,	2010: • recycling of 65% by average weight of lead-acid batteries and accumulators, including	

Provision	PPW	Batteries	ELVs
	paper and board • 50% of metal • 22.5% of plastic • 15% of wood	recycling of the lead content • recycling of 75% by average weight of nickel-cadmium batteries and accumulators, including recycling of the cadmium content • recycling of 50% by average weight of other waste batteries and accumulators	• 85% (reuse and recycling)

Table 5: Comparison of targets in the PPW, Batteries and ELV Directives

It would potentially increase coherence to have a similar approach to targets across all waste stream Directives and the WFD. Only the Batteries Directive has an explicit collection target, while it has no re-use target in contrast to the ELV and the PPWD. Furthermore, "separate collection" featuring high in the WFD, because it is important for increasing the recycling yield, does not play any role in the PPWD Directive, although it covers also household waste packaging.

In the ELV and PPWD, re-use, although higher up on the WFD waste hierarchy, features less prominently than recycling or recovery.

Recycling efficiency is a parameter in the Batteries Directive, but not addressed in the ELV and PPWD.

There is growing concern amongst stakeholders that in future the existing quantitative targets may not be enough to respond adequately to the challenges form resource efficiency and preservation of raw materials. In order to achieve resource efficiency it seems evident that recycling targets should in future have a qualitative element to allow for cradle to cradle recycling as a general rule and to accept only exceptionally downcycling. Evidently, net virgin material savings require recyclates which are on the same quality level as virgin raw material.

f. Export Provisions

Export provisions are an important consideration for the environmentally sound management of waste, and these feature in all but the PCB and Sewage Sludge Directives. Each of the waste stream recycling Directives includes export provisions, and a similar approach is taken to recycling and recovery occurring outside the EU. Recycling or recovery activities undertaken on waste exported from a Member State can count against that Member State's targets if the recycling or recovery operation took place under conditions broadly equivalent to those prescribed in EU legislation. Despite these provisions, significant illegal exports still occur. Beyond a harmonisation of the Directives in this respect, there may be scope to further tighten export controls, e.g by introducing requirements for evidence of functionality for exported second hand vehicles.[185]

[185] BIOIS(2014), ex-post evaluation of certain waste stream Directives, p. 292.

g. Definitions

It has been highlighted under the different evaluation criteria that there is a lack of coherence in a small number of definitions across the waste stream Directives and that **the WFD key definitions could be mainstreamed into the waste stream Directives**. This would improve legal certainty. Inconsistent definitions in legislation covering the same policy field cannot be tolerated since they can be a source of confusion.

h. Reporting and calculation

The three yearly reporting (and 4 years in the sewage sludge Directive) could be reconsidered. Member States have consistently complained about excessive reporting obligations in the waste stream Directives, while they also have to report to EUROSTAT. Moreover, there are doubts about the usefulness of current reporting mechanisms. Too often reports are late or incomplete and don't allow for a timely, sufficiently precise and meaningful information.

An additional problem has been identified as regards the calculation of recycling rates. This is of particular significance to monitor compliance with the PPWD targets.

Solutions to both these issues (reporting and calculation) are being considered as part of the review of waste targets. The review may include proposals to amend the WFD and the PPWD to:

- Simplify reporting mechanisms and obligations by relying on the waste statistics collected by EUROSTAT as the main mechanism to monitor compliance with waste targets, and

- Ensure that only waste which effectively undergoes a recovery or recycling operation is accounted for when calculating recovery or recycling rates.

Consideration may also need to be given as to whether at least the batteries and the ELV directives could be amended to introduce similar rules on reporting and calculation.

The WFD makes in its recital 23 explicit reference to the three product related waste stream Directives screened here and stipulates that for the purpose of calculation of fulfilment of recycling targets **the amounts of waste which have ceased to be waste should be accounted for as recycled** and recovered waste when the recycling or recovery requirements of that legislation are satisfied. However, it seems that waste which is transferred to a recycling facility but not effectively recycled (e.g. waste discarded as non-fit for recycling) is being accounted for as recycled.

i. Producer responsibility

Producer responsibility is an important element in the WFD to supporting resource efficiency by linking more clearly the obvious interdependence of product and waste regime. It is evident that the success of waste prevention depends largely on how producers manufacture their products, to make them long lasting, repairable, not containing hazardous substances and recyclable.

None of the three waste stream Directives is sufficiently strong on producer responsibility and in particular the PPWD has no reference to producer responsibility.

Future legislative action on waste legislation could look for ways to introduce a more coherent approach on producer responsibility across the waste stream Directives. The review

of waste targets includes amendments to set minimum EPR requirements in the WFD building upon the findings of a recent study commissioned by DG ENV. It might be advisable to consider including similar requirements, or referring to the ones proposed for the WFD, whenever relevant, in waste stream directives.

j. Implementation gap

All the directives assessed have been effective in achieving the environmental and resource efficiency objectives for which they were designed. The PPWD, the ELV Directive and the Batteries Directive have significantly contributed, particularly through target-setting, to raising waste collection and recycling rates throughout the EU. The level of compliance with the recycling targets in the PPWD is a case in point. The two older directives (PCB/PCT and sewage sludge) have also been successful by reducing potential risks to human health and the environment.

Stakeholders have also stressed the importance of internal market benefits through the removal of trade barriers and marketing restrictions. The establishment of harmonised product-related requirements in the PPWD, the ELV Directive and the Batteries Directive has helped to ensure a smooth functioning of the internal market in three sectors of particular economic significance.

There are however some implementation gaps which may have their roots also in legislative ambiguity, lack of clarity or even contradictions. A case of bad implementation, however not due to ambiguity, was found in the PCB Directive. The Directive is clear in its structure, free of ambiguity of contradiction and it has still not been properly implemented by a majority of Member States. Other examples of bad implementation may concern the ELV directive (illegal exports and ELVs of unknown whereabouts) and the batteries directive (marketing of non-compliant batteries). Legislative action may be needed, if appropriate, improving the design of legislation, to address those and other implementation gaps.

7.3 AREAS FOR IMPROVEMENT AND PRIORITY SETTING

Improving implementation and ensuring coherence in the design of waste legislation and improving relevance in relation to the EU Raw Materials Initiative appear as the most important priorities to be pursued.

A classical instrument of ensuring coherence and simplification is codification. **Codification is expressly mentioned in the Commission's smart Regulation process as a classical tool to ensure coherence**. The 3 product related waste stream Directives screened here and possibly even more Directives may be candidates for simplification through codification. This has already been pointed out in earlier studies on coherence of waste legislation.[186] Other possible options to improve coherence include the recast of waste stream directives or a limited review to align them with the waste framework legislation.

Whatever option is chosen, it might be wise not to take action until the legislative process to review the targets in the WFD, the LD and the PPWD is finalised since it may result in

[186] BIOIS(2011) *Study on Coherence of Waste legislation*, European Commission.

legislative changes concerning some key horizontal issues (e. g. EPR, monitoring, calculation of recycling rates and reporting).

The status quo, however, by no means showed to be unsatisfactory to any major degree, a view that was unanimously shared by stakeholders throughout the consultation process. Most of the specific issues highlighted in the foregoing chapter can be addressed on occasion of a general overhaul of the waste acquis when it is deemed to be politically opportune.

With regard to synergies with EU raw materials policy, an important priority is for the (implementation of the) ELV and Batteries Directive to properly address the challenges of increasing the resource efficiency and recycling of critical raw materials.

One point of major concern, relates to the already mentioned calculation of targets and reporting by Member States. Material collected for recycling needs to be reported in a uniform way across Member States and from what is collected for recycling can only be calculated towards the recycling target if it has actually been recycled. This is already being addressed as part of the target review carried out in parallel to this exercise.

ANNEX I

Mandate

FITNESS CHECK OF WASTE STREAM DIRECTIVES

1. BACKGROUND

As part of the 2010 Work Programme[1], the Commission has started reviewing the body of EU legislation in selected policy fields through "fitness checks" in order to keep current regulation "fit for purpose". Their goal is to assess issues related to "effectiveness", "efficiency", "coherence" and "relevance" of specific parts of the EU acquis, thus promoting better/smart EU legislation, making it more responsive to current and future challenges, and helping improve implementation.

Within the Commission pilot exercises were launched in four areas: employment & social policy, environment, transport and industrial policy. Following its first fitness check (in the area of freshwater policy), DG ENV will now launch a fitness check related to waste policy.

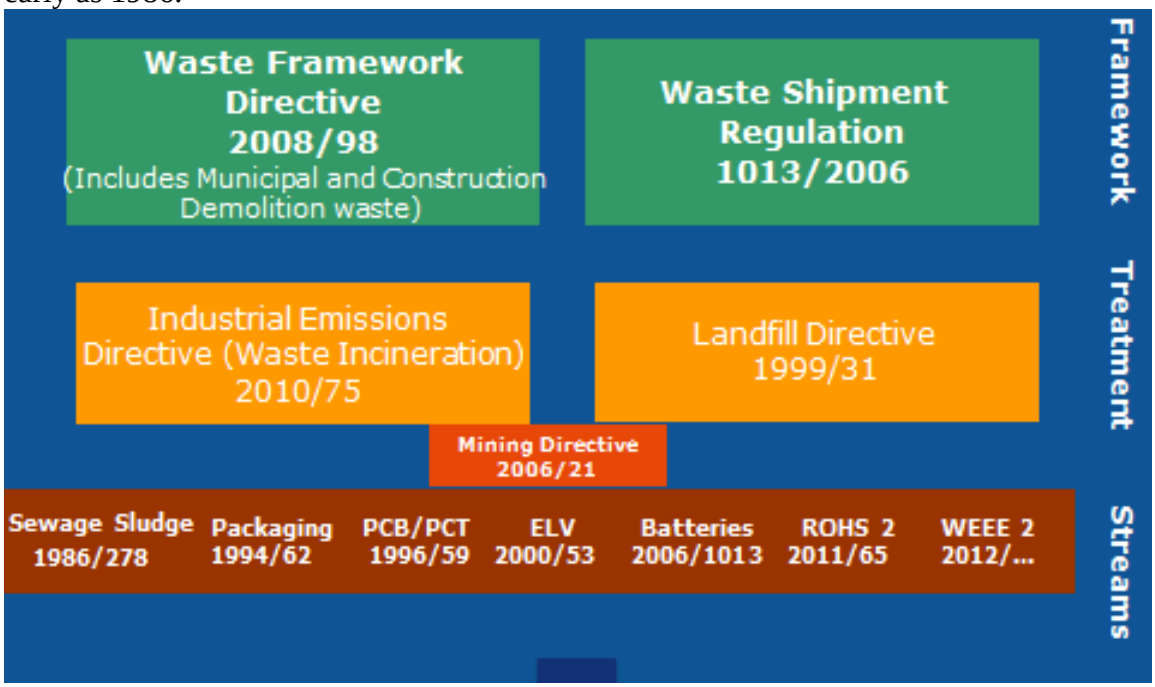
This document describes the context framing the fitness check of five waste stream directives and identifies the key activities that will be undertaken. The overall aim of this fitness check is to:

- Assess if the expectations of these directives have been met and assess whether the existing framework is fit for purpose,

- Assess how coherently and consistently the legislation/activities work together and to identify any excessive (regulatory) burdens, overlaps, gaps, inconsistencies and or/obsolete measures which may have appeared over time,
- Contribute to the knowledge base regarding the overall impact (benefits and costs) of legislation/Commission actions.

2. SCOPE OF THE FITNESS CHECK

The box below summarizes the main legal instruments forming the EU waste acquis. These consist of three different categories of legislation: i) framework legislation; ii) legislation on waste treatment operations; iii) and waste stream specific legislation (the 'waste stream directives'). Some of these legal instruments are quite new whereas others date back to as early as 1986.



Waste stream directives covered by the fitness check

This fitness check will focus on directives dealing with five specific waste streams. These directives have similar objectives in that they each ensure the efficient and environmentally sound management of *specific* waste categories. They also share a similar framework with regard to substance restriction, extended producer responsibility and collection and recycling targets (with the exception of the two oldest directives on sewage sludge and PCB/PCT). The majority of them have been in place for ten or more years, allowing reasonable conclusions to be drawn on their impact and effectiveness.

The following directives will be covered by this fitness check:

- **Directive 86/278/EEC of the Council of 12 June 1986** on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture[187].

[187] *OJ L 181, 4.7.1986, p. 6–12.*

This Directive regulates the use of sewage sludge in agriculture in order to prevent harmful effects on soil, vegetation, animals and humans. It encourages the correct use of sewage sludge.

- **Directive 94/62/EC of the European Parliament and of the Council of 20 December 1994 on packaging and packaging waste**[188].This Directive aims at harmonizing national measures concerned with the management of packaging and packaging waste. This was expected to achieve a high level of environmental protection while ensuring the proper functioning of the internal market. To this end, the Directive lays down measures aimed at, as a first priority, preventing the production of packaging waste and, as additional fundamental objectives, at reusing packaging, at recycling and other forms of recovering packaging waste and, hence, at reducing the final disposal of such waste.

- **Directive 96/59/EC of the Council of 16 September 1996 on the disposal of polychlorinated biphenyls and polychlorinated terphenyls** (PCB/PCT)[189]. This Directive seeks to approximate Member States' laws on the controlled disposal of PCBs, the decontamination or disposal of equipment containing PCBs and/or the disposal of used PCBs in order to eliminate them completely.

- **Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of life vehicles**[190]. The ELV Directive seeks to prevent waste from vehicles and to increase re-use, recycling and other forms of recovery of ELVs and their components, as well as to improve the environmental performance of all economic operators involved in the life cycle of vehicles as well as the treatment of ELVs.

- **Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators** and repealing Directives 91/157/EEC[191]. The Batteries Directive establishes rules on the placing on the market of batteries and accumulators, prohibiting hazardous content. It also contains rules on the collection, treatment, recycling and disposal of batteries. The Directive also seeks to improve the overall environmental performance of waste batteries under a life cycle perspective.

Although the Batteries Directive will be covered, it will not be possible to produce a detailed analysis of aspects concerning its effectiveness and efficiency, given the relatively short time frame over which it has been in effect. The Commission's first implementation report on the Directive is only due in the first quarter of 2014.

Directives not covered by the fitness check

The Directive on Waste from Electric and Electronic Equipment (WEEE)[192] and the Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic

188 *OJ L 365, 31.12.1994, p. 10–23.*

189 *OJ L 243, 24.9.1996, p. 31–35.*

190 *OJ L 269, 21.10.2000, p.34.*

191 *OJL 266, 26.0.2006, p. 1-14.*

192 Directive 2012/19/EU of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE) - Joint declaration of the European Parliament, OJ L 37, 13.2.2003, p. 24–39.

Equipment[193] will not be covered by the fitness check since these two waste stream directives have very recently been subject to an extensive recast. Their transposition deadlines are 14 February 2014 and 2 January 2013 respectively.

The fitness check will not directly cover the Framework Directive on Waste 2008/98/EC (WFD)[194]. This Directive had a transposition deadline of December 2010, but four Member States have not yet completed their transposition and others did so late. Therefore, it is not possible to evaluate the WFD under this fitness check. The fitness check will nonetheless refer to the WFD with regards to the coherence of waste stream legislation with the WFD. Within that context, questions of interest include the extent to which key concepts contained in the WFD, such as extended producer responsibility, the five step waste hierarchy, specific definitions, environmental objectives and life-cycle thinking would need to be mainstreamed into the (older) waste stream directives.

Three other EU waste directives will not be covered by the fitness check since they are not waste-stream but process-related directives i.e. they deal with the technical conditions of waste treatment operations, such as landfill and incineration rather than the management of specific waste streams. These are: i) the Directive on Landfill of Waste[195]; ii) the Mining Waste Directive[196]; and iii) the Directive covering the incineration of waste[197]. The latter two directives are also too new to enable a proper evaluation under the fitness check.

3. QUESTIONS TO BE ADDRESSED BY THE FITNESS CHECK

The following questions will be addressed under the four basic aspects that the fitness check will cover:

- ***Effectiveness***

- What progress has been made over time towards achieving the objectives (and, where applicable, targets) set out in the Directives in various Member States? Is the progress made in line with initial expectations?

- Which main factors (e.g. implementation by Member States, action by stakeholders, cooperation between producers and recyclers) have contributed to – respectively stood in the way of – achieving these objectives?

- Beyond these objectives, did the Directives achieve any other significant results e.g. have they helped ensure safer EU access to raw materials, reduced GHG emissions and/or spurred innovation?

193 Directive 2011/65/EU of the European Parliament and of the Council of 8. June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, *OJ L 174, 1.7.2011, p. 88.*

194 Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives, *OJ L 312, 22.11.2008, p. 3–30.*

195 Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste, *OJ L 182, 16.7.1999, p. 1–19.*

196 Directive 2006/21/EC of the European Parliament and of the Council of 15 March 2006 on the management of waste from extractive industries and amending Directive 2004/35/EC *OJ L 102, 11.4.2006, p. 15–34.*

197 Covered by the Industrial Emissions Directive 2010/75.

- ***Efficiency***

- What are the costs and benefits associated with the implementation of the Directives in various Member States? If there are significant cost differences between Member States, what is causing them? Can any costs be identified that are out of proportion with the benefits achieved?

- What good practices in terms of cost-effective implementation of the Directives in MS can be identified e.g. use of economic instruments such as cost-effective producer responsibility schemes, product policies?

- Can any specific provisions in the Directives be identified that make cost-effective implementation more difficult?

- Have the Directives been kept fit for purpose through regular adaptation to technical and scientific progress?

- ***Coherence***

- To what extent do the Directives satisfactorily complement other parts of EU waste law, especially the Waste Framework Directive, and coherently reflect conceptual changes such as the five step waste hierarchy, life-cycle thinking and resource efficiency?

- Can any specific inconsistencies and unjustified overlaps e.g. in terms of definitions and key concepts, across the Directives concerned and between them and other parts of EU waste law (especially the Waste Framework Directive) be identified?

- Is there any scope for aligning key aspects across the Directives concerned, e.g. legal base, provisions related to export?

- Can any obsolete provisions in the Directives be identified?

- ***Relevance***

- Do the issues addressed by the Directives still match current needs and do they continue to require action at EU level?

- Are factors (such as eco-design) that influence end-of-life impacts sufficiently integrated into the Directives?

- Are the EU waste stream Directives consistent with Commission policies on resource efficiency and raw materials and do they cover all relevant waste streams or are there gaps in the present EU waste legislation?

- Are there any gaps where further EU waste legislation is required to achieve the objectives set out in the Resource Efficiency Roadmap?

Aspects of the relationship between the five waste stream directives and wider EU (environmental and other) legislation may be addressed in the context of this fitness check if appropriate.

4. WORKING METHODS AND EXPECTED RESULTS

The fitness check will be based on an evidence-based approach and cover legal (legal base, coherence in terminology and legal concepts) as well as environmental, economic and social aspects of the five waste stream directives described above. Extensive and recent studies and implementation reports already exist on many of the aspects covered by the fitness check. The most pertinent studies and reports are listed in the Annex. Further relevant information is provided on DG ENV's web page: http://ec.europa.eu/environment/waste/studies/index.htm. The existing studies and reports will be used as a basis and, where necessary, will be complemented by additional literature and empirical research, alongside consultation of Member States and stakeholders.

The fitness check is expected to further improve our understanding of the functioning of the directives covered by the exercise. Problems may have various causes, ranging from inadequate provisions to provisions which have become redundant over time. It may also turn out that regulation is sound but that there is a deficiency in the implementation. In this respect, the fitness check may deliver information on specific problem areas of implementation and provide insight into the possible obstacles to achieve the objectives set in the respective legal instruments.

The fitness check should also use cost-benefit analysis to assess the availability of alternative options which may achieve the same objectives at a lower cost. Finally, it is expected that potential new challenges will be identified, which are not yet sufficiently addressed by existing waste legislation,

5. THE FITNESS CHECK AS PART OF THE PLANNED REVIEW OF WASTE POLICY AND LEGISLATION

As reflected in the Commission's work programme for 2013, the fitness check will take place as part of a planned review of EU waste policy and legislation. The results of this single, comprehensive and coherent review will be presented in 2014 and will, in addition to the fitness check, cover the following two elements:

- 1. A review of key targets in EU waste legislation (in line with the review clauses in the Waste Framework Directive, the Landfill Directive and the Packaging Directive);
- 2. An assessment of how the problem of plastic waste can best be tackled in the context of the current waste policy framework.

This review of EU waste policy and legislation will be informed by the 'aspirational objectives'[198] set out in the Commission's Resource Efficiency Roadmap, as well as by the

[198] By 2020 landfilling should be virtually eliminated, reuse and recycling should be at their maximum feasible level, energy recovery should be limited to not recyclable waste and waste generation should have been decreased.

objective to ensure safe/sustainable access to raw materials as one of the key contributions to the Raw Materials Initiative. The review will also build upon the 2011 Communication on the implementation of the Thematic Strategy on the Prevention and Recycling of Waste[199], where the Commission identified a list of actions and priorities to both improve the implementation of existing legislation and to move towards a more ambitious waste management policy. This includes continuing efforts to modernize, simplify and ensure the consistency of the waste legislation and the review of main targets included in key waste Directives.

The two exercises – fitness check and targets review – are fundamentally different (an ex post evaluation covering *all* relevant aspects of the selected waste stream directives in case of the fitness check versus a forward-looking review of *one* specific aspect – the quantified targets – in case of the targets review) without any significant risks of overlaps. The objective of the directives covered by the fitness check is to create specific waste streams with their own collection and recycling channels which operate in isolation from all other waste streams.

There is only one area where the fitness check and the review of targets may overlap. At present, the Packaging Waste Directive includes recycling targets for some categories of packaging materials (e.g. plastic, paper) which are found in municipal waste and which are therefore also covered by the recycling target for household waste set out in the WFD. In order to ensure consistency and avoid duplications and double counting, it might be necessary to redesign the targets in the Packaging Waste Directive and to align them to the WFD. This issue should be addressed together with the review of the WFD targets and not as a part of the fitness check.

6. STEERING GROUP

The Commission's Waste Management Unit (Unit C2 in DG Environment) has set up an interdepartmental Steering Committee comprising staff from SG, ENTR, ECFIN, ESTAT and CLIMA as well as colleagues from the evaluation and impact assessment unit in ENV. The group will meet at regular intervals; the first preparatory meeting took place in June 2012.

7. TASKS/PHASES

7.1 Preparation of this fitness check mandate

This mandate was prepared by DG ENV C2 in consultation with the Steering Group.

7.2 External study (January 2013 – April 2014)

During this phase, an integrated evaluation of the five directives covered by the fitness check will be carried out. This activity will aim to provide answers to the fitness check questions formulated above. The exercise will be outsourced to independent consultants, using the DG ENV framework contract for such studies. The consultants' terms of reference include requirements to conduct desk research, face-to-face consultations including interviews of selected stakeholders and Member States, as well as the organization of a stakeholder workshop in October 2013. The consultants will deliver and present his intermediate findings in a draft evaluation report in August 2013. They will also organise a stakeholder workshop in

[199] COM (2011) 13.

October 2013 in which preliminary findings will be discussed and then refined in the month remaining until the delivery of the final evaluation report in March 2014.

7.3 Commission Staff Working Paper

The final results of the fitness check will be presented in the form of a Commission Staff Working Paper.

8. COMMUNICATION AND CONSULTATION

DG ENV has set up a dedicated page on the Europa website to outline the fitness check and provide links to key documents.

The consultants, together with DG ENV, have established a list of stakeholders to be consulted in a constant process until November 2013. The consultations will be based on stakeholder questionnaires which will be adapted according to the stakeholders to be consulted. Means of consultation will be e-mails, online surveys and structured interviews.

The results of the stakeholder consultation will be published on the website, as will the outcome of the fitness check.

ANNEX II

OVERVIEW OF EXISTING STUDIES AND REPORTS

1. Commission staff working document (2011) 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

The Staff Working Paper was based on a number of preparatory studies including one synthetic study coordinated by the Institute for European Environmental Policy (IEEP).

The paper contains an in-depth assessment of the contribution that current EU waste legislation has made, Directive by Directive, to achieve the objectives of the 6th EAP, mainly to help Europe to become a resource efficient, recycling society with a high standard of environmental protection.

The report was underpinned ample stakeholder consultation. It examined the achievements of each single Directive and their individual contribution to the 6th EAP. Among the parameters assessed were: level of implementation; Member State performances; progress to a recycling society; GHG emissions and recycling; economic impacts of legislation; waste policy and globalisation; and future trends in all relevant parameters.

The report is an extensive ex-post evaluation of the whole existing EU waste acquis.

2. Study on coherence of waste legislation 2009

This study checked coherence between the new WFD and the Directives on Packaging, ELV, WEEE, RoHS, Batteries, including their interaction with REACH.

It was accompanied by extensive stakeholder consultation and delivered significant results in identifying incoherence between older legislation and the new WFD. The stress was on legally formal inconsistencies with impact on practicality of the acquis. Inconsistencies were inter alia identified relating to: definitions, objectives and principles, legal bases, producer responsibility, targets and their comparability (baselines and end points), flexibility for adjustment to scientific progress, different concepts not mainstreamed (such as waste hierarchy, life cycle thinking, re-use, recycling, recovery not defined or defined differently etc.)

This study is an in depth assessment of coherence of the main legal instruments in waste policy.

3. Study on coherence of waste legislation 2011

This study took an even broader look in the functionality of existing key legislation, the Directives on WEEE, Batteries, ELV, RoHS, Packaging and its interdependence with the WFD and corollary acquis such as the Landfill Directive and the Waste Shipment Regulation as well as its effectiveness and efficiency.

The objectives were to identify: potential gaps, inconsistencies and overlaps between the five Directives and other main elements of EU waste legislation; the effectiveness and efficiency of the current waste stream Directives; potential alternative approaches in the design of legislation; and upcoming challenges in the development of EU waste legislation related to recycling.

Key findings include: introduction of additional material-based targets, better implementation and enforcement, integration of eco-design requirements, harmonisation with WFD, improved separate collection, increased quantitative targets for ELV and Packaging Waste.

The study also covered an evaluation of current achievements, gaps, burdens, socio-economic effects, cost savings potentials, contribution to resource efficiency and relevant drivers for resource efficiency.

4. Study on green growth (2010)

This study looked into benefits and barriers related to better implementation of the EU waste acquis. It was informed by a number of stakeholder workshops. The study contains ample information about the functioning of legislation, its benefits and obstacles to reaping these benefits.

5. Study on market-based instruments for waste management (2012)

This study was a follow-up to the studies carried out for the study on the Thematic Strategy on Waste and looked into the use of economic instruments in relation to the management of specific waste stream Directives in different Members States (producer responsibility schemes, pay-as-you-throw schemes and taxes for landfill and incineration).

This study also looks into how the implementation of the waste stream Directives can be improved by using economic instruments. The results have already been used in the AGS 2012 exercise as well as to better define ex ante conditionality for the use of structural funds.

6. Study on the feasibility of a waste implementation agency (2010)

This study examined how insufficient enforcement by Member States affects the effectiveness of the EU waste acquis and lists the benefits of better enforcement of current rules.

7. Implementation reports

Various implementation reports under the Directives concerned (with the exception of the Batteries Directives for which the first implementation report is not due until the first quarter of 2014).

Annex III

Material-specific recycling targets under the PPWD

Material-specific recycling targets under the PPWD were by and large met:

- For paper and board:

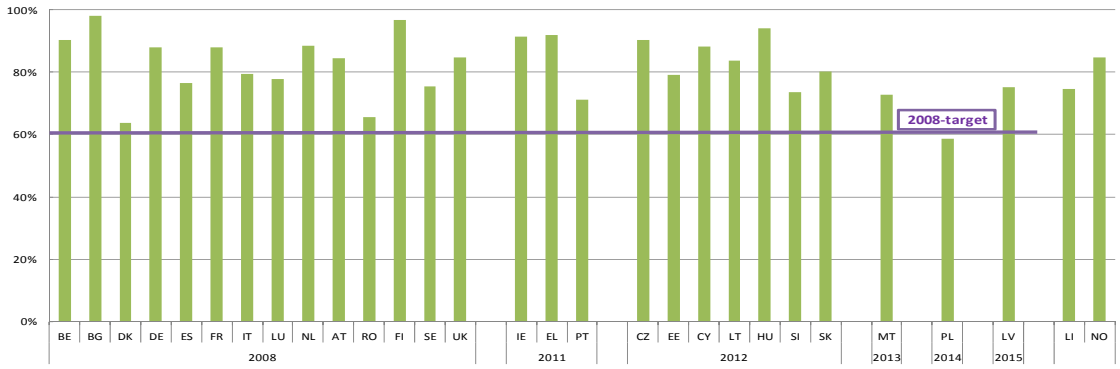


Figure 1: Paper and board recycling rates by EU-27 Member State, 2011 (%)Error! Bookmark not defined.

- For glass:

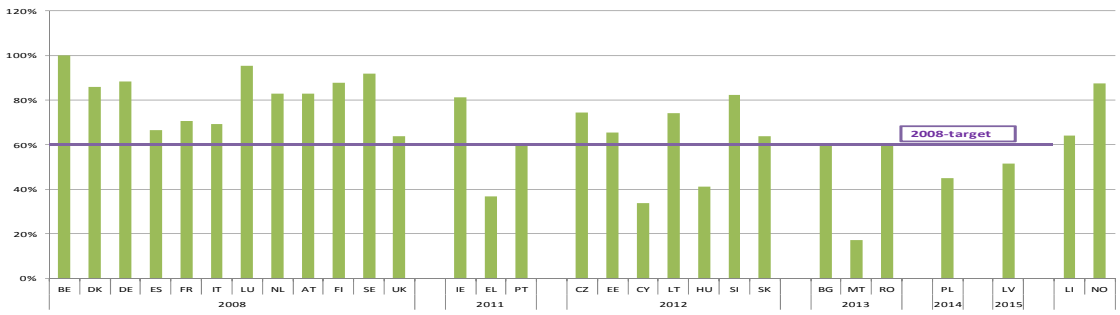


Figure 2: Glass packaging recycling rate, 2011 (%)[200]

- For metal:

200 Eurostat (2013), Packaging waste statistics, (env_waspac), http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_waspac&lang=en.

Figure 3: Metallic recycling rate by Member State, 2011 (%)

- And for plastic:

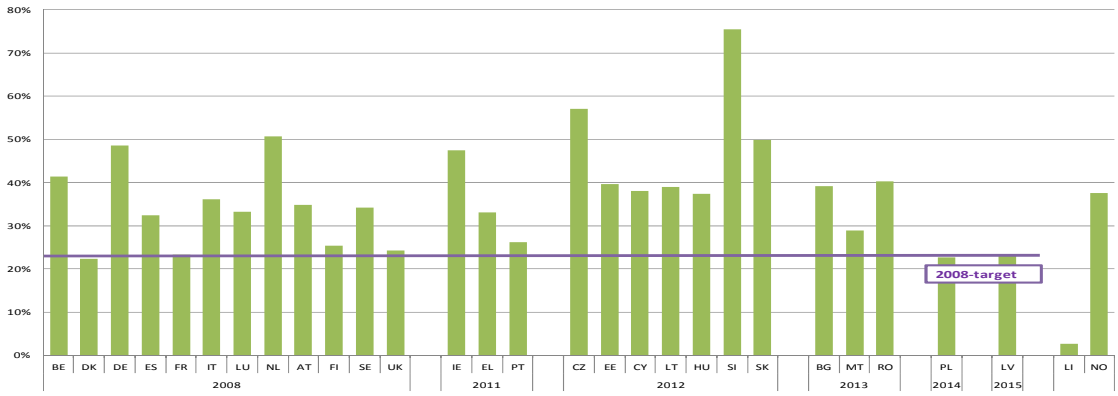


Figure 4: Plastic packaging recycling rates by Member State, 2011 (%)[201]

While for paper, metal and glass the difference between the total amount of waste and the amounts recycled were very close, there is a very large gap between plastic waste arisings and plastic waste recycling, being a relatively new technology.

201 Eurostat (2013), Packaging waste statistics, (env_waspac), http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_waspac&lang=en.

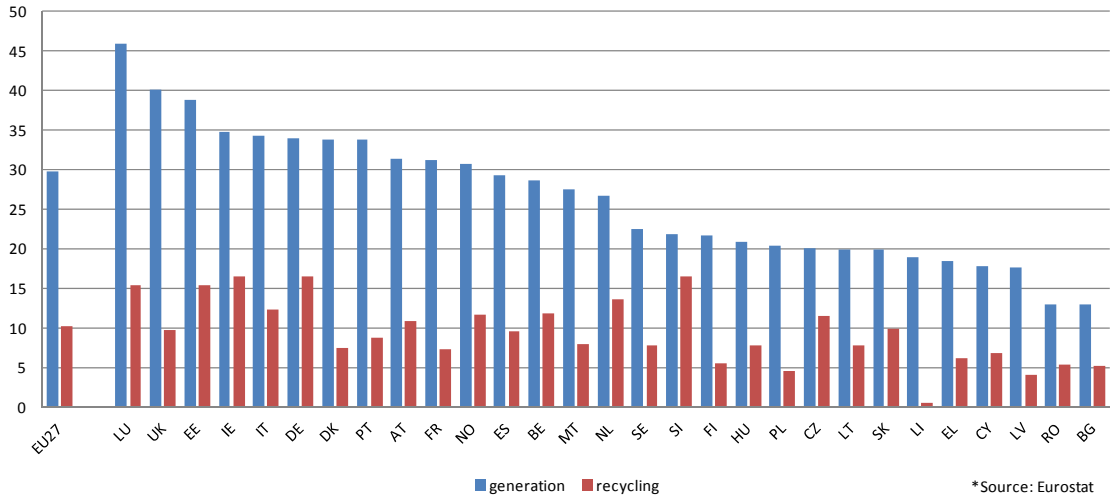


Figure 5: Plastic packaging waste generated and recycled by Member States, 2011 (kg/capita)[202]

Statistical plastic packaging waste recycling rates over 30% in certain Member States would deserve some additional scrutiny, since they are way above the 32,2% overall plastic packaging recycling rate calculated by "Consultic"[203] in 2012 for the German BVSE.

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202 Eurostat (2013), Packaging waste statistics, (env_waspac), http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_waspac&lang=en.

203 Consultic Marketing & Industrieberatung GmbH, Christof Lindner, www.consultic.com.