Awareness and Exchange of Best Practices on the Implementation and Enforcement of the Essential Requirements for Packaging and Packaging Waste

FINAL REPORT

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# Project description

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# Chapter 1: Executive summary

# 1.1 Context and objectives

The Packaging and Packaging Waste Directive (PPWD) seeks to harmonise national packaging legislation, with the dual goal of preventing/reducing the environmental impact of packaging and packaging waste and ensuring the functioning of the internal market to avoid trade barriers and distorted competition. The Essential Requirements (ER), provisions laid out in the PPWD, provide criteria for packaging to be put on the market, in relation to minimisation of weight and volume, minimisation of hazardous substances, and packaging reuse and recovery.

According to a survey launched by the Commission in 2009 on the ER, a large gap exists between the Member States and the industry in terms of implementation of and compliance with the ER. Few MS have put in place mechanisms to ensure the implementation and enforcement of the Essential Requirements. The industry has taken steps to implement the ER, and, according to the 2009 survey, is in favour of the flexibility of the ER (as companies are in general free to implement any procedure to show compliance with the ER).

The objectives of the current study are to assess the current state of implementations of the ER, the impacts resulting from the current state, and collect and disseminate best practices for implementation and enforcement of the ER.

# 1.2 Current state of implementation of the Essential Requirements, challenges, and possible solutions

The current picture of the state of implementation and enforcement of the ER shows that the majority of the Member States do not have any formal procedures to enforce or implement the ER. While interesting and promising initiatives already exist in several Member States, such initiatives must be duplicated and further developed.

The following barriers to implementation and enforcement of the ER have been identified:

- MS often lack knowledge on how to implement/enforce the ER. Sometimes this is also coupled with a lack of dedicated staff and finances.
- Regarding enforcement, it is difficult to judge when packaging is compliant with the ER as the formulations in the Directive are not sufficiently concrete to enable a clear assessment (apart from the concentration limits of heavy metals). Without any quantitative benchmark, it is difficult to identify companies which do not comply with the ER.
- In several MS, it is considered that the industry has sufficient incentives to comply with the ER and that companies integrate considerations of the ER in their businesses anyway (mainly for cost considerations).



Potential solutions to address the above barriers to implementation and enforcement are policyrelated or linked with providing guidance at the EU level. Proposed policy-related solutions are inclusion of the requirement to assess conformity to the ER in the Packaging Directive, and clarification of when packaging conforms with the ER or not via the introduction into the Packaging Directive of benchmark indicators on the weight and size of packaging for various product categories. Alternatively, providing guidance at an EU level could be a potential solution; such guidance could cover implementation, inspections and producer responsibility systems.

# 1.3 Impacts of the implementation of the Essential Requirements

Historical trends have shown, over the years, a general improvement in terms of both recycling rates of packaging and individual packaging weight. Due to a lack of information, it is currently not possible to directly assess the contributions by the current state of implementation of the ER to these developments. Increased implementation of the ER is however estimated to lead to considerable cost reductions and environmental benefits.

Scenarios on weight reduction, reuse, and avoidance of packaging, as well as the recyclability of packaging, were prepared to estimate potential benefits of such prevention actions. Increased recycling would lead to a reduction of GHG emissions and natural and fossil resource depletions equivalent to the impact of 1.5 to 4.3 million European inhabitants per year, depending on the impact categories. If all the quantitative prevention scenarios analysed were implemented, they would generate a reduction of those impacts equivalent to 0.4 to 1.1 million European inhabitants per year, depending on the impact categories.

# 1.4 Best practices for implementation and enforcement of the Essential Requirements

Despite limited action on the part of MS in general, some best practices for the implementation and enforcement of the Essential Requirements could be identified in some countries using the following criteria: representation, focus, efficacity, replicability, innovation, and life cycle approach. Implementation best practices were selected highlighting packaging design that minimises weight and volume, design to increase the durability and reusability of packaging, different types of packaging recovery (reuse, composting, recycling), and qualitative waste prevention (minimum levels of hazardous substances and heavy metals). Enforcement best practices were selected highlighting guidance for industry on implementation and compliance, inspection measures, case law demonstrating prosecution for infringements, and specific regulations such as obligatory prevention plans. In total, there are 20 best practice factsheets available. In order to render them easy to read and use, the format was designed in a way that facilitates the appropriation by the reader.These factsheets are part of the present report and will also be made available on the project's website.



# Chapter 2: Introduction

In brief The Packaging and Packaging Waste Directive seeks to harmonise national packaging legislation, with the dual goal of preventing/reducing the environmental impact of packaging and packaging waste and ensuring the functioning of the internal market to avoid trade barriers and distorted competition. A survey launched by the Commission on the Essential Requirements indicated a large gap between the Member States and the industry in terms of implementation of and compliance with the Essential Requirements; while industry is in favour of the flexibility of the Essential Requirements, authorities show minimal interest in enforcing the Essential Requirements, citing other priorities. The objectives of the current study are to assess the current state of implementation of the Essential Requirements, the impacts resulting from the current state, and collect and disseminate best practices for implementation and enforcement of the Essential Requirements.

# 2.1 Background

# 2.1.1 Essential requirements for packaging and packaging waste

he Packaging and Packaging Waste Directive (PPWD) aims at harmonising national packaging legislation with the twin objectives of preventing or reducing the environmental impact caused by packaging and packaging waste, and ensuring the functioning of the internal market so as to avoid obstacles to trade, as well as the distortion of or restrictions to competition. To achieve these aims, PPWD promotes prevention of the production of packaging waste as a first priority along with the additional fundamental principles of reuse, recycling and other forms of recovery of packaging waste (such as energy recovery).

Essential requirements define the results to be attained, or the hazards to be dealt with, but do not specify or predict the technical solutions for doing so. This flexibility allows manufacturers to choose the way to meet the requirements. Member States should not impede the placing packaging on the market which complies with the Directive. The essential requirements are defined in article 9 and Annex II of Directive 94/62, and can be summarised as follows:

- Packaging weight and volume must be reduced to the minimum necessary for safety, hygiene, and consumer acceptance of the packaged product;
- Hazardous substances and materials must be minimised as constituents of packaging with regard to emissions from incineration or landfill (Article 11 lays down specific limits on named heavy metals);
- If reuse is claimed, packaging must be suitable for that purpose as well as for at least one of the three recovery methods specified, i.e. material recycling, energy recovery, or composting/biodegradation.



Article 9.1 of Directive 94/62 on packaging and packaging waste requires Member States to ensure that packaging may be placed on the market only if it complies with all Essential Requirements defined by the Directive.

Article 11 specifies concentration limits for the sum of specified heavy metals (lead, cadmium, mercury and hexavalent chromium) in packaging. The content of the specified heavy metals in packaging must not exceed the following<sup>1</sup>:

- 600 ppm on or after 30 June 1998;
- 250 ppm on or after 30 June 1999;
- 100 ppm on or after 30 June 2001.

Member States have the obligation to ensure that the Essential Requirements are fulfilled, but there is no requirement to do this in a particular way. Companies can prove compliance by using CEN standards, but are free to implement any other procedure to show compliance with the Essential Requirements.

## 2.1.2 State of implementation and enforcement as of 2009

In 2009, the Commission launched a survey to assess compliance with the Essential Requirements in the Member States. The results of the survey showed that there was a large gap between the Member States and the industry with regard to implementation of and compliance with the Essential Requirements:

- The industry was very much in favour of the Essential Requirements, which do not specify or predict the technical solutions for minimising the amount of packaging. They regretted that so few Member States enforce implementation of the Essential Requirements.
- The authorities, on the other hand, showed little interest in enforcing the Essential Requirements. Initiatives are taken by the industry. Arguments were other priorities (e.g. food safety), lack of staff and finances, and lack of understanding on how to assess compliance with the Essential Requirements.

Only four Member States had implementation measures and an enforcement procedure for all three Essential Requirements at that time, namely the UK, France, the Czech Republic, and Bulgaria. No Member States have demonstrated that all packaging on their market is compliant with the Essential Requirements, and no Member States have been able to provide evidence that they do not need an enforcement mechanism. Except from occasional communication, company support and awareness rising, enforcement measures mainly focussed on the heavy metals content of packaging (and sometimes on minimisation efforts). Nevertheless, even on the requirement on heavy metals, inspection efforts could be improved and augmented. Nearly all interviewed Member States expressed their desire to exchange knowledge on how to organise in-the-field-inspection on the heavy metals contents of packaging. They said that they would appreciate awareness raising programs where know-how and experience could be exchanged

<sup>&</sup>lt;sup>1</sup> There are certain exemptions to heavy metal limits.



between competent authorities.

# 2.2 Scope and objectives of the study

The objectives of this study were:

- To assess the current state of implementation of the Essential Requirements, the impacts resulting from this current state of implementation, monitoring and enforcement, and the identification of solutions in collaboration with relevant stakeholders;
- To collect and disseminate best practices in implementation and enforcement of the Essential Requirements with a view to facilitate learning and support the implementation and enforcement where it is not strong enough.







Figure 1: Methodology and task structure

**Task 1**, which involved the organization of a stakeholder workshop, sought to gain insight into the current status of implementation, the impacts resulting from the lack of monitoring and enforcement, as well as to promote the exchange of best practices on the implementation and enforcement of the Essential Requirements.

**Task 2** built on the outcomes of the stakeholder workshop and involved a further assessment of the implementation and enforcement of the Essential Requirements and the impacts of the current situation. The task also involved the identification of practices to strengthen implementation and enforcement, the selection of 20 best practices and the preparation of fact sheets profiling the best practices selected.

**Task 3** involved the preparation of a website to publish the information identified and documents prepared in Tasks 1 and 2 to the public as well as to promote the exchange of best practices. The website was operational and made available to stakeholders following on the completion of the stakeholder workshop; the website is accessible via the following link: <u>http://er.eu-smr.eu/</u>.



# 2.4 Document structure

Following this introduction, the report is structured as follows:

- Chapter 3 assesses the current state of implementation and enforcement of the Essential Requirements, and its impacts in particular on resource efficiency, as well as the potential impacts (including cost reduction) of further implementation of the Essential Requirements.
- Chapter 4 presents the selection criteria for best practices in implementation and enforcement of the Essential Requirements and includes the factsheets prepared on each of the 20 selected practices.
- Chapter 5 identifies the challenges and possible solutions for a better implementation of the Essential Requirements and provides recommendations for further work.
- The annexes provide supplementary documents and more detailed analysis prepared throughout the course of the study, including an assessment of hazardous substances in packaging.



# Chapter 3: Assessment of the implementation and enforcement of the Essential Requirements

In brief The stakeholder workshop held for the current study and additional analysis completed upheld the image of Essential Requirements implementation provided by the 2009 Commission's survey results; some MS have put in place formal procedures on implementation and enforcement, while some industry is active in voluntary initiatives. Scenarios on weight reduction, reuse, and avoidance of packaging as well as the recyclability of packaging were prepared to estimate potential benefits of such prevention actions. Increased recycling would lead to a reduction of GHG emissions, natural and fossil resource depletion equivalent to the impacts of 1.5 to 4.3 million European inhabitants per year depending on the impacts. If all the quantitative prevention scenarios analysed were implemented, they would generate a reduction of those impacts equivalent to 0.4 to 1.1 million European inhabitants per year depending on the impacts.

# 3.1 Current state of implementation and enforcement of the ER

# 3.1.1 Information obtained during this study

In the course of this project, all Member States were asked to provide updated information related to their state of implementation/enforcement, several countries responded, many of them confirming that they do indeed not have any formal procedures<sup>2</sup>.

In total, 12 MS confirmed the information provided during the 2009 survey<sup>3</sup> on the ER, 6 partly updated the information from 2009, and 9 MS did not respond at all. For 4 countries (Finland, Greece, Malta, Slovakia) there is no information available at all<sup>4</sup>.

Some voluntary initiatives have been launched by the industry to integrate the Essential Requirements in the business (product development, packaging design, etc.). This chapter focuses however on the implementation and enforcement of the Essential Requirements by the Member States. Please refer to chapter 3 on best practices for selected examples of implementation of the Essential Requirements by the industry and green-dot organisations.



<sup>&</sup>lt;sup>2</sup> Countries which had not provided an update were contacted several times (before and after the workshop organised during this assignment).

<sup>&</sup>lt;sup>3</sup> A Survey on compliance with the Essential Requirements in the Member States, Study performed for DG Environment by ARCADIS, 2009.

<sup>&</sup>lt;sup>4</sup> They have not responded in 2009 or during this assignment.

# 3.1.2 Current situation in MS

The picture of the state of implementation/enforcement by the Member States which had been obtained during the last survey on the ER (2.1.2 above) seems not to have changed considerably since then. This seems especially true as far as enforcement is concerned, the large majority of Member States do not have any formal procedures.

Table 1 below gives an overview of the state of implementation and enforcement per Member State. Further explanations are provided below the table.

A more detailed short description of the state of each Member State can be found in Table 5 in Annex 1.



	Austria	Belgium	Bulgaria	Cyprus	Czech Rep.	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Luxemburg	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	UK
											IMPL	EMEN	TATIO	N													
Specific/detailed implementation procedure for ER	N	N	Y	N	Y	N	N		Y	N <sup>1</sup>		?	N	N	N	N	N		N	N	N	N		N	N	N	Y
Formal guidelines for showing compliance (next to CEN standards)	N	N	Y	N	N	N	N		Y	N		?	N	N	N	N <sup>2</sup>	N		N	N	N	N		N	N	N	Y
Informal guidelines for showing compliance (next to CEN standards)	N	N	Y	N	Y	Y <sup>3</sup>	N		Y	N		Y	Y	Y	N	Y	N		Y <sup>4</sup>	Z	N	N		N	N	Y	Y
Use of CEN standards accepted to show compliance	Y	Y	Y	Y	Y	Y	Y		Y	Y		Y	Y	Y	Y	Y	Y		Y	Y	Y	Y		Y	Y	Y	Y
											ENF	ORCE	MEN	<u>г</u>													
Specific/detailed enforcement procedure for ER	N	N	N	N	Y	N	Ν		N	N		?	N	N	N	N	N		Y	N	?	N		N	N	N	Y
Inspection on all 3 types of ER (art. 9) in the past 5 years	Y	N	N	N	Y (19) <sup>5</sup>	N	N		N	?		?	Y	N	N	?	N		Y	<b>?</b> <sup>6</sup>	?	N		N	N	N	Y
Inspections on heavy metal concentrations (art.11) in the past 5 years	Y	Y	N	Y	Y	Y	N		N	Y		?	Y	N	N	Y	N		Y	?7	?	N		N	N	N	Y
Infringements detected in the past 5 years	N	N	N	N	N	Y (2) 8	N		N	N		?	N	N	N	Y (103) 9	N		Y <sup>10</sup>	N	?	N		N	N	N	Y (5) 11

Table 1: Current state of implementation and enforcement of ER, EU-27



#### Legend:

1 Germany considers that the Green dot dual system provides enough incentive to comply with the ER.

2 Regulation and responsible authority foreseen for 2011 in order to implement procedures to prove compliance with the standards

3 Checklist developed by the Danish EPA in cooperation with the Danish industry

4 Provided by the non-governmental Netherlands Packaging Centre

5 Check of 16 producers and 3 importers (2008), in general several random checks per year

6 Inspections do not seem to specifically focus on the ER

7 But companies have to submit an annual report on the content of heavy metals to the Ministry of the Environment

8 Inspections on heavy metal: prosecutions because of too high cadmium levels (2006)

9 Infringements on heavy metal concentrations: 29 (2006), 37 (2007), 37 (2008)

10 Inspections on ER: infringements of three retailers (supermarkets) and some importers in the non-food sector (2011)

11 Five prosecutions based on « misleading packaging » in addition to non-compliance with the ER, one prosecution entirely based on non-compliance with the ER

The following main trends can be observed (based on the currently available information).

## Implementation

Specific/detailed implementation procedure for the ER

Most Member States do not have any rules or guidelines to prove compliance other than compliance with the CEN standards. Compared to 2009, the number of countries having a formal implementation procedure seems not to have increased. Among the four countries identified for having adopted some specific implementation measures (submission of technical documentation and/or presentation of declarations of conformity to control body), large differences appear in the ambitiousness of the approach – not all of them can necessarily be considered as 'best practice' (see formal guidelines below).

Formal guidelines for showing compliance with the ER (next to the CEN standards)

Formal guidelines specify how compliance can be proven, it can for example detail which kind of technical documentation has to be made available and to whom and when it has to be submitted. Only very specific and detailed guidelines were considered (e.g. the guidelines provided by the Czech authorities were not considered as formal guidelines as they only state that documents have to be provided which prove that packaging prevention has been considered). The French



'Application Guide'<sup>5</sup> asks companies for a written declaration of conformity and technical documentation (specifying clearly the kind of documentation requested and providing a model of the declaration of conformity) based on a self-assessment. The UK also details how to show compliance in its 'Goverment Guidance Notes' ('other means' than the CEN standards are acceptable, but none are prescribed) and gives information on the timing and nature of information to be supplied. Bulgaria's guidelines ask companies to sign a declaration of compliance with the ER (in regards to compliance with heavy metal limits, it needs to be signed by an accredited laboratory.

Informal guidelines for showing compliance with the ER (next to the CEN standards)

According to the currently available information from the Member States, informal guidelines for showing compliance are available in 11 countries. Apart from the UK, which government advice service Envirowise provides an eco-design guide for packaging based on the essential requirements, and Denmark where the Danish EPA elaborated a guidance document in collaboration with the industry, there do not seem to be any other MS authorities providing these kinds of guidelines. This kind of support can be found, rather, on the side of producer responsibility compliance schemes which they offer to their members, or sometimes also from associations (involving the industry), such as the French Packaging Council or the Netherlands Packaging Centre.

These kinds of guidelines (especially if not provided by an authority) can be considered as « soft» implementation measures.

Use of CEN standards to prove compliance

In general, all countries seem to accept the use of CEN standards to prove compliance. Some countries encourage their use (i.e. the UK considers them a consistent framework to show compliance), while other countries are more reluctant (i.e. Belgium considers them as too vague and therefore difficult to enforce).

#### Enforcement

Specific/detailed enforcement procedure for ER

Only three countries have a specific/detailed enforcement procedure for the ER. In the Netherlands, inspections specifically focusing on the ER have started in 2011 and are performed by the Dutch Ministry for Infrastructure and Environment which has also developed an inspection list to support inspection officers. In the UK, the ER are enforced in a decentralised way by the comptetent organisations of the different areas (e.g. in England and Wales by the Trading Standards departments of local authorities), a Trading Standards toolkit providing a list of questions for enforcement officers is available. The officers also try to resolve issues of non-compliance with the companies by providing assistance. In the Czech Republic, the Trade Inspectorate is in charge of inspections and performs several random checks on the ER per year (also based on complaints).

■ Inspection on all 3 types of ER (art.9) in the past 5 years

Apart from the three previously mentioned countries, inspections on all three aspects of the ER have also taken place in Austria and Ireland in the past five years, even if these countries do not have a

<sup>&</sup>lt;sup>5</sup> Guide d'application pour la mise en conformité des emballages avec les obligations réglementaires de la directive européenne 94/62/CE



specific/detailed enforcement procedure for the ER. In Ireland, inspections which took place in 2009 (in relation to the compliance with the Waste Management (Packaging) Regulations), focused on producers suspected of 'free riding' rather than an explicit focus on the essential requirements, but the inspections also took a look at compliance with the ER.

Inspections on heavy metal concentrations (art.11) in the past 5 years

Inspections on heavy metals are performed by more Member States than on all three aspects of the ER. In addition to the countries which have a formal enforcement procedure (Czech Republic, Netherlands, UK) and the ones which inspect on the ER without having a formal enforcement procedure (Austria and Ireland), inspections have also been conducted in Belgium, Cyprus, Denmark, Germany and Lithuania in the last five years. The competent bodies in charge of inspections on heavy metals differ between these countries (Ministry of Environment in Cyprus, Ministry of Economy in Lithuania, EPA in Denmark, depending on the States in Germany). Inspections are very often not regularly performed (e.g. not on a yearly basis). In Belgium however, the Federal Environment Inspectorate conducts yearly inspection campaigns, since 2005 (heavy metals are assessed in the field with a mobile XRF gun).

Infringements detected in the past 5 years

Little information is available on detected infringements, only four countries seem to have detected non-compliant packaging in the past 5 years. In Denmark, inspections on heavy metals have detected two cases of too high cadmium levels in 2006 in packaging of products originating from Asia. In Lithuania, a high number of infringements on hazardous substances was detected during controls which took place from 2006 to 2008: 29 in 2006 (out of 45 companies checked), 37 in 2007 (out of 45 checked), 37 in 2008 (out of 42 checked). Infringements were detected in the Netherlands and in the UK during inspections on all aspects of the ER. In the context of the recently started inspections in the Netherlands (February 2011), none of the inspected companies - three retailers (supermarkets) and some importers in the non-food sector - could show evidence that their products were compliant with the ER. The UK has so far five prosecutions and numerous cautions. Four of the cautions are based on « misleading packaging » in addition to non-compliance with the ER, one prosecution is entirely based on non-compliance with the ER.

Even if the large majority of MS do not have any formalised procedures for implementation and enforcement of the ER, interesting initiatives exist in some of the Member States. The most interesting ones which can serve as an inspiration for other countries or provide them with practical solutions have been selected and are available as best practice factsheets (see Chapter 3). They cover compliance procedures (technical documentation and declaration of conformity to be submitted), inspection procedures, prosecution as well as alternative means for achieving prevention of packaging and packaging waste implemented by Member States (packaging prevention plan, awareness raising campaign to encourage consumers to challenge excess packaging).

Regarding qualitative prevention specifically, the efforts made are unclear as it was not possible to accurately evaluate the current level of implementation of this Essential Requirement because many Member States do not provide any information on their efforts related to the prevention of hazardous substances (apart from heavy metals in some countries). It was therefore also not



possible to quantify the benefits resulting from the current level of implementation.

# 3.2 Impacts of the current state of implementation of the ER

## 3.2.1 General trends

Historical trends have shown, over the years, a general improvement in terms of both recycling rates of packaging and individual packaging weight.

The amount of recycled and recovered packaging has steadily increased in the EU over time; in the EU-27 the recycling rate for packaging waste increased from 46% to 61% between 1997 and 2008.<sup>6</sup> The recycling rate for packaging waste increased in nearly all EU-15 countries between 1998 and 2008; Germany and Sweden are the only exceptions where the recycling rates dropped, from 80% to 58%, and from 75% to 58% respectively, while the recovery rates of packaging waste increased from 81% to 95% in Germany and decreased in Sweden from 82% to 80%. Figure 2 below shows the development of the recycling rate for EU-15.



Figure 2: Packaging waste recycling rate, 1998 and 2008<sup>7</sup>

The weight of individual packaging has also been decreasing, although at a slower rate since the year 2000; see Table 2 below.

<sup>&</sup>lt;sup>7</sup> Derived from Eurostat, 2010.



<sup>&</sup>lt;sup>6</sup> Eurostat, 2010.

					5 5		
Type of packaging	1950s	19605	19705	19905	2000	2008	Per cent change <sup>9</sup>
Washing-up liquid bottle (1 litre)	_	-	120g	67g	50g	439	64%
Soup can (400g)	90g	-	69g	579	559	499	46%
Yoghurt pot (165g)	-	12g	79	59	_	49	67%
Plastics fizzy drinks bottle (2 litres)	-	-	58g	-	43g	4og	31%
Metal drinks can (330ml)	_	6og	_	21g	159	149	77%
Glass beer bottle (275g)	_	_	450g	_	325g	176g	61%
Glass milk bottle (1 pint)	538g	_	3979	230g	_	186g	65%

Table 2: Examples of the evolution of packaging weight<sup>8</sup>

Despite increases in recycling and recovery rates and reductions in the weight of individual packaging<sup>10</sup>, the development of the total packaging waste generated in the EU, shown below in Figure 3, indicates a constant but slight decrease since 2006 and therefore moderate progress in terms of quantitative waste prevention. In fact, packaging minimisation cannot be obtained only through lightweighting of individual packaging, and is also linked to general trends in consumption, as well as other packaging design features such as reusability.



Figure 3: Total packaging waste generation in the EU (kg/year/capita)<sup>11</sup>



<sup>&</sup>lt;sup>8</sup> Packaging and Packaging Waste Statistics 1998 – 2006, EUROPEN.

 $<sup>^{9}</sup>$  The per cent change measures the weight reduction in 2008 compared with the first year of data reporting for the product in the table

<sup>&</sup>lt;sup>11</sup> EEA 2009, Eurostat 2010.

# 3.2.2 Impacts which can be allocated to the implementation of the ER

In order to estimate the impacts of the current state of implementation of the Essential Requirements, both in terms of resource efficiency and cost reductions for industry, a comparison with a reference scenario, with no implementation of the ER, would be needed. There are in principle two ways of achieving such a comparison:

- Observe trends in packaging waste generation and recycling over time, and link them to the level of implementation of the Essential Requirements: this is not possible as improvements in recycling rates and in amounts of packaging waste generated can be the combined effects of the implementation of the Essential Requirements, the targets set out in the Packaging Waste Directive, the obligation to set up waste collection and treatment infrastructure, and economic considerations by producers leading to higher resource and cost efficiency.
- Compare the situation between a country where the implementation of the Essential Requirements is high, with a country where the implementation is low: this approach cannot lead to any conclusive results either. Firstly, it is very hard to find an 'exemplary' country when it comes to the implementation of the Essential Requirements. Secondly, the actual amounts of packaging waste generated, and the recycling rates also depend on the local situation: consumption habits, development of separate collection, etc. Finally, packaging producers are often multinational companies, and any effort (or the absence of efforts) taken to prevent packaging at source would have an impact on several countries, without distinction of the local level of implementation of the Essential Requirements.

Given these difficulties, it was not possible to assess directly the contribution of the current state of implementation of the Essential Requirements to resource efficiency and costs reduction.

However, significant improvements can still be expected through further implementation of the Essential Requirements. This 'potential' contribution of the Essential Requirements to resource efficiency and costs reduction is the subject of the following chapter.

# 3.3 Impacts of further implementation of the ER

This section aims at estimating the potential benefits of further implementation of the Essential Requirements, through the resulting costs reduction for the industry, and the potential environmental benefits in particular to resource efficiency.

The following quantitative analysis distinguishes quantitative prevention (reduction of the quantities of packaging waste through weight reduction, reuse and avoidance of packaging), and recyclability of packaging.



# 3.3.1 General approach

## 3.3.1.1 SCENARIO DEVELOPMENT

In order to assess the potential benefits (in terms of costs reduction and environmental impacts) of further implementation of the Essential Requirements, it was decided with the EC to develop scenarios focusing on concrete initiatives.

Regarding quantitative prevention, three types of scenarios were developed and analysed: weight reduction, reuse and avoidance of certain types of packaging.

These scenarios were developed on certain specific types of packaging, selected for their representativeness and the availability of market and benchmarking data. As a result, the proposed 'quantitative prevention' scenarios do not account for the total benefits that could be achieved through an enhanced implementation of the Essential Requirements, but rather give an overview of the potential benefits of their implementation on specific types of packaging.

The aim in chosing these scenarios was to illustrate the diversity of solutions to prevention. Weight reduction can be an obvious prevention action, for instance for glass, and achievements along these lines have been made for many years, but further reduction is still possible in many cases without lessening the functionality of the packaging. Prevention also includes the redesign of packaging for reuse, the elimination of superfluous elements, etc. Reuse initiatives refer not only strictly to reuse of packaging such as for beverage or cleaning products, but also to giving a second life to packaging with a different functionality.

The potential benefits to be achieved through increased recyclability were also assessed. The scenario retained to calculate these benefits assumes that the recycling rates of the best performing Member States, for each fraction of packaging waste, are achieved for all Member States; this scenario is compared to the current average recycling rate. It must be noted that recycling rates do not only depend on the recyclability of packaging, but also on the collection systems and treatment facilities available, and that the full benefits of this scenario cannot be obtained through improved recyclability only.

Case		Reference situation	Scenario analysed						
QUANTITATIVE PREVENTION									
Weight reduction	Wine bottles	Glass bottles of 500 g	Glass bottles of 300 g						
Reuse	Hygiene products	Soap in bottles with dispensing pumps	Refill systems for soap						
	Household cleaning products	Bottles with dispensing pumps/triggers	Refill systems						
Avoidance Dry food		Plastic or paper/cardboard packaging	Bulk						
RECYCLABILITY									
Recyclability	Each fraction of packaging waste	Current recycling rates reached in EU-27	Recycling rates of the best performing MS achieved by all MS						

#### Table 3: Scenarios considered



The weight reduction scenario with wine bottles is considered realistic and feasible as many producers already use thick heavy bottles for the domestic market and ultra slim bottles for export (largely to cut shipping costs), therefore indicating that weight reductions are technically feasible. According to WRAP's Glass Rite Wine project, it has been shown that the current minimum possible weight for wine bottles is 300 g; this has been applied in the current scenario.

The reuse scenarios with hygiene products and household cleaning products are esteemed to be realistic and feasible as such systems already exist; use of flexible pouches or sachets for refill packs reduces material use and removes the necessity of selling a pump with each unit.

The avoidance scenarios for dry food products are considered realistic and feasible as companies have already undertaken such initiatives. For example, a supermarket chain in Italy has created an initiative since 2005 to offer dry foods in bulk.<sup>12</sup>

#### Remark:

Reuse cases involving a second life for packaging with a different functionality or as part of the product (e.g. a dishwasher powder container which can be reused as a flower pot, a television box which can be turned into a stand following unpacking) were also not considered due to the high variety of functions packaging can have and the numerous products it can replace. This makes it difficult to analyse the costs and environmental savings without considering the impacts of the item replaced (e.g. flower pot, TV stand), which is out of the scope of this study.

## **3.3.1.2 Assessment of the cost reductions**

The diversity and complexity of the impacts only allows for a rough estimate of the magnitude of the cost savings to be made.

## Cost components potentially involved

Cost reductions (or for some specific components, additional costs) related to ER may occur at different levels in the packaging and packaging waste (treatment) chain. Industry or private producers might reduce costs by rethinking or lightweighting of their packaging. Further cost savings might be targeted in the transport or distribution phase of (no longer) packaged products. Alternative packaging options might also result in lower waste collection costs or higher input of recycled materials which could be beneficial for both private actors and society.

The prevention measures might thus have an influence on multiple cost components and impacts can be expected in the various steps of the life cycle.

<sup>&</sup>lt;sup>12</sup> EC (2009) Waste Prevention Best Practice Factsheets: Eco-Point initiative for Bulk Good Sales (Italy) <u>http://ec.europa.eu/environment/waste/prevention/pdf/Ecopoint\_crai\_Factsheet.pdf</u>







#### Cost components quantified in this study

The estimate of the cost reduction of prevention scenarios focuses primarily on(private) costs for industry, as this exercise needs to avoid double counting of cost reductions (e.g. waste collection and treatment costs versus green dot fees).

Within the limited scope of this study, cost components that could be considered in this study are primarily:

- avoided raw material costs for packaging
- impact on Green Dot fees

It is assumed that there is no significant change in production and process costs i.e. that the implementation of the prevention initiatives selected is supposed to be technically feasible without (large) investments during the packaging production stage. This is not necessarily possible in the short run as some difficulties might arise at the initial stage. But as discussed in Annex 3 for each of the scenarios analysed, the identified literature sources mention cost savings without indicating significant additional production or process costs packaging makers. It is often argued that further research is needed in order to convince producers of the performance (aesthetics, market acceptance, strength) but that it is technically feasible without risking product degradation.

As for recyclability is concerned, an increase of recycling rates throughout the EU could also be associated with cost savings for businesses affected by the Essential Requirements, by means of lower raw material inputs. Much depends on the potential to maximise the use of recycled materials in the packaging without compromising the performance and role of packaging<sup>13</sup>. The approach to calculate the potential cost reductions stems from the production costs of recycled materials compared to production costs of virgin raw material (e.g. lower energy costs<sup>14</sup>), reflected in market prices of both materials. The difference between the market prices of virgin and recycled material is used to calculate the magnitude of the impact (i.e. for the reduced need of virgin input material).



<sup>&</sup>lt;sup>13</sup> Different sources suggest that this is most likely feasible both from the marketing perspective (consumer acceptance) as well as from the performance perspective. See e.g. <u>http://www.wastewatch.org.uk/data/files/resources/57/LR-8-</u> <u>Packaging-Materials.pdf</u> or

http://www.wrap.org.uk/downloads/Using\_recycled\_content\_in\_plastic\_packaging\_the\_benefits.2f836eac.3597.pdf

<sup>&</sup>lt;sup>14</sup> E.g. for use of recycled glass instead of production of new virgin material, energy savings could amount up to 15%. <u>http://www.milieucentraal.nl/pagina.aspx?onderwerp=Glas</u>

#### Key assumptions and sensitivity analyses

The costs were assessed based on the lower bound estimates for prevented quantities and lower bound raw material prices. This choice was inspired by uncertainties in proposed quantities, the volatility of raw material prices and the absence of both additional and saved costs that could not be quantified.

A sensitivity analysis was performed using upper bound prices and higher prevented quantities in some specific scenarios. Cost savings would increased by about 20% higher compared to lower values.

Regarding the impact on Green Dot fees, it should be noted that the fee rate could be adapted by national recovery systems if system costs face changing trends or practices<sup>15</sup>. Guiding principles for calculation of fees are rarely transparent and it could be assumed that total savings on Green Dot fees will be less important than the amount estimated in this study.

## 3.3.1.3 ASSESSMENT OF ENVIRONMENTAL IMPACTS

The environmental impacts and benefits of the scenarios were assessed through a life cycle approach, starting from the raw material extraction stage up to the end of life stage.

The life cycle approach taken was the method of substitution, also known as the 'impacts avoided' system and illustrated in the graphics hereafter.

#### Systems boundaries

Packaging waste prevention (through weight reduction, reuse and avoidance) results in the avoidance of packaging material production and packaging end of life, and their associated resource use and environmental impacts.

In the current models, packaging filling and transportation were not taken into account across all scenarios considered. Packaging filling was not considered as energy used to fill the packaging can be assumed to be the same regardless of the type of packaging, therefore its impact is cancelled out across all scenarios considered (this life cycle step is represented with dotted lines in the systems represented below). Transportation accounts for only 2% to 5% of the life cycle impact, and has been left off since it is considered to have a minor impact on the overall environmental impacts.

The systems studied for lightweighting and reuse are illustrated below, representing the steps of the packaging life cycle taken into account. In an avoidance situation, the system assessed is similar to lightweighting; however, it is possible that only the second subsystem would be considered if the packaging disappears completely, for example in the case of bulk sales of dry food goods. In the case of higher recycling rates (recyclability scenario), the system is similar to the lightweighting one, with the same quantity of packaging producing X and a higher recycling rate  $T'_R$  compared to the reference recycling rate  $T_R$ .

<sup>&</sup>lt;sup>15</sup> In Hungary for example, the increasing share of reusable wine bottles resulted in higher fees for other bottles. See <a href="http://www.slideshare.net/vba.vargabor/bottle-reuse-in-hungarys-wine-sector-presentation">http://www.slideshare.net/vba.vargabor/bottle-reuse-in-hungarys-wine-sector-presentation</a>





Figure 5: System studied for lightweighting - Life cycle approach







## Modelisation of impacts from recycling

Increased recycling rates for packaging materials results in the production of recycled materials that can be used again in packaging, therefore avoiding the manufacturing of packaging from raw materials. Increased recycling rates also lead to the avoidance of landfilling and incineration (with or without energy recovery).

The environmental impacts avoided through recycling are calculated as follows:

$$I = I_{mv} + (1 - r) \times I_{eol} + r \times (I_{mr} - I_{mv})$$

With:

I: Environmental impact avoided by recycling

 $I_{m\nu}\!:$  Environmental impacts of manufacturing from virgin material

 $I_{\mbox{\scriptsize mr}}$ : Environmental impacts of manufacturing from recycled material

 $I_{eol}$ : Environmental impacts of end of life (without recycling)

r: recycling rate



## Key assumptions

In the prevention scenarios, recycling, incineration, and landfilling rates were assumed for various packaging materials based on current data by Eurostat.<sup>16</sup>

Mat	erial	Recycling	Incineration with energy recovery	Incineration without energy recovery	Landfilling	
All household packagin	g		21%	14%	66%	
Glass		66%	7%	5%	22%	
Plastic		30%	14%	10%	46%	
Plastic in the form of bot	tles or flasks (PET, PEHD)	30%	14%	10%	46%	
Paper/cardboard		81%	4%	3%	12%	
Steel		68%	7%	4%	21%	
Cartana	Material: cardboard		21%	14%	66%	
Cartons	Material: plastic foil		21%	14%	66%	

Table 4: Recycling, incineration and landfilling rates considered by material

#### Environmental indicators

Three environmental indicators were retained and evaluated to assess the benefits of the scenarios:

- Green House Gases Emissions (expressed in tonnes CO<sub>2</sub> equivalent)
- Natural resource depletion (expressed in tonnes Sb equivalent)
- Fossil resource depletion (expressed in tonnes oil equivalent)

Natural resources and fossil resources depletion were selected to focus on resource efficiency and capture the use of materials. Green House Gases Emissions was selected as it is a widely used environmental indicator and linked with major policy issues. Furthermore Green House Gases Emissions data are particularly robust for life cycle analysis.

These three indicators were calculated based on the quantities of packaging material saved in each scenario, and the Life Cycle Inventories of each packaging type involved. GHG emissions were assessed using the CML impact assessment method, and fossil resources depletion using the Recipe impact assessment method.

#### <u>Data sources</u>

The database used for the preparation of the Life Cycle Analysis (LCA) is Ecoinvent v2.2, which is recognised by experts worldwide as one of the best data sources for LCA. As indicated further above, 2009 Eurostat data was used for the percentage of waste landfilled, incinerated, and recycled.<sup>16</sup> In terms of the quantities of energy and heat produced by the incineration of each material, data was used from the Ecoinvent database. The LC inventory data used for each material are presented Annex 6.

<sup>&</sup>lt;sup>16</sup> Eurostat, 2011, Recycling accounted for a quarter of total municipal waste treated in 2009 (http://epp.eurostat.ec.europa.eu/cache/ITY\_PUBLIC/8-08032011-AP/EN/8-08032011-AP-EN.PDF)

Below, a summary of the cost reductions and environmental impacts for each scenario assessed is presented. Quantities, cost impacts, and environmental impacts are indicated, comparing the reference situation to the prevention scenario.

Main assumptions and results are highlighted. Positive and negative impacts of the prevention scenario versus the reference situation are illustrated using the following symbols:

Symbol	Meaning
1	Increase in amount of materials or environmental impact (e.g. use of additional 5 kt of glass)
A.	Reduction in amount of materials or environmental impact (e.g. 5 Kt less glass used)
+	Positive effect in terms of cost or environmental impacts (e.g. reduction in material used)
-	Negative effect in terms of cost or environmental impacts (e.g. use of additional materials)

In order to facilitate the reading and interpretation of the results, the following equivalences are used to express the environmental impacts of each scenario:

Environmental indicator	Equivalence for 1 average inhabitant of the EU-27
Green House Gases Emissions	11 232 kg CO2 eg./yr
Natural resource depletion	36 kg Sb eq./yr
Fossil resource depletion	1 558 kg oil eq./yr

More in-depth information on hypotheses used and calculations of cost and environmental results can be found for each scenario in Annex 3.



# 3.3.2 Impacts of quantitative prevention

## 3.3.2.1 WEIGHT REDUCTION

WEIGHT RED	UCTION	Scenario: WINE BOTTLES				
	Reference situation Heavier glass bottles	Prevention scenario Lighter glass bottles				
Action taken	Reduction of all wine bottles on the n cases, bottles are recyclable (up to 66 incinerated or landfilled)	narket in EU-27 to 300 g. In both 5% currently in the EU, the rest being				
Quantities	<ul> <li>Glass bottle (75 cl) of 500 g</li> <li>160 M hectolitres/year in EU-27 thus 21.3 billion bottles of 75 cl (46 bottles/capita/yr)</li> <li>10.7 Mt of glass</li> <li>Glass bottle (75 cl) of 300 g</li> <li>160 M hectolitres/year in EU-27 thus 21.3 billion bottles of 75 cl (46 bottles/capita/yr)</li> <li>10.7 Mt of glass</li> <li>6.4 Mt of glass</li> </ul>					
Cost impacts	Packaging production & processing	to & use				
	Raw material cost +112.3 M€	Green dot fees +81.3 M€				
Main assumptions	<ul> <li>A mix of 35% virgin (52 €/t) &amp; 65% recycled (125€/t)</li> <li>Lightweighted technically no signification required</li> <li>Average g for glass: 1</li> </ul>	hting / feasible with ant investment reen dot fees -9,06€/t				
Environmen- tal impacts	GHG emissions: +3.7 Mt CO2 eq Natural resource depletion: +28 Fossil resource depletion: +1.4 N	. (~o.3 M inhab.) .2 Kt Sb eq. (~o.8 M inhab) /It oil eq. (~o.9 M inhab)				

In this weight reduction scenario involving wine bottles, the weight of all wine bottles (excluding sparkling wine) on the market in the EU-27 were reduced to 300g, involving a saving of 40% of glass consumed (4.3 M $\epsilon$ ). Such a reduction would result in a cost reduction for industry of 193.6 million Euros (112.3 M $\epsilon$  for reduced raw material costs, 81.3 M $\epsilon$  for reduced green dot fees). The lightweighting would also lead to a reduction of GHG emissions, natural resource depletion and fossil resource depletion equivalent to the impacts of about 0.3 to 0.9 million European inhabitants per year depending on the impacts (3.7 Mt CO<sub>2</sub> eq., 28.2 Kt Sb eq., 1.4 Mt oil eq.).

## 3.3.2.2 REUSE

REUSE	Scenario: HYGIENE PRODUCTS			
	Reference situation Non-refillable soap dispenser			
Action taken	50% of HDPE bottles with non-refillable dispensing pumps/triggers on the market in the EU-27 are replaced by refill systems (HDPE refill dispenser plus HDPEplastic bags/pouches). In both cases, bottles are recyclable (up to 30% currently in the EU, the rest being incinerated or landfilled).			
Quantities	<ul> <li>Non-refillable soap dispenser of 200g (HDPE)</li> <li>720 Kt/yr of soap in EU-27 thus 3.6 billion packs of soap/year in EU-27 (7 packs/capita/yr)</li> <li>Refillable soap dispenser of 200 g (HDPE)</li> <li>50% of soap dispensers thus 1.8 billion primary packs/year in EU-27 (3.4 packs/capita/yr)</li> <li>45 Kt of HDPE saved</li> </ul>			
Cost impacts	Packaging production & processing			
	Raw material cost     Green dot fees       +36 M€     +7.3 M€			
Main assumptions	<ul> <li>Refill pack is not the same size refill but contains more product than the primary pack</li> <li>Need for only one pump (not replaced every time refilled) for primary pack; use of cap or foil seal for refill packs</li> <li>HDPE bottles/flasks:a mix of 25% recycled HDPE (245 €/t) and 75% virgin (990 €/t)</li> <li>Average green dot fees:         <ul> <li>HDPE bottles</li> <li>192.43€/t</li> </ul> </li> </ul>			
Environment al impacts	GHG emissions: +145 Kt CO2 eq. (~13000 inhab.) Natural resource depletion: +1.4 Kt Sb eq. (~39000 inhab.) Fossil resource depletion: +69 Kt oil eq. (~44000 inhab)			

In this reuse scenario involving hygiene products, 50% of HDPE non-refillable pump/trigger dispensers on the market in the EU-27 would be replaced by HDPE refillable dispensers (the refill packs would be plastic bags or pouches also be made of HDPE). For the sake of this exercise, not only the dispenser but also the refill packs are considered recyclable and are considered to have the



same recycling rate as the non-refillable soap dispensers used in the base scenario. Due to a lack of information on the recycling rate specific to HDPE, the recycling rate is estimated at 30%, which is the average recycling rate for plastic packaging in the EU-27. However, it is possible that the actual recycling rate for HDPE is lower in particularly for the refill packs/pouches (which could reduce the benefits assessed here). Moving from non-refillable to refillable dispensers with refill packs would result in a cost reduction for industry of 43.3 million Euros (36 M $\in$  for reduced raw material costs, 7.3 M $\in$  for reduced green dot fees). The replacement would lead to a reduction of GHG emissions, natural resource depletion and fossil resource depletion equivalent to the impacts of 13,000 to 45,000 European inhabitants per year depending on the impacts (145 Kt CO2 eq., 1.4 Kt Sb eq., 69 Kt oil eq.).



REUSE	Scenario: HOUSEHOLD CLEANING PRODUCTS					
	Reference situation	Prevention scenario Refillable spray bottle				
Action taken	25% of household cleaning products sold in the EU-27 in non-refillable packs with dispensers and 25% sold in non-refillable trigger packs, replaced by refillable packs. In both cases, bottles are recyclable (up to 30% currently in the EU, the rest being incinerated or landfilled, in line with European recycling rates for HDPE used in packaging).					
Quantities	<ul> <li>Non-refillable spray bottle (500ml)</li> <li>Non-refillable soap pump (500ml)</li> <li>3.9 billion spray bottles/year in EU-27 (8 bottles/capita/yr)</li> <li>3.9 billion packs of soap pumps/year in EU-27 (8 pumps/capita/yr)</li> <li>98.4 Kt of HDPE saved for dispenser pump containers</li> <li>78.7 Kt of HDPE saved for spray bottles</li> </ul>					
Cost impacts	Packaging production & processing					
	Raw material cost	Green dot fees				
	+142 M€	+29 M€				
Main assumptions	<ul> <li>Refill pack is not the same size refill but contains more product than primary pack</li> <li>Need for only one pump (not replaced every time refilled) for primary pack; use of cap or foil seal for refill packs</li> <li>HDPE bottles/flasks: a mix of 75% virgin HDPE (990 €/t) and 25% recycled (245 €/t)</li> </ul>	Average green dot fees: • HDPE bottles and flasks: 192.43€/t				
Environment al impacts	GHG emissions: +476 Kt CO2 e Natural resource depletion: +4 Fossil resource depletion: +20	eq. (~43,000 inhab.) 3 Kt Sb eq. (~119,000 inhab) 5 Kt oil eq. (~132,000 inhab)				



In this reuse scenario involving household cleaning products, 25% of household cleaning products sold in EU-27 in non-refillable packs with dispensers and 25% with trigger packs, would be replaced by refillable packs. Such a replacement would result in a cost reduction for industry of 171 million euros (142 M $\in$  for reduced raw material costs, 29 M $\in$  for reduced green dot fees). The replacement would lead to a reduction of GHG emissions, natural resource depletion and fossil resource depletion equivalent to the impacts of 43,000 to 130,000 European inhabitants per year depending on the impacts (476 Kt CO2 eq., 4.3 Kt Sb eq., 206 Kt oil eq.).



## 3.3.2.3 AVOIDANCE

AVOIDANCE	Scenario: DRY FOOD					
	Reference situation	Prevention scenario				
	Packs of dry foods	Dry foods sold in bulk				
Action taken	Replacement of packs of dry foods by food sold in bulk for 50% of dried fruits and nuts, 50% of breakfast and other cereals, and 50% of pasta on the market in the EU-27.					
Quantities	Dried fruits and nuts: • pack of 250g • 128 million tonnes dried fruits/year in EU-27 thus 1.03 billion packs in EU-27 (2 packs/capita/yr) Breakfast cereals and other cereal grain products: • pack of 500g • 1.1 billion tonnes cereal/year in EU- 27 thus 4.58 billion packs in EU-27 (9 packs/capita/yr) Pasta: • pack of 1 kg • 1.9 billion tonnes pasta/year in EU- 27 thus 3.86 billion packs in EU-27 (8 packs/capita/yr) PP: 2.58 Kt (dried fruit and nuts) + 45.85 Kt (cereals) + 19.31 Kt (pasta) Cardboard: 97.4 Kt (cereals) + 38.62 Kt (pasta)	Dried fruits and nuits, breakfast and other cereals, and pasta sold in bulk				
	68 Kt of PP saved 136 kt of cardboard saved					
Cost impacts	Packaging production & processing					
	Raw material cost G	ireen dot fees				
	Plastic: +65 M€	Plastics: +7.6 M€				
	Cardboard: +52 M€	Cardboard: +7.7 M€				
	+117 M€	+15.3 M€				



Main assumptions	<ul> <li>Dried fruit and nuts: 5g of plastic per pack</li> <li>Breakfast and other cereals: 20g of plastic for inner bag and 85g of cardboard for outer layer; half the market consists of plastic bag with cardboard, half consists of only a plastic bag</li> <li>Pasta: 20g of plastic per pack 40g per cardboard box; half the market in cardboard, half in plastic</li> <li>PP foil/bags: only virgin raw material (900 €/t)</li> <li>Paper/cardboard: a mix of 55% recycled (115 €/t) and 45% virgin (717 €/t)</li> </ul>	Average (fees: • Paper/o 56.67 € • Other r 112.90	green dot ardboard: /t ecoverables: €/t	
Environmental impacts	Plastics (PP film) saved GHG emissions: +181 Kt C Natural resource depletion Kt Sb eq. Fossil resource depletion: oil eq. GHG emissions: +38 Natural resource depletion Fossil resource depletion	:O2 eq n: +1.8 +92 Kt 6 Kt CO2 pletion: + etion: +15	Cardboard sa GHG emise Natural res Sb eq. Fossil reso oil eq. eq. (~35,000 in 3.2Kt Sb eq. (~35,	aved sions: +2.5 Kt CO2 eq source depletion: +1.3 Kt urce depletion: +63 Mt hhab.) ~89,000 inhab.) 99,500 inhab.)

In this avoidance scenario involving dry foods, 50% of dried fruits and nuts, 50% of breakfast and other cereals, and 50% of pasta on the market in the EU-27 would move from being sold in packets to being sold in bulk. Such a change would result in a cost reduction for industry of 132.3 million Euros (117 M $\in$  for reduced raw material costs, 15.3 M $\in$  for reduced green dot fees) related to a reduction in the amount of plastics (PP film) and cardboard used. The replacement would lead to a reduction of GHG emissions, natural resource depletion, and fossil resource depletion equivalent to the impacts of 35,000 to 100,000 European inhabitants per year depending on the impacts (386 Kt CO2 eq., 3.2 Kt Sb eq., 155 Kt oil eq.).

#### Remark:

In this scenario, it is assumed that the consumer brings the necessary containers to the shop to buy bulk food (plastic or cotton bags, plastic containers or other). In the situation in which the shop provides containers (i.e. plastic or paper bags) and consumers mainly use these, the aforementioned cost and environmental savings are anticipated to be lower since more plastic or paper would be used. However, the amount of packaging material used per kg of food purchased is anticipated to still be less than in a scenario where non-bulk cardboard or plastic packaging would be used.


# Impacts of the recyclability of waste

RECYCLABILITY			
	Reference situation Current recycling rates reached in EU-27	Recyclability scenario Recycling rates of the best performing MS achieved by all MS	
Action taken	Application of the recycling rates for ea MS across the EU-27.	ch material of the `best-performing'	
Quantities	Recycling rates Glass: 66% (11.02 Mt) Plastics: 30% (4.53 Mt) Paper & board: 81% (25.27 Mt) Metals: 68% (3.34 Mt) Glass: +5.7 Mt recycle Plastics: +3.8 Mt recycle Paper & board: +4.7 I Metals: +1.3 Mt recycle	Recycling rates Glass: 100% Plastics: 56% Paper and board: 96% Metals: 95% ed vcled Mt recycled cled	
Cost impacts	Packaging production & processing	g to & use	
	Raw material cost Glass: +0.14 billion € Paper & boa Plastics: +4.03 billion € Metals: +0.5 +7.5 billion €	ard: +2.84 billion € 53 billion €	
Main assumptions	<ul> <li>Glass: 50% white and 50% green glass cul</li> <li>Plastics: 73%PET and 27% HDPE</li> <li>Metals: 81% steel and 19% aluminium</li> </ul>	lets	
Environmen- tal impacts	GHG emissions: +17 Mt CO2 eq. ( Natural resource depletion: +139 Fossil resource depletion: +6.7 M	~1.5 M inhab.) Kt Sb eq. (~3.9 M inhab.) t oil eq. (~4.3 M inhab)	

In this recyclability scenario, the packaging material recycling rates of the 'best-performing' MS in the EU-27 for each material were applied across the entire EU-27. Such a change would result in a cost reduction for industry of 7.5 billion Euros (0.14 billion  $\in$  for glass, 4.03 billion  $\in$  for plastics, 2.84 billion  $\in$  for paper and cardboard, 0.53 billion  $\in$  for metals). Increased recycling would lead to a reduction of GHG emissions, natural and fossil resource depletion equivalent to the impacts of 1.5 to 4.3 million EU inhabitants per year depending on the impact (17 Mt CO2 eq., 139 Kt Sb eq., 6.7 Mt oil eq.).

The benefits obtained from the recycling scenario are much higher than the benefits obtained through each of the quantitative prevention scenario analysed as the recycling scenario covers the totality of packaging waste, whereas the quantitative prevention scenarios benefits were only quantified for selected types of packaging.



# Chapter 4: Best practices

In brief Best practices for the implementation and enforcement of the Essential Requirements were selected, using the following criteria: representation, focus, efficacity, replicability, innovation, and life cycle approach. Implementation best practices were selected highlighting: packaging design that minimises weight and volume, design to increase the durability and reusability of packaging, different types of packaging recovery (reuse, composting, recycling), and qualitative waste prevention (minimum levels of hazardous substances and heavy metals). Enforcement best practices were selected highlighting: guidance for industry on implementation and compliance, inspection measures, case law demonstrating prosecution for infringements, as well as specific regulations (such as prevention plans).

# 4.1 Presentation of the best practices selected

Good practices were in the first instance identified during the stakeholder workshop. Subsequently, authorities and relevant experts were consulted, completed by literature search. The identified initiatives were then analysed and evaluated.

Practices were separated into implementation and enforcement measures of the Essential Requirements.

Where feasible, the following criteria were applied in order to select the best practices:

- Representation: Practices selected have to cover a variety of types of packaging waste, use a range of approaches to implementation and enforcement of the Essential Requirements, and originate from a range of MS across the EU<sub>27</sub>
- Focus: Practices have to clearly address one or more facets of the Essential Requirements (quantitative waste prevention, recyclability, reduction of hazardous content, etc.)
- Efficacy: Practices that have clearly defined objectives and have proven results in achieving one or more aims of the Essential Requirements
- Replicability: Practices that are not reliant on specific MS circumstances and could be reproduced widely in the EU
- Innovation: Practices that use innovative or resourceful techniques to prevent packaging waste and minimise its environmental impacts
- Life cycle approach: Practices that reduce the environmental impact of packaging across its life cycle





#### Implementation

The examples were also chosen based on their potential impacts on stakeholders, therefore, for instance, the choice of cases of the food sector (being one of the main contributors to the packaging waste stream) or green-dot organisation initiatives (their proposed tools and guidance having a large impact on all types of producers).

The implementation measures covered by the best practices include:

- packaging design that minimises weight and volume;
- design to increase the durability and reusability of packaging;
- different types of packaging recovery (reuse, composting, recycling);
- qualitative waste prevention (minimum levels of hazardous substances and heavy metals).

Promotional and informational measures are part of the selected best practices.

#### Disclaimer:

The given examples are purely indicative, the list of examples chosen is non-exhaustive. Any future actions must be based on full life cycle analysis to be performed on a case-by-case basis.

#### Enforcement

As especially regarding enforcement, there are not many (Member State) initiatives available from which to select best practices, the approach was to compile the initiatives available, and to eliminate the ones which did not seem interesting/less interesting than another similar example (e.g. the Czech example, where producers and importers have to show compliance by submitting technical documentation to the control bodies or by using Czech national standards, was not kept as the similar UK initiative is more comprehensive and therefore more interesting). The selection of enforcement examples was therefore mainly based on availability coupled with replicability and the possible inspiration they can bring for other MS. The criterion 'efficacy' was considered to a lesser extent as none of the examples is yet at a stage where no further improvement is required anymore (e.g. also the UK, which can be considered as a Member State having very ambitious implementation and enforcement procedures, still has to face some open challenges).

Enforcement measures include measures to monitor and control the application of the Essential Requirements in Member States, and to take corrective action where infringements are encountered. This includes:

- guidance for industry on implementation and compliance;
- inspection measures;
- case law demonstrating prosecution for infringements;
- specific regulations such as prevention plans by companies (to be approved by the authorities).

Regulatory, informational, and promotional measures are part of the selected enforcement best practices.



The final list of 20 best practices is provided below:

#### Implementation

- UNESDA/RECOUP Recyclability guide for plastics packaging (Recycling/Recoverability – Informational measure)
- DANONE Remove of board cluster packaging (Prevention Packaging reduction through avoidance)
- Eco-Emballages Bonus-malus system for green dot fees (Prevention, Recyclability Packaging prevention through eco-modulation of green dot fees)
- WRAP/DHL/Packaging Datastore Packaging weight benchmarking datastore (Packaging prevention – Informational measure)
- Alcatel Supplier restrictions for substances of environmental concern (Minimisation of hazardous substances)
- Scandinavia Opti-Pack (All ER Toolbox with informational guidelines)
- KRAFT Development of flow pack solution (Prevention Packaging reduction through substitution of packaging material)
- IKEA Switch from bulk packaging to staple packaging for tea lights (Prevention Packaging minimisation through redesign)
- Hewlett Packard ClearView packaging for high-end printers (Prevention Packaging reduction through packaging redesign)Unilever – Conversion to concentrated liquid laundry formulations (Prevention – Packaging reduction through redesign)
- Ciclus Packaging reuse for wine as a lamp (Reuse Packaging reduction through reuse)
- Puma Fuse Project (Prevention, reuse Packaging reduction through reuse)

#### Enforcement

- UK Toolkit for ER inspection (All ER Regulatory measure)
- FR Declaration of conformity based on self-assessment (All ER Regulatory measure)
- NL Inspection list (Prevention/Minimisation of hazardous substances Regulatory measure)
- BE X-ray fluorescence gun inspection (Minimisation of hazardous substances Regulatory measure)
- UK Prosecutions for excessive packaging (All ER Regulatory measure)
- UK Lincolnshire County Council Awareness campaign on packaging (Prevention –



Encouragement of consumers to challenge excess packaging)

- BE Packaging prevention plans (Prevention Regulatory Measure)
- **D**K Documentation system on packaging (Prevention Technical documentation)

A short presentation of each case can be found in Annex 7 (as well as other potentially interesting examples which were not selected at the end).

Each selected best practices is described in a factsheet included hereafter and published on the Europa website in the dedicated packaging and packaging waste section (http://er.eu-smr.eu). They cover the following aspects:

- General information (region, type of implementation/enforcement measure, geographical level of implementation, type of stakeholder originating the initiative, date of implementation, type of packaging waste, Essential Requirement concerned)
- Objective
- Means and Resources (description of measures/ actions taken; costs of investment if available)
- Results (environmental and economic impact, drawbacks, difficulties faced...)
- Further information (publications or links)



# 4.2 Best practices factsheets for ER implementation

#### The following 12 factsheets are included in the next pages:

- <u>UNESDA/RECOUP</u> <u>Recyclability</u> <u>guide</u> for <u>plastics</u> <u>packaging</u> (Recycling/Recoverability – Informational measure)
- <u>DANONE Remove of board cluster packaging</u> (Prevention Packaging reduction through avoidance)
- Eco-Emballages Bonus-malus system for green dot fees (Prevention, Recyclability Packaging prevention through eco-modulation of green dot fees)
- WRAP/DHL/Packaging Datastore Packaging weight benchmarking datastore (Packaging prevention – Informational measure)
- <u>Alcatel Supplier restrictions for substances of environmental concern</u> (Minimisation of hazardous substances)
- Scandinavia Opti-Pack (All ER Toolbox with informational guidelines)
- KRAFT Development of flow pack solution (Prevention Packaging reduction through substitution of packaging material)
- IKEA Switch from bulk packaging to staple packaging for tea lights (Prevention Packaging minimisation through redesign)
- <u>Hewlett Packard ClearView packaging for high-end printers</u> (Prevention Packaging reduction through packaging redesign)
- <u>Unilever</u> Conversion to concentrated liquid laundry formulations (Prevention Packaging reduction through redesign)
- <u>Ciclus Packaging reuse for wine as a lamp</u> (Reuse Packaging reduction through reuse)
- Puma Fuse Project (Prevention, reuse Packaging reduction through reuse)



	Country	N/A
	Type of implementation measure	Informational
	Geographical level of implementation	International
	Type of stakeholder originating the initiative	Industry
	Date of implementation	N/A
	Type of packaging waste	Plastics packaging
	Essential Requirement(s) concerned	Recycling/recoverability

# Implementation Best Practice Factsheet Recyclability guide for plastics packaging

Recyclability guide for plastics packaging allow designers to make packaging (more) recyclable.

#### Context

One of the Essential Requirements of Directive 94/62/EC requires that packaging be designed, produced and commercialized in such a way as to permit its reuse or recovery, including recycling.

#### Objective

The goal of recyclability guides and tools are to encourage designers to consider recycling possibilities, provide guidelines for those wishing to make their packaging (more) recyclable and provide everyone with information on how to prevent their packaging from inadvertently interfering with existing plastic recycling streams.

#### Means

Different initiatives have been taken by the industry. The European PET Bottle Platform (EPBP), for example, developed the "Design for recycling guidelines-PET bottles". In May 2011, UNESDA, the European nonalcoholic beverages association, adopted the 'Code of Conduct on PET bottles recyclability'. It will bind members of UNESDA to:

- adhere to EPBP 'Design for Recyclability Guidelines' in the context of the internal 'Design Guide for PET Bottle Recyclability', developed jointly with the European Federation of Bottled Waters (EFBW)
- apply the principle of due diligence and, if necessary, bring their products to the EPBP for an independent assessment when designing or purchasing PET bottles

The Code will take immediate effect with full implementation in the marketplace due by the end of 2012.

In 2006, the design guidelines for PET bottles were elaborated with design guidelines from other industry associations into the "Plastic Packaging - Recycled by Design" guide. Examples of such guidelines are:

- Metal caps should be avoided;
- The use of other components of a different material (e.g. handles) is discouraged;
- The use of opacifiers should be avoided as they significantly reduce the value of PET recyclate;
- Use of paper labels on plastic film presents a significant problem to conventional recycling and therefore needs to be avoided;
- Use of PVC components should be avoided as they can cause discolouration and malodour.

The guide was developed by the packaging consultancy firm Recoup in cooperation with all the relevant industry associations and experts. The guide was first launched in 2006, followed by revisions to keep the document up-todate. The primary goal is to ensure that plastic packaging placed on to the market is designed to be easy to collect, sort and reprocess for recycling.

The guide includes general guidelines, material-specific guidelines (PET, PE, PP, PVC, mixed plastics) and information on bioplastic.







Other recycling guides have been developed by UNESDA's commitment to these recycling guidelines will French Elipso and the Belgian organisations Fost Plus & large portion of EU beverage packaging. VAL-I-PAC.

The Belgian tool is designed as an online test/questionnaire where companies (or consumers) can check the recyclability of the packaging. The tool makes a distinction between industrial and household packaging, and includes plastic, glass, paper/cardboard, aluminium, steel and other types of packaging.

The ELIPSO guide is a document with practical guidelines.

#### Results

UNESDA represents a substantial part of the European non-alcoholic beverages industry, uniting all major producers of non-alcoholic beverages (carbonated and non-carbonated drinks, juice drinks, ready-to-drink teas and coffees, bottled water, sports and energy drinks) as well as the industry's trade associations in 25 countries. The European beverages market amounts to 123 billion litres per year.

packaging associations at national level, such as the therefore have significant impact on the recyclability of a

Further Information						
Recycled	by	Design"	guide	-	Recoup	website:
www.recoup.org						
Elipso website: <u>www.elipso.org</u>						
Fost Plus guideline website: <u>www.pack4recycling.be</u>						
UNESDA commitment: www.unesda.org						



# Remove of board cluster packaging

	Region	France
D. AD BAS	Type of implementation measure	Packaging reduction through avoidance
	Geographical level of implementation	National
	Type of stakeholder originating the initiative	Food industry
Kull: Ansh	Date of implementation	2010
DANONE	Type of packaging waste	Food packaging (board cluster for yogurts)
	Essential Requirement concerned	Prevention

Small quantity yogurts are usually sold in small plastic cups inside a cardboard sleeve. Danone successfully abandoned the paper wrap: the reduced packaging is well accepted by consumers and has resulted in high savings of resources.

#### Objective

Danone set an initial objective of eliminating the external cardboard packaging of its yogurts sold in lots of four. The project was focused on two product ranges (Activia and Taillefine), with a total of 52 references. While reducing the packaging, sufficient levels of protection (from shocks), visualisation (customers should still be able to identify the product in the store), and consumer information (on ingredients etc.) had to be maintained. The associated risks of the initiative were therefore a loss of the brands' visibility on the shelves (and consequently a drop in sales) and a dissatisfaction of the customers with a less protected product which also displays less information.

#### **Means and Resources**

In order to tackle the different challenges of a suppression of the cardboard packaging, a dedicated team, composed of members of multiple departments, worked on possible solutions:

- Production: the initiative involved 52 references produced on 46 production lines in 3 factories
- Quality: legal constraints (regulatory data such as volume, flavour, bar code, list of ingredients, nutritional data) were integrated as well as the quality of the final product (ensuring that lids are securely sealed, etc.)
- R&D: a reliable framework was elaborated packaging development teams worked on the crashworthiness of the cups, the plans of the winding machines, techniques to avoid tearing of the lids

- Purchasing: modified supply in raw materials (cut volume of cardboard) as well as higher complexity of the sleeve (all legal information printed before on one cardboard sleeve is now divided between the four cups)
- Marketing: graphic design was modified and the product information is now simply printed on the cups
- Communication: the operation was accompanied by explanations directed to the customers
- Sales: Danone cooperated with the retailers throughout the process (specific communication was displayed on the shelves, events were jointly organised at the launch of the new packaging, etc.)
- Logistics: the logistics database needed to be modified, transportation and handling tests were performed



#### Results

Despite the fact that retailers were sceptical, consumers responded positively to this initiative. As the operation was supported by an advertising campaign and promotions, it even contributed to increased sales (about 10% in volume). It saves 600 tonnes of cardboard and 2,500 tonnes of  $CO_2$  equivalent per year. The saving per selling unit accounts for  $\notin 0,02$ .

Contact:

Delphine Lopez, Danone « Produits Frais » France, Environment Manager: <u>Delphine.LOPEZ@danone.com</u>

**Further Information** 



# **Bonus-malus system for green-dot fees**

and the second	Region	France
i gaz	Type of implementation measure	Packaging prevention through eco-modulation of green dot fees
	Geographical level of	National
2 Star	implementation	
	Type of stakeholder originating the	Green-dot organisation
Auto sal	initiative	
ECO EMBALLAGES	Date of implementation	2012
	Type of packaging waste	Household packaging waste
	Essential Requirement concerned	Prevention, Recyclability

Eco-Emballages will strengthen the consideration of prevention and packaging recyclability criteria in its fee in order to achieve a recycling rate of 75% on household packaging and a national prevention target of 100,000 tonnes by 2012.

#### Objective

packaging weight and number of units. The new regulatory targets and related increase in the of packaging elements of a product. opportunity to strengthen the prevention incentive of this fee. In 2012, Eco-Emballages will introduce a new tariff system for the green dot fee paid by companies putting packaged goods on the market, aiming at three concrete goals:

- household packaging compared to 64% in 2010;
- Cover 80% of net-cost of an optimised collection and sorting system capable of recycling these 75% of household packaging waste;
- Provide an incentive for packaging prevention

#### Means and Resources

Eco-Emballages will strengthen the use of variable green dot fees, based on new prevention criteria. Historically, companies contributed to the green dot based on the weight and number of compounds of the packaging they put on the market. Since 2011, packaging shown to hinder recycling processes has been subject to a 20% increase in fees. From 2012 onward, a new bonus-malus system will strongly favor easily recyclable materials, and companies which have reduced the weight or volume of their packaging or implemented refill solutions. Companies which have implemented prevention actions or packaging bearing a message to raise awareness on sorting of waste, receive a 2% bonus. In contrast, packaging obstructive to sorting (e.g. a

glass bottle with a porcelain cap) receives a malus of Eco-Emballages is a private non-profit company 50%. A malus of 100% applies to packaging which is not accredited by the French public authorities to set up, at all recyclable.\* The contribution of a packaging item organise, and optimise sorting and separate will be based on each of its components (e.g. removable collection of household packaging. Since 2000, the caps or lids will be considered elements of the green dot fee paid by companies has been based on packaging, and the contributor will need to pay the price for each component) aiming to limit the number

packaging waste collection and sorting costs give the Fees are differentiated based on the materials of the packaging; each packaging unit's price is based on the material that makes up more than 80% of the packaging. If the packaging is composed of two or more materials, of which none account for more than 80%, each fraction is priced separately. This enables fees Achieve a national recycling rate of 75% for which are as close as possible to the actual net costs for collection and recycling.

#### Results

Since the initiative starts in 2012, there are yet to be results or quantified assessments of the contribution to prevention. For the latter, data is also not available for the previous system, as analyses were not performed on the prevention outcome. However, if the measures are implemented successfully, the changes in the fee and incentive system should result in an additional 100,000 tonnes of household packaging waste prevented in 2012 compared to 2010. An additional 400,000 tonnes are expected to be recycled compared to 2010. However, the achieved result on recycling will also depend on the behavior of the citizens - if they can be encouraged to better sort their waste, a recycling rate of 75% could be achieved for household packaging waste by 2013 or 2014.

\*Other variants of fee systems have been chosen in other countries (e.g. FostPlus in Belgium) to address packaging obstructive to sorting or material which is not at all recyclable.

**Further Information** Link: <u>http://www.ecoemballages.fr/entreprises/</u> Contact: prevention@ecoemballages.fr



## Implementation Best Practice Factsheet Packaging Weight Benchmarking Database

~	Region	United Kingdom
	Type of implementation measure	Informational
	Geographical level of implementation	National
	Type of stakeholder originating the initiative	MS authority
	Date of implementation	2008
	Type of packaging waste	All packaging
	Essential Requirement(s) concerned	Packaging prevention

The UK Packaging Benchmark is an indication of the lightest packaging for various products found on the shelves of UK supermarkets.

#### Context

In the framework of the Courtauld Commitment 2 and the Home Improvement Sector Commitment, WRAP, in cooperation with DHL and Packaging datastore, developed a packaging weight database.

Both commitments aim at improving resource efficiency of the grocery retail sector and the Home Improvement/DIY sector. The commitments include targets, such as on packaging reduction (15% for the home improvement sector by the end of 2012).

#### Objective

The packaging weight database is filled with specific products within the grocery and home improvement sector. This database intends to support the packaging targets outlined in the Courtauld Commitment 2 and Home Improvement Sector Commitment. the Companies will be able to benchmark their (primary and secondary) packaging and identify light-weighting and potentially increased recycled content opportunities.

#### Means

For 157 sub-product categories, the database lists information on the lightest, average, and heaviest weight packaging used for the products found on the UK supermarket shelf. Data are included for food and non-food household products, and for different types of packaging material and kinds (bottle, can, tube, etc.).

All product data have been supplied by the manufacturers, suppliers, or importers of those products. Data have been checked against other products to ensure that they appear sensible.

# UK Packaging Benchmark SEARCH THE DATABASE

A database that indicates what is the lightest, middle and heaviest weight packaging used for food and drink products found on the UK supermarket shelf.

Moving to UK Packaging Benchmark has many advantages including minimising the use of valuable resources, reducing costs and reducing energy consumption.

CATEGORY	All	•
SUB-CATEGORY	Choose	
MATERIAL	All	•
PACKAGING TYPE	All	
SEARCH CLEAR	ALL FILTERS	

#### Results

This packaging benchmark is part of a number of tools provided by WRAP for the industry. Other tools include an 'International Packaging Study' with prevention examples and an 'Introduction to Packaging and Recyclability Guide'.

The benchmark database was last updated in 2008. A new tool has been developed with packaging weights, but is not yet public due to confidentiality reasons.

#### Further Information

UK Packaging Benchmark: <u>http://www.wrap.org.uk/</u> <u>retail\_supply\_chain/research\_tools/index.html</u>



# Implementation Best Practice Factsheet Supplier requirements on substance restrictions

<b>O</b> Alcatel·Lucent	Region	Global
	Type of implementation measure	Supplier restrictions for substances of environmental concern
	Geographical level of implementation	Global
	Type of stakeholder originating the initiative	ICT industry
	Date of implementation	2008
	Type of packaging waste	All
	Essential Requirement concerned	Minimisation of hazardous substances

Suppliers of Alcatel-Lucent must avoid specific substances in their products and packaging. A comprehensive document provides suppliers with requirements for the ban, restriction, and tracking of environmentally harmful substances.

#### Context

Alcatel-Lucent is committed to reducing the impact of its restrictions" holds 3 types of requirements: products throughout their life cycle (design, supply, use,

end-of-life management). To achieve this goal, Alcatel-Lucent carries on a policy requiring "EcoDeclarations" all along the supply chain in order to improve the information provided to customers concerning the environmental performance of its products.

For ICT and CE (consumer electronics) products, the relevant EcoDeclaration is the ECMA-370 standard. This standard presents the environmental characteristics of a product (such as energy consumption), physical emissions (such as noise), or chemical pollution (such as volatile organic components).

To ensure that Alcatel-Lucent meets the standard for all its finished products, suppliers must provide an EcoDeclaration for their end-products, otherwise they will need to fill in a standard questionnaire covering Banned and/or restricted substances packaging.

"Supplier requirements on substance restrictions".

#### Objective

To limit the impact of hazardous materials and waste on Substances to be avoided human health and the environment, and costs for recycling of products, suppliers are required to avoid certain substances in their products and packaging. This commitment applies to both products and packaging purchased or used by Alcatel-Lucent, as well as products for which Alcatel-Lucent has contracted the design and the use of certain substances in manufacturing operations.

#### Means

Following its Environment, Health and Safety Policy, Alcatel-Lucent's "Supplier requirements on substance

- Ban and/or restriction of substances
- Substances that should be avoided
- Tracking of substance content



issues such as substances present in products and their Following existing regulations, a number of substances were banned or restricted. Cadmium, mercury, lead, and In addition, suppliers must meet Alcatel-Lucent's hexavalent chromium compounds are completely banned, which therefor goes further than Art. 11 of the Packaging Directive.

Because the presence of certain materials or substances may increase Alcatel-Lucent's costs of recycling products, suppliers are requested to avoid a certain number of substances, such as heavy metals (antimony, beryllium, nickel, selenium), a number of phthalates used as plasticizers, and PVC. Alcatel-Lucent is committed to eliminate PVC from its products globally.



To prevent a shift in environmental impact, Alcatel-Lucent works with suppliers, industry standards technical committees, and academia to fully evaluate the life cycle impacts of substituting these substances while evaluating the impact on the supply chain and their products.

#### Tracking of substance content

Because Alcatel-Lucent relies on information provided by its suppliers in ensuring and reporting its own compliance, suppliers are requested to report substances following a standard, namely the "Joint Industry Material Composition Declaration Guide for Electronic Products".

Suppliers should also be prepared to respond to Alcatel-Lucent's inquiries regarding the presence of a number of substances listed in the "Supplier requirements on substance restrictions".

#### Results

The "Supplier requirements on substance restrictions" are part of the contract with Alcatel-Lucent, so suppliers must implement them. They apply to all of Alcatel-Lucent's suppliers worldwide, resulting in a global reduction of certain hazardous substances in ICT products and their packaging.

Alcatel-Lucent is not the only company with these types of supplier requirements – a number of multinational companies have similar policies. Some of them are limited to legal restrictions, while others go beyond the scope of existing legislation.

This type of supplier requirement is comparable to green public procurement policy of some authorities, which also includes restrictions of hazardous substances. The scope of these restrictions, however, could also go beyond legal restrictions, and therefore challenge the industry to come up with innovative and sustainable alternatives.

#### Further Information

#### www.alcatel-lucent.com

Supplier requirements on substance restrictions, Alcatel-Lucent, 2009

ECMA-370 Standard, TED – The Eco-Declaration, ECMA, 2009



### Implementation Best Practice Factsheet

# **OPTI-PACK**

	Country	Scandinavia (Denmark, Finland, Iceland, Norway and Sweden)
	Type of implementation measure	Toolbox with informational guidelines
A A	Geographical level of implementation	International (Nordic region)
The second	Type of stakeholder initiating the measure	Industry
	Date of implementation	2003
	Type of packaging waste	All types of packaging
<b>OPTI</b>	Essential Requirements concerned	All

Since the Packaging and Packaging Waste Directive (94/62/EU) and the 6 standards EN13427-13432 do not give companies precise instructions on how to optimise packaging, the Scandinavian project 'OPTI-PACK' was created in order to provide the industry with practical methods.

### Context

OPTI-PACK is a Scandinavian project financed by Nordisk Industrifond (Nordic Innovation). The elements in OPTI-PACK are developed by Scandinavian companies, business associations, and institutes through a number of national projects in Denmark, Finland, Iceland, Norway, and Sweden. OPTI-PACK has integrated these elements into a general Scandinavian project.

#### Objective

The aim of OPTI-PACK is to support companies to be in accordance with the European Packaging and Packaging Waste Directive (EU/94/62),the 6 harmonised CEN Standards (EN 13427-13432), and to assist national authorities in the implementation and auditing of the Directive and Standards. Moreover, OPTI-PACK works on the development of practical methods for packaging optimisation in accordance with the EN13428 Standard.

#### Means

OPTI-PACK provides a 'system description' and a 'toolbox'. The 'system description' is in the form of a business guide in which the background, an interpretation of the Directive and Standards, and an overall introduction of how to work with the assessment of the Essential Requirements, are given. The 'toolbox' has been drawn up to help companies in the process of implementation.

The toolbox contains assessment methods for packaging optimisation and tools for using packaging indicators in order to control packaging optimisation in companies.

Assessment methods deal with items such as:

- the use of standard packaging for different products;
- packaging performance testing;
- practical tests on existing packaging lines with new packaging material;
- evaluation of the handling and storage equipment of the packaged products;
- market tests for user/consumer acceptance, e.g. 'focus groups' or 'hall tests'. A 'focus group' consists of a small group of respondents to which different packaging designs are presented. The interview is conducted in an unstructured and natural way where respondents are free to give views on any aspects. The basic idea in the 'hall test' is to stop just as many persons of the product's target group that it will be possible to make a statistical correct evaluation. 'Hall tests' are conducted personally (in a hall), by phone, by questionnaires, on the internet.).

Examples of relevant packaging indicators are:

- minimisation of material use;
- maximisation of material recovery;
- minimisation of energy use;
- minimisation of transport work and inefficient use of space.

#### Results

Companies can choose between different methods presented by OPTI-PACK but must evaluate each method for their own purpose. The methods and tools are being tested in all 5 Scandinavian countries in a large number of industries.

**Further Information** OPTI-PACK website: <u>www.opti-pack.org</u>



## Implementation Best Practice Factsheet **Development of flow pack solution**

	Region	Europe
	Type of implementation measure	Packaging reduction through substitution of packaging material
	Geographical level of implementation	International
2 ACOre	Type of stakeholder originating the initiative	Food Industry
A Composition	Date of implementation	2010 tbc
	Type of packaging waste	Food packaging (wrapping paper, aluminum)
Kraft foods	Essential Requirement concerned	Prevention

Kraft successfully replaced the double layer paper and aluminium packaging of the Milka and LEO chocolate bars using a hermetical flow pack. The change in packaging material resulted in savings of more than 60% in material weight.

#### Objective

to improve product protection with a flow pack current pack at the time. wrapped around), or as two-step stage (wrapping first the new way. with alu, then at a second stage wrapping the paper). Moreover, no glue should be used for closure of the paper wrapping.

#### Means and Resources

The initiative was started with an R&D brainstorming session to gain different packaging concepts and asses them. A simplified LCA assessment was then conducted with respect to the different packaging materials required for the different concepts (using the Kraft eco calculator which takes into account the weighted indicators material use, recycling content, energy, CO<sub>2</sub> and net weight). The internal 'Kraft packaging compliance checklist' was then used to assess the concepts against the Essential Requirements, followed by consumer tests with the different concepts. Kraft also assessed the impacts of trade and transport compared to the standard packaging.

The two best options diverged from the renewable material 'paper and well recyclable alufoil', which implied a huge paradigm shift. Kraft ran a full LCA through an independent external lab, also including

transport, production of packed product, and end-of life This initiative had a twofold purpose: first, Kraft aimed scenarios for the two best options in comparison with the

(hermetical seal) in order to avoid infestation, flavor From the beginning of the development phase on, other loss, and taint pick up from the environment. A second internal departments, such as procurement, engineering, goal consisted in reducing the complexity at the marketing and manufacturing, were involved to find packaging line by introducing a one wrapper concept. It material producers able to make such material and should replace a two wrapper procedure where two machine suppliers come up with manufacturing solutions, separate layers were wrapped either in a single stage but also to find internal capital for new machines and (both aluminium and paper come together to be production sites where the product would be packed in





#### Results

Although flexible materials are currently not mechanically recycled, the LCA clearly demonstrated an overall advantage with respect to main environmental impact categories including CO<sub>2</sub>, eutrophication, and human toxicity, based on the end-of-life option 'land fill' incineration, with and without energy recovery'. The overall benefits of this option are due to the prevented packaging.

More than 60% of material weight was saved thanks to the changed packaging.

Further Information Contact data: mhuber@kraftfoods.com



# Packaging prevention for Glimma tea candles

	Region	Europe
	Type of implementation measure	Packaging minimisation through redesign
ALL S	Geographical level of	International
KEA	implementation	
	Type of stakeholder originating	Industry
	the initiative	industry
	Date of implementation	n/a
	Type of packaging waste	Home goods packaging (candles)
	Essential Requirement concerned	Prevention

In order to address sustainability as well as increase transport, warehouse, and cost efficiency, IKEA revamped the packaging of its Glimma tea candles. This packaging modification has had significant economic and environmental results.

#### Objective

In order to make their products more environmentally friendly and increase their transportation, warehouse, and cost efficiency, IKEA regularly reviews the design of their products, including the packaging. The Glimma tea candles were identified as needing packaging redesign, particularly because of the unnecessary amount of air in their packaging.

#### **Means and Resources**

IKEA began an internal "air hunting" competition in order to reduce unnecessary air in the packaging of their products and therefore lower their costs and increase their efficiency. Through this competition, several IKEA products were identified as needing packaging improvement, one of which was the Glimma tea candles. The original packaging of the Glimma tea candles—a plastic bag of 100—resulted in a 30% increase in the volume of the actual product.

In order to address this problem, IKEA came up with the solution to increase the packing density of the product by creating stacks of 4 in rows of 5 (as shown below.)



#### Results

As a result of this packaging modification, IKEA has managed to increase the load capacity of their pallets by 30%, requiring 400 fewer trucks per week. The new packaging has also allowed workers to save 30-45 minutes per day in handling time and has reduced the company's costs for the product by 10%.





*Further Information Contact: Katarina Maaskant, IKEA, EU Affairs:* 

katarina.maaskant@ikea.com



	Region	Global
	Type of implementation measure	Packaging reduction through redesign
	Geographical level of	Global
	implementation	Global
	Type of stakeholder originating the	Industry
	initiative	industry
	Date of implementation	2010
	Type of packaging waste	Packaging for electronics consumer products
	Essential Requirement concerned	Packaging prevention

# **ClearView packaging for high-end printers**

HP engineered a package design for its high-end printers that, on average, cuts the volume of materials needed for shipping in half.

#### Objective

HP aimed to reduce the amount of packaging material and associated logistics costs accrued in the distribution process for its high-end printers. For this purpose, HP engineered a package design that, on average, cuts the volume of materials needed for shipping in half. The ClearView design eliminates the need for an outer corrugated box and minimises the use of foam. Instead, a durable transparent film is applied to encase the product for safe shipping. The outer transparent plastic film is made from the same recyclable materials as plastic milk jugs. The LCA which was performed (including end of life) to compare the two options, showed overall significantly better results for ClearView.

#### **Means and Resources**

The initiative was managed by a dedicated team composed of members from different departments.

- Research & Development: A team tested the materials to ensure they met the American Society for Testing and Materials standards as well as the International Safe Transit standards. The team then shipped samples to major customers, gathered their feedback, and incorporated it.
- Production: Three manufacturing sites located in Europe, Asia, and North America coordinated the production efforts for the ClearView packaging.
- Quality: Commodity managers worked with production managers to enforce engineering specifications at all three production sites.
- Logistics: The transportation model was reviewed to account for the reduction in the quantities of packaging volumes used in the supply chain.
- Purchasing: Commodity managers awarded procurement contracts with suppliers and incorporated supplier feedback into future designs.

• Sales: The team worked with distributors throughout the process to communicate the advantages of the new packaging solution.



#### Results

In the fiscal year 2009-2010, ClearView's smaller, lighter packaging resulted in 65 tonnes of weight reduction and millions of dollars in materials saving. The design also reduced the overall environmental impact of both the packaging but also the environmental impact due to transportation.

- 33% reduction in packaging material weight
- 47% reduction in packing material volume
- 66% reduction in foam weight and volume
- 36 to 38% reduction in paper weight and volume
- 23% reduction in wood weight

In addition, the transparent packaging facilitates product handling for customers; allowing easy inspection for damage before accepting delivery and reducing the amount of packaging material the customer has to manage when receiving the product.

**Further Information** 

Link: http://www.idsa.org/content/content1/clearviewpackaging

**Contact:** Director, Stakeholder Engagement HP Environmental Sustainability

<u>nancykeith.kelly@hp.com</u>



# Implementation Best Practice Factsheet **Conversion to concentrated liquid laundry formulations**

	Region	Global
	Type of implementation measure	Packaging minimisation through product
		redesign
	Geographical level of	Global
	implementation	Global
Unilever	Type of stakeholder originating the	Industry
	initiative	maasay
	Date of implementation	2008
	Type of packaging waste	Packaging for liquid laundry detergents
	Essential Requirement concerned	Packaging prevention

Unilever has converted its liquid laundry detergents from dilute to concentrated formulations and, as a consequence, reduced product and packaging volume.

#### Objective

The reduction of product and packaging impacts on • Maximise the proportion of packaging environment constitute the an integrated requirement of Unilever's product process. The product innovation for liquid laundry detergents should specifically contribute to:

- a reduction in the use of natural resources in the (computer-aided production and consumption phase;
- a reduction of production and logistics costs.

It was imperative to achieve these improvements without decreasing product quality and customer satisfaction.

#### Means and Resources

Unilever based its innovation process on the concept of life cycle thinking, focusing on the minimisation of environmental impacts in the sourcing, production, distribution, consumption, and disposal phase of a product. Unilever translated the life cycle approach into five core principles, which it applies to packaging innovations:

- Remove unnecessary packaging layers
- Reduce packages to the optimal size and weight through the use of best in class technologies. Reduction in the use of chemicals was an important consideration in the conversion to concentrated detergent formulations.
- Reuse packaging from the materials received at Unilever's factories
- Increase the use of recycled, recyclable and single material components in packaging for easy sorting and recycling at the end of its use

from sustainable resources sourced responsibly

innovation To convert from diluted to concentrated formulations, Unilever applied a number of packaging design tools, which support the life cycle approach, such as CAD design) modeling, fast tooling (production of prototypes), and functional optimisation. The concentrated formulations were first introduced in the US, before they were launched globally. Thereby, the improved performance and the ecologic advantages of the concentrated formulations were extensively promoted in marketing campaigns that accompanied the roll-out of the new product in the national markets.



#### Results

A life cycle assessment of the new concentrated detergent formulations showed significant environmental improvements; alone in the US, 24m gallons of water (70%) and 5m litres of diesel (66%) were saved, the number of logistics trucks was reduced by 6,000 (66%), and 5,000 tonnes of plastic resins were saved. The savings in resources and weight helped to considerably reduce production and logistics costs.

#### **Further Information**

Link: http://www.iopp.org/files/public/IoPPSummit08Humbe rtoGarcia.pdf

Contact: Rose Fenn, Corporate Responsibility Manager, Unilever PLC London, Rose.Fenn@unilever.com



# Implementation Best Practice Factsheet

# Packaging reuse for wine

	Region	Spain
	Type of implementation measure	Packaging reduction through reuse
	Geographical level of implementation	Spain
	Type of stakeholder originating the initiative	Industry
	Date of implementation	2007
	Type of packaging waste	Beverages packaging (wine)
	Essential Requirement concerned	Reuse

Spanish design studio, Ciclus, came up with a packaging design for wine that can be made into a modern, attractive lamp.

#### Objective

Ciclus was asked by Hera Holding (Spanish waste management and consulting firm) to produce a gift which portrays the idea of turning waste into resources. The design studio came up with 'Cavallum', a wine bottle that could be reused as a lamp. 'Cava' is a Catalan sparkling wine, and 'llum' means 'light' in Catalan.

#### **Means and Resources**

Ciclus' biggest challenge was to facilitate production in the design; materials and processes had to be reduced. Ciclus made many prototypes and conducted research on materials that would be appropriate for the project. In just 3 months, Ciclus was able to design, develop and produce this product.

The cava case consists of an internal layer, which carries the wine, and an external layer, which turns into a lamp. The internal layer is split into two boxes: one to hold the bulb and electric line, and the other to hold the wine. The smaller compartment for the bulb and electric line are used as the base of the lamp.

Cavallum is made of 100% recycled carton, organic cotton cord, and abedul wood taken from controlled reforestation projects. Only 30% of the packaging gets wasted (the carton box that comes with the wine).



#### Results

In terms of environmental impact, 70% of the Cavallum box can be reused to make a new product, and all materials are 100% renewable. The product uses minimal materials, print and processing, and does not use glue or incompatible materials.

The client (Hera Holding) approved Cavallum with honors, creating publicity and new clients for the product. In 2009, the piece won an important Ecodesign Award in Brazil (IDEA BRASIL 2009), was featured on the Global Innovation Report – London 2009, a publication dedicated to innovation in retail, and has been praised in prestigious websites, magazines, and books around the world.



#### Further Information

Contact: Ciclus, General Information: <u>ciclus@ciclus.com</u>



### Implementation Best Practice Factsheet

# Packaging prevention through the 'Clever Little Bag'

Fuseproject	Region	USA
	Type of implementation measure	Packaging reduction through reuse
	Geographical level of implementation	International
	Type of stakeholder originating the initiative	Industry
	Date of implementation	2011
	Type of packaging waste	Accessories packaging (shoe box)
	Essential Requirement concerned	Prevention, reuse

PUMA and fuseproject have collaborated in order to convert the conventional shoebox into an environmentally-friendly reusable product.

#### Objective

The retail industry faces a difficult issue when it comes to packaging. Shoeboxes are particularly harmful for the environment, as boxes alone contribute to millions of tonnes of waste a year. Despite proposed reuse, they eventually enter the waste stream.

In light of this, fuseproject collaborated with PUMA to create a packaging system that would reduce their carbon footprint.

#### **Means and Resources**

For 21 months, fuseproject studied boxes and systems (folding, shipping, reducing, etc.) Eventually, fuseproject came up with the idea of getting rid of the box altogether, calling the new packaging system a 'clever little bag'.

The new packaging system uses a cardboard sheet as the structure, using 65% less cardboard than the standard shoebox. Tissue paper and laminated printing are also eliminated. The new package now has lower weight and volume, and abolishes the retail bag.

The cardboard structure is cut in one flat piece of material and requires no printing or assembly, making it more efficient to recycle. The bag is stitched with heat as opposed to woven, which prevents waste and saves time. It protects the shoes from dust and dirt and can serve as a bag for shoe storage or travelling.



#### Results

Due to the novelty of the product, concrete results have not yet been determined. However, the tens of millions of shoes shipped in this bag have the potential to reduce water and energy consumption on the manufacturing level by more than 60% per year. More specifically, this product can help to save approximately 8,500 tonnes of paper, 20 million MJ of electricity, 1 million litres of fuel oil, and 1 million litres of water. Because of the reduced weight, 500,000 litres of diesel can be saved on transport. Additionally, because of the lack of need for retail shopping bags, this packaging system has the potential to save 275 tonnes of plastic. Overall, this packaging product has the ability to reduce carbon emissions by 10,000 tonnes per year.

**Further Information** 

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Contact:

fuseproject, General information: info@fuseproject.com





# 4.3 Best practices factsheets for ER enforcement

The following 8 factsheets are included in the next pages:

- <u>UK Toolkit for ER inspection</u> (All ER Regulatory measure)
- FR Declaration of conformity based on self-assessment (All ER Regulatory measure)
- <u>NL Inspection list</u> (Prevention/Minimisation of hazardous substances Regulatory measure)
- <u>BE Inspection X-ray fluorescence gun</u> (Minimisation of hazardous substances Regulatory measure)
- <u>UK Prosecutions for excessive packaging</u> (All ER Regulatory measure)
- <u>UK Lincolnshire County Council</u> Awareness campaign on packaging (Prevention Encouragement of consumers to challenge excess packaging)
- BE Packaging prevention plans (Prevention Regulatory Measure)
- <u>DK Documentation system on packaging</u> (Prevention Technical documentation)

# Enforcement Best Practice Factsheet Toolkit for Essential Requirements inspection (UK)

	Country	United Kingdom
	Type of enforcement measure	Regulatory
	Geographical level of implementation	Regional/Local
	Type of stakeholder initiating the measure	MS authority
	Date of implementation	2009
	Type of packaging waste	All
	Essential Requirements concerned	All

A Toolkit was developed with checklists, standard forms, information on past prosecutions, case studies, etc., to support enforcement officers in understanding the field of packaging prevention and its relevant regulations

#### Context

The Essential Requirements of Directive 94/62/EC requires, amongst others, that packaging must be reduced to a minimum necessary for safety, hygiene and, consumer acceptance. In the UK, these requirements are implemented by the Packaging (Essential Requirements) Regulations. Compliance and enforcement of these Regulations is decentralised, so inspection is performed by local authorities.

#### Objective

No clear level for minimisation of packaging has been defined in the Directive and this can make it harder to judge whether certain packaging complies with the regulations or not. Moreover because enforcement officers have a wide range of legislation in their remit, and are very often, not packaging experts.

#### Means

In 2009, the Local Authorities Co-ordinators of Regulatory Services, (LACORS) in conjunction with BIS (Ministry Department of Business, Innovation and Skills), developed a Toolkit for local authority trading standards enforcement officers containing a checklist, information and examples of good packaging design, links to Waste Reduction Action Programme (WRAP) data and case studies, information on past prosecutions, flow charts, and standard letters to use.

Although the Toolkit includes information on, for instance, the inspection of heavy metals in packaging, its primary focus is on packaging prevention, which in the UK, has been the main focus.

Case studies on packaging prevention are an important tool for enforcement officers, because it gives them knowledge of the feasibility of packaging prevention for specific products (see 'Further Information box' for a source providing several case studies). With this knowledge, they can also challenge producers who claim that prevention is not possible for their specific product. Benchmarks of product packaging weight are likewise an interesting source of information to officers (see factsheet 'Packaging Weight Benchmarking Database').

Although the Toolkit is not publicly available, as it contains guidelines and information which is also applicable in other Member States, it might be interesting to contact those listed below for further information.



One potential issue with regard to the evaluation of apparent excessive packaging is the concept of 'consumer acceptance'. The industry sometimes uses consumer acceptance as an argument for not changing their packaging. Inspection officers can challenge this by asking for proof that packaging prevention would result in lower market share of their product. Evidence might be a market study/consumer research, or providing sales figures/market shares that demonstrate the negative impact of changes to their own or their competitors' packaging.

#### Results

LACORS has yet to receive feedback from inspection officers regarding the Toolkit. As there is no central database of cases or complaints, it is not clear how many inspections are performed at local level or what the results are.

#### **Further Information**

#### Contacts:

*Lisa Foster, Trading Standards Institute Environment Lead Officer, loenvironment@tsi.org.uk* 

 Peter Askew, Product Policy Unit, Department for

 Business, Innovation and Skills (BIS),

 env.reqs@bis.qsi.qov.uk

 Packaging (Essential Requirements) Regulations –

 Government Guidance Notes (January 2011), BIS (publicly available, English)

 Publications:

 Case
 studies:

 http://www.wrap.org.uk/downloads/CC\_Case\_Studies\_1

 9\_Aug\_2010\_final.4b28c1d5.6249.pdf



# **Enforcement Best Practice Factsheet** Declaration of conformity based on self-assessment

	Region	France
O. A. Br	Type of implementation measure	Regulatory
A WAR	Geographical level of implementation	National
PER THAN	Type of stakeholder originating the	MS aubority
) CAR PA	initiative	wis durinity
T I Ster	Date of implementation	Since 1998
Alli Marsh	Type of packaging waste	All types of packaging waste
	Essential Requirement concerned	All Essential Requirements

In France, packaging manufacturers must ensure and declare that the packaging placed on the market complies with the Essential Requirements. The outcome of the self-assessment has to be available in a file comprised of a written declaration of conformity and technical documentation.

#### Objective

bodies upon request.

#### Means and Resources

manufacturers and Packaging packaging (packers/fillers) therefore have the following obligations followed. in France:

made available in a file containing:

- a written declaration of conformity: below).
- accompanied by technical documentation which contains the information necessary to assess whether the packaging meets the requirements: a description of the packaging and its composition, drawings of design and manufacturing with explanations, a list of the standards used and the results of the self-assessment, an attestation on the minimisation of hazardous substances, and the concentration levels of heavy metals, etc.

In order to reduce the costs for compiling the technical documentation, the packaging manufacturer may group technical documentation by type of packaging.

If the packer/filler, is not the manufacturer of the While Member States are obliged to ensure that the packaging, then he should receive from his supplier the Essential Requirements are fulfilled, there is no declarations of conformity (and not the technical requirement as to how to accomplish this. France has documentation) of the packaging or elements of packaging chosen to ask companies for a self-assessment of their he assembles. For the packaging for which the packer/filler compliance which must then be submitted to the control is the designer, the packer/filler must ensure that it meets the requirement of prevention by source reduction.

> When the regulation came into force, the competent Government body checked the conformity of the packaging users by verifying if the self-assessment procedures had been

For an inspection during the following two calendar years The packaging manufacturer has to ensure and declare, after the packaging was first introduced to the market, the according to internal manufacturing control procedures, packaging manufacturer must be in a position to present that the packaging he places on the market is compliant their file (declaration of conformity and technical with the regulation. In order to do so, CEN standards can documentation) within 15 days to the control authorities, be used. The results of this self-assessment must be The packer/filler must be able to submit the declaration of conformity (which he has received from his supplier) and his self-assessment that the packaging complies with the This must attest to the conformity of the packaging requirement on prevention by source reduction (when he and may be passed to the packaging user (see model is the designer of the packaging) within the same period of time.

#### Results

Data on inspections (the last controls took place 10 years ago when the regulation came into force) are confidential.

#### **Further Information**

Link: Guidelines on the website of the French Packaging Council http://www.conseilemballage.org/Img/Publications/1\_1.pdf



MODEL DECLARATION OF CONFORM	ITY	
Name and address of company:	}	
· · · · · · · · · · · · · · · · · · ·		
Environmental Code (Regulatory Part – Book V – Articles R.543-42 to R.543-	rective 9 52).	4/62/CE, and the
The pack(s) below have been designed and manufactured in compliance with the relevant CEN standards indicated below.		
The company has available all information relevant to this declaration of conformity and can present them to the authorities within the prescribed timetable.		
Packaging reference		
◆ Prevention by source reduction (EN 13428) <sup>18</sup>		
• Reuse (EN 13429)		where claimed
◆ Material recycling (EN 13430)		
• Energy recovery (EN 13431)		at least one
• Recovery by composting and biodegradation (EN 13432)		
<ul> <li>Dangerous substances: Declaration of minimisation (EN 13428)</li> </ul>		
<ul> <li>Heavy metals: Declaration that limits have not been exceeded</li> </ul>		
Done at		
Authorised signatory and com	pany sec	al
Model prepared by CNE, in co-operation with CLIFE, FCD, ILEC and INTERFII	LIERES N	MATERIAUX.

The user who transmits a function specification or a design brief to a packaging manufacturer is not considered as the designer.



<sup>&</sup>lt;sup>17</sup> Packaging or packaging type

<sup>&</sup>lt;sup>18</sup> If the packaging manufacturer is its designer, he shall compile that part of the technical documentation relating to prevention by source reduction.

If the manufacturer of the packaging is not the designer, and manufactures according to a descriptive specification, this specification may constitute for him the critical area unless he exercises his professional duty to advise the designer. It is the responsibility of the designer (packer/filler or distributor for private label products) to use the standard to demonstrate compliance with the requirements on prevention.

The person considered as the designer of the packaging is the person who has drawn up a precise descriptive specification including technical plans and at the minimum a definition of the weight and/or volume of the packaging.

# Enforcement Best Practice Factsheet Inspection list (Netherlands)

	Region	The Netherlands
D' TOP	Type of enforcement measure	Regulatory
N ALL	Geographical level of implementation	National
TAR	Type of stakeholder originating the initiative	MS authority
	Date of implementation	2011
	Type of packaging	All types
	Essential Requirement(s) concerned	Packaging prevention / Minimisation of hazardous substances

The Dutch IenM developed an inspection list to help officers inspect compliance with the Essential Requirement on packaging minimisation.

Packaging specific questions

#### Context

One of the Essential Requirements of Directive 94/62/EC requires that packaging be reduced to the minimum necessary for safety, hygiene, and consumer acceptance. In the Netherlands, these requirements are implemented by the Dutch Resolution on management of paper and cardboard packaging. Inspections on the Essential Requirements are conducted by the Inspectorate of the Dutch Ministry for Infrastructure and Environment (IenM).

#### Objective

IenM developed an inspection list to help and support inspection officers. The inspection list comprises specific questions for guidance purposes.

#### Means

Inspections by IenM are conducted for both importers and producers in the food and non-food sector. Companies are informed several weeks ahead of time that they will be inspected. They are provided with the inspection list, allowing them to collect and prepare all essential documents beforehand. A document with FAQ is also included.

The inspection list consists of general questions concerning packaging prevention and awareness of the Essential Requirements and a few specific questions that concentrate on particular packaging samples or packed products.

Inspection on packaging prevention began in February 2011.

Inspections on the Essential Requirements regarding prevention of packaging were also combined with inspection of heavy metal content of the packaging

#### Can you show evidence that the ER have been evaluated (inspectors need to take a picture of the packaging, describe it, and note down the composition of the packaging. Samples need to be taken to analyse composition in the lab). Does the dossier proove that the ER are met? How? (inspectors need to ask for copies of the documents) What is the yearly turnover of the specific packaging or product? Other questions What innovations and technologies do you use for design, production, and marketing of new packaging? Did you already receive questions regarding the ER from inspection officers, environmental, or consumer organisations? Are packaging prevention and related accomplishments a topic in your annual reports? **General questions** Do you know the ER? Do you have a documentation system to proove compliance with the ER? If so, describe the system ٠ If not, do you have requirements for your packaging • (yes/which ones, no/why not)

Did you adjust packaging to make it compliant with the ER? Example?

Who is involved in your organisation regarding production & marketing of packaging?

Who is involved in innovation and design of packaging?

Who is involved in purchase & import of packaging.

Do you have a say on the composition & design of imported products? (How? Does this influence your purchase policy?)

Do you have a quality and environmental management system? Do you perform external and internal audits?



using the XRF gun (see best practice example on the XRF gun for more information). The inspection list also contains questions regarding heavy metals.

lenM aims at conducting 20 to 25 packaging prevention inspections in 2011. After which, inspection frequency and the inspection list will be further assessed.

#### Results

In the first half of 2011, 15 supermarket chains, importers, and producers in the food and non-food sector have been inspected. None of these companies adequately met the Essential Requirements in the field of prevention. They could not show any evidence that the ER have been evaluated for their products.

Half of the companies already received a letter with the conclusion they did not (completely) comply with the packaging regulations. The other half will receive a letter in the coming months. Within 3 months they have to inform the Inspectorate which measurements have been taken place to comply with the regulations. In 2012 a second inspection will take place. If the company still not complies with the regulations, further enforcement actions will be taken by the Inspectorate.

These inspections and publication of the results (published end of 2011) aim to make companies aware of their obligations. Visited companies have to inform the Inspectorate in what way they are going to comply with the EE

#### Further Information

Website of the Dutch Ministry of Infrastructure and the Environment:

http://www.ministryofinfrastructureandtheenvironment.n

Website on packaging of the Inspectorate of the Dutch Ministry of Infrastructure and the Environment: <u>http://www.vrominspectie.nl/onderwerpen/milieu/verpak</u> <u>kingen/index.aspx</u>



# Enforcement Best Practice Factsheet X-ray fluorescence gun (Belgium)

·	Region	Belgium
0 :	Type of enforcement measure	Regulatory
是平白	Geographical level of implementation	National
L'ARD	Type of stakeholder originating the initiative	Business
1 miles	Date of implementation	2005
	Type of packaging	All types of packaging
	Essential Requirement(s) concerned	Minimisation of hazardous substances

Portable X-ray fluorescence (XRF) analysers, or XRF guns, are used to test the chemical composition of materials (toys, electronics, paint, etc.). The Belgian Inspectorate applies this device to test the heavy metal content of packaging.

#### Context

The Belgian integrated product policy takes into account a product's environmental impact at all stages in its life: from production and distribution to use and disposal. Within this framework, inspections are conducted by the Belgian Federal Environment Inspectorate (product standards are a federal competence). One of the inspection topics is the heavy metal content of packaging. Since 2005, the Federal Environment Inspectorate conducts inspection campaigns annually to check the heavy metal content in packaging.



#### Objective

Heavy metal concentrations may not exceed the levels defined in Article 11 of Directive 94/62/EC. All actors in the chain are inspected: both distribution (wholesalers, supermarkets, etc.) and production (producers, importers, etc.). The heavy metal content in packaging samples is screened by an XRF gun , which allows non-destructive on-site analysis within seconds.

#### Means

Annually, the Belgian Federal Environment Inspectorate tests several hundreds of packaging samples, that have mainly been selected on the basis of their colour (some colours pose higher risk of high heavy metal content) or content of recycled materials (also a higher risk factor). If the XRF gun indicates excessive concentration levels, the sample is sent to a laboratory for more accurate verification.

Inspection agencies of a few other countries (e.g. the Netherlands, UK, USA, etc.) also use this device. The XRF gun is not only used to inspect heavy metals in packaging, but also in toys, electronic devices, paint, etc. The present cost of an XRF gun amounts up to  $\notin$  35,000.

#### Results

Test results improve each year; in 2006, roughly 10 % of the samples had tested positive (mainly lead, in plastics packaging). By 2010, this number decreased to less than 5 %.

A drawback of the XRF gun is the fact that the oxidation state of chromium cannot be defined (Cr III versus the more toxic Cr VI). But continuous improvements are being applied to these XRF analysers in order to improve accuracy and ease of use.

#### Further Information

Labcompare website: <u>www.labcompare.com</u>, gives information on commercially available XRF guns Website Belgian Federal Public Service for Health, Food chain safety and Environment: <u>www.health.belgium.be</u>



## **Enforcement Best Practice Factsheet** Prosecutions for excessive packaging (UK)

	Country	United Kingdom
to ARE	Type of enforcement measure	Regulatory
A A A A A A A A A A A A A A A A A A A	Geographical level of	Local
	Type of stakeholder initiating the	MS authority
	measure	
	Date of implementation	N/A
	Type of packaging waste	All
	Essential Requirements concerned	All

# Prosecutions of excessive packaging are often supported by consumer protection regulations such as misleading consumers with over-packaging and little product.

#### Context

The Essential Requirements of Directive 94/62/EC require, amongst others, that packaging must be reduced to a minimum necessary for safety, hygiene, and consumer acceptance. In the UK, these requirements are implemented by the Packaging (Essential Requirements) Regulations. Compliance and enforcement of these Regulations is decentralised, so inspection is performed by local authorities.

#### Objective

The enforcement system in the UK primarily aims to raise awareness of the existing legislation with companies and work with them to ensure not only process. However, if a trading standards service is of the opinion that a companies packaging is in breach of the legislation, and despite intervention, the company believes their packaging to be compliant, the local authority will have to decide if formal action is the addition of this component for rigidity purposes. necessary.

#### **Means & results**

There have been five successful prosecutions for excessive packaging to date under these Regulations. In three of the cases, the company involved was charged with an offence under the Trade Descriptions Act 1968 (unfair commercial practices) in addition to charges under the Essential Requirements Regulations, because the excessive packaging made it look as though more product was being sold than was actually present.

The packaging unit in question was prepackaged meat,

The main provisions in the Trade Descriptions Act have recently been revoked and replaced by the Consumer Protection from Unfair Trading regulations 2008.

In the next paragraphs, more information on the 5 prosecutions is presented.

#### 1) Dried Mushroom Powder

This prosecution was brought forward in January 2000. The company pleaded guilty to one offence under the Trade Descriptions Act 1968 and one offence under the Packaging Regulations for the same packaging unit.

compliance, but potentially save them money in the The packaging unit in question was a tin of mushroom powder containing an insert which formed a false bottom about 2.7cm from the base. An expert witness in metal packaging gave evidence that from a packaging point of view the false bottom was superfluous i.e. it did not need

> The company was fined for one offence under the Packaging Regulations and one offence under the Trade Descriptions Act 1968.

#### 2. Meat in Prepacks

This prosecution was brought forward in February 2000 against a butcher. The company pleaded guilty to two offences under the Trade Descriptions Act 1968 and two offences under the Packaging Regulations for the packaging units of four different products.

#### 5. Video game accessory



Awareness and Exchange of Best Practices on the Implementation and Enforcement of the Essential Requirements for Packaging and Packaging Waste

#### Best practices

where the meat was placed on an upturned polystyrene tray inside a larger tray. The upturned tray was considered to be excessive packaging and also to have the effect of misleading consumers about the amount of meat contained.

The company was fined on two counts under the Packaging Regulations and Trade Descriptions Act offences. The Magistrates stated that they considered the packaging offence was the more serious one.

#### 3. Mail-order stationery

This prosecution was brought forward in September 2004, against a national stationery company. Trading Standards carried out three test purchases online from the company website. Each delivery was found to have excessive packaging, with the products ordered only filling a small part of the packaging; 19% full, 7% full and 29% full.

The company pleaded guilty to one offence under the Packaging (Essential Requirements) Regulations 2003, regarding the 7% filled packaging box. However, the two other purchases were also taken into consideration, and The firm pleaded guilty to three charges and was fined the company was fined £2,000 plus £550 costs.

#### 4) Biscuits

The prosecution was concluded in May 2006, against a food manufacturer supplying a major UK brand. The company pleaded guilty to 3 charges:

i) Offence under the Trade Descriptions Act 1968

ii) Failing to comply with the essential requirements of the Packaging (Essential Requirements) Regulations

iii) Failing to supply technical information in accordance with the Packaging (Essential Requirements) Regulations.

The packaging in question was a tin of biscuits 167mm in length, but inside the pack were 9 biscuits (individually wrapped in foil) with an average length of 116mm - The size of the tin bore no relationship to the size of the biscuits inside.

The Company was fined for all three charges and ordered to pay prosecution costs.



This prosecution was brought forward in 2007, against a video game accessory supplier for a Stylus pack that was deemed to be "10% product and 90% packaging". It followed from an "excessive packaging survey", that examined some 100 products across a range of product categories such as toys, food, and drink at eight national chain stores.

The packaging has since been changed to the size of a cigarette pack.

£750 for the packaging offence, £1,000 for failing to supply technical information following two requests and £1,500 in costs.

#### **Further Information**

Lisa Foster, Trading Standards Institute Environment Lead Officer, loenvironment@tsi.org.uk

Peter Askew, Product Policy Unit, Department for Innovation Skills Business, and (BIS), env.regs@bis.gsi.gov.uk

#### Information on the prosecutions

http://www.packagingnews.co.uk/environment/videogame-firm-in-rare-packaging-regulations-prosecution http://www.endsreport.com/13334/rare-excessivepackaging-prosecution http://news.bbc.co.uk/1/hi/england/cambridgeshire/476 7119.stm



#### **Enforcement Best Practice Factsheet**

# Awareness campaign on packaging (Lincolnshire Trading Standards)

es test	Region	Lincolnshire, England
i the states	Type of implementation measure	Encouragement of consumers to challenge excessive packaging
apply and	Geographical level of implementation	Local, but with local, regional and national impact,
	Type of stakeholder originating the initiative	County Council Trading Standards Service
	Date of implementation	Since 2008
	Type of packaging waste	All types of packaging waste
	Essential Requirement concerned	Prevention

Lincolnshire County Council implemented a successful awareness campaign. Within less than three years, over 100 complaints of alleged excess packaging were made by consumers using the new communication channels offered by the county services.

#### Objective

In 2008, Lincolnshire County Council Waste Department contacted the relevant company directly, excess packaging. The team has two main goals:

- potential environmental impact that excessive optimise their packaging). packaging on the products that they buy can have;
- packaging design, reducing the environmental product life impact.

#### **Means and Resources**

In order to achieve the above-mentioned goals, the team launched the awareness campaign "Pack It In". The campaign was built on a coordinated communications strategy using press releases in the local media, including TV and radio. The campaign started with a series of road-shows which took the message to 10 venues across Lincolnshire. Interviews with consumers conducted during these road shows revealed that over 90% of consumers were concerned about the issue of over-packaging, but that they did not know how to file a complaint. In response to the comments made, an email address and telephone number were heavily publicised to encourage consumers to challenge and report any products they felt were excessively packaged directly to the team. In addition, a dedicated section of the Lincolnshire Trading Standards website provided information and advice about communication channels for complaints regarding excess packaging. During the campaign, the value of packaging and reasons why it could not be further reduced in certain circumstances, were also explained to the consumers (hygiene aspects, extension of shelf-life for certain products, etc.).

When a complaint was received, the team usually initially provided financial funds to the Trading Standards requesting the technical documentation for the packaging Department, creating a team to tackle the issue of in question. The challenged companies were engaged in active dialogue (e.g. they were given explanations as to the First, to raise awareness among consumers of the nature of the complaint and advice on how they could

Cooperation and coordination with businesses and other And second, to engage all actors in the product trading standards services were emphasised throughout supply chain to initiate positive changes in the the entire initiative to ensure that all stakeholders in the were aware of the potential cycle environmental impact of packaging.

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#### Results

The campaign successfully raised awareness among consumers and business; whereas the Lincolnshire Trading Standards Service received three complaints about excessive packaging from consumers between 2006 and 2008, from end of 2008 to beginning of 2011, over 110 complaints had been made to the service. The majority of these were justified, in the sense that in the opinion and experience of the officer handling the complaint, and the company should be asked to provide their technical file in the first instance.

Moreover, the majority of the interventions with companies have resulted in a change to the packaging. During the project, no prosecutions have been required, as the packaging team has been able to use the regulatory framework as a mechanism for making changes.

#### **Further Information**

http://www.lincolnshire.gov.uk/business/trading-Link: standards/packaging-team-lincolnshire-trading-standards Contact: Lisa Foster - lisa.foster@lincolnshire.gov.uk



#### Packaging prevention plans (Belgium) Country Belgium Type of implementation measure Regulatory **Geographical level of implementation** National (interregional) Type of stakeholder originating the MS authority initiative

1996

All packaging

Packaging prevention

# Implementation Best Practice Factsheet

Companies that import or produce threshold amounts of packaging for the Belgian market need to submit a packaging prevention plan every 3 years.

#### Context

Date of implementation

Type of packaging waste

**Essential Requirement(s) concerned** 

In Belgium, the Walloon, Flemish, and Brussels-Capital Regions responsible for waste management policy and packaging waste have been united through a Cooperation Agreement since 1996 in the Interregional Packaging Commission (IVCIE). The Agreement implements the Packaging and Packaging Waste Directive, imposing on certain categories of companies in order to create an obligatory packaging prevention plan.

#### Objective

The objective of the prevention plans is to oblige companies who produce or import large amounts of packaging to consider ways of reducing packaging.

#### Means

A company qualifies as 'packaging-responsible' if it (a) packs goods in order to put them on the Belgian market, (b) imports packed good to be put on the Belgian market, (c) unpacks imported goods in order to put them on the Belgian market, or (d) produces or imports service packaging like shopping bags. Companies that are packaging-responsible for at least 300 tonnes of single-use packaging per year, or at least 100 tonnes as packaging-responsible type (a), must submit a prevention plan to IVCIE every 3 years.

A prevention plan includes, among others, measures that are taken to increase the amount of re-usable packaging, and to reduce the weight and/or hazardousness of some packaging materials. Companies need to evaluate their plan after the second and third years. Companies can make up an individual prevention plan, but industrial federation can choose to report on behalf of their members (sectoral prevention plan). A sectoral prevention plan groups measures for individual companies and includes prevention efforts for the sector as a whole.

An online reporting tool and follow up system tool is developed for individual plans and is foreseen for sectoral plans. Each plan is evaluated and scored on a scale of 1 to 4: (1) its reported data on packaging put on the market; (2) its proposed prevention measures; (3) its measurable targets; (4) its reasons for not being able to perform prevention measures (also referred to as limiting factors). The evaluation takes into account defendable arguments for not being able to take certain prevention measures (e.g. dependence on international suppliers, legal restrictions on safety, etc.). The score of previous plans is also taken into account to compensate for the effect of the law of diminishing returns. When substantial prevention measures have been taken in the past, it becomes increasingly difficult to apply additional measures.

#### Results

A few hundred individual and 30 sectoral plans have been submitted for evaluation, and have been approved for the last round (2010-2013).

Each plan is scored based on four different aspects : the score of the previous plan, the score on the realisation of the previous plan (based on two evaluation reports after the second and third years), the score on the accuracy of the market description, and the score on the new prevention measures and limiting factors.

When a plan fails (overall score of D or E) a company can be punished with 2 month jail time or fines up to €5,000.

**Further Information** Links: www.ivcie.be http://www.ivcie.be/fr/page.php?pageId=154 Contact: <u>m.adams@ivcie.be</u>



#### **Enforcement Best Practice Factsheet**

	Country	Denmark
- 13	Type of enforcement measure	Technical documentation
1 6 F	Geographical level of implementation	National
Pasta.	Type of stakeholder originating the initiative	MS authority
A. John T	Date of implementation	2011
	Type of packaging waste	All
	Essential Requirement concerned	Prevention

# Documentation system on packaging (Denmark)

The Danish EPA developed a documentation system, which makes it easier for companies to report on the efforts they take with regard to waste prevention.

#### Context

One of the Essential Requirements of Directive 94/62/EC requires that packaging must be reduced to the minimum necessary to ensure safety, hygiene, and consumer acceptance. In Denmark, these requirements are implemented by the Statutory order on certain requirements for packaging.

Companies can prove compliance by using CEN standards or by implementing any other procedure.

The Danish Environmental Protection Agency found that while a majority of companies try to reduce their product packaging (for economic if not environmental reasons), these efforts are rarely documented, and it is thus difficult to demonstrate compliance with the **Essential Requirements.** 

#### Objective

In cooperation with industry associations, the Danish Environmental Protection Agency developed а documentation system tracking which companies can certify their efforts regarding packaging optimisation through methods other than harmonised standard EN 13428.

#### Means

The approach of the CEN standard 13428 entails that a company determines the "critical areas" that have the highest potential for significant packaging reduction, and then documents for each critical area whether the minimum adequate amount of weight and/or volume In order to help companies to design a documentation have been reached. Critical areas include product system, the Danish Environmental Protection Agency packing/filling protection, process, logistics, and consumer acceptance.

The following elements are seen as important in a documentation system:

process. During the process, a number of tests are

often conducted, and the results of these are often suited as documentation.

Experience from packaging production. As an example, the failure rate may become unacceptable when large-scale production is commenced (e.g. because different machinery is used).

Experience from filling processes (e.g. torn or toppled packaging). The documentation of problems and the corrective actions taken are important elements in the dialogue with customers and authorities.

Experience from distribution (e.g. if a product is damaged when it reaches the customer). A description of the problem and a statement that it has been corrected is an important element in the documentation of a packaging solution.

Dialogue with vendors. It is generally accepted that wishes from retail stores may lead to larger packaging solutions (e.g. providing pilfer resistance), but a formal documentation of this requires a written request from the customer.

with end-users and Dialogue consumers. Complaints from consumers must be taken seriously, and corrective actions must be taken if possible. In order to ensure good documentation, the complaints should be stored with the possibility of re-finding it when necessary.

developed a checklist, both relevant for packaging producers as well as packers/fillers.

The list contains examples of which actors and types of documentation may be relevant. Possible actors include: Knowledge obtained in the primary development packers/fillers, packaging manufacturers, sales and marketing staff, designers, production technicians, etc.





On a regular basis, companies test different packaging solutions to ensure that they are technologically functional, fulfil the requirements of all actors in the value chain, and use minimal packaging materials. At the end of a development process, there may be a solution which has been tested in all relevant ways, but which has not documented –as required by the standard - that a critical area (and only one) has been identified, or that a lighter/smaller packaging solution will not have the desired properties.

In order to maintain operational flexibility, it is suggested that companies establish and maintain a documentation system, which collects knowledge about the positive and negative aspects of any given packaging and describes the consequences this knowledge may have on its final design. The documentation system suggested by EPA includes a number of elements that are generally thought to be important, but to which there are no formal requirements.

The system can function on its own but many companies will probably find it suitable to integrate relevant elements into an existing quality or environmental management system such as EMAS, ISO 14001 or ISO 9001.

#### Results

The documentation system has recently been finished. The intention is to communicate the documentation system through websites of the authorities and industry associations. Furthermore, articles on the system (including the checklist) are to be published in relevant newsletters and journals, targeting the packaging industry, packers/fillers, grocery etc.

Question	Yes/ No	Act or	Type of documentation
Is there a designated person responsible for maintaining documentation?			Name, Local Phone
Is there a written procedure for how experiences from the development process must be documented, for example. as part of a design brief?			Description (from) selected solution, eg in the form of photos and notes from technicians. Identification of the critical point Implemented changes
Is there a written procedure for how experiences from the production process must be handled and documented?			Reports of high error rates or the down-time in production Identification of the critical point
Is there a written procedure for how experiences from filling process must be handled and documented?			Implemented changes Reports - For high error rates or down- time in production - Long transition periods and / or product spillage Identification of the critical point Implemented changes
Is there a written procedure for how experiences of distribution must be handled and documented			Complaints from the carrier or customer Identification of the critical point Implemented changes
Is there a written procedure for how the demands and requests from customers to be handled and documented?			Requirements for packaging size, for example. in relation to the shelf systems, burglar alarm, pilfingeri, etc Identification of the critical point Implemented changes
Is there a written procedure for how complaints and requests from end users must be handled and documented?			Complaints of damaged products, difficulties in opening the packaging or dispensing the product Identification of the critical point Implemented changes
Is there a written procedure for how to liaise with the packaging suppliers?			Note on new opportunities for relevant packages Implemented changes
Is there a procedure that ensures that there are compliance statements with regard to content of heavy metals and N-classified substances			Declarations of Conformity

Though the checklists are not intended for use by inspection officers, a company that has established the basic procedures should generally be able to present information demonstrating their packaging optimisation efforts to customers and authorities.

*Further Information* Danish Environmental Protection Agency: <u>http://www.mst.dk/English/</u>



# Chapter 5: Conclusions: challenges and solutions for a better implementation of the ER

The current picture of the state of implementation and enforcement of the ER shows that the majority of the Member States do not have any formal procedures to enforce or implement the ER. But it can be observed that interesting and promising initiatives already exist in several Member States (see chapter 4) which could be duplicated and further developed. Chapter 5 of this report has also shown that further implementation of the ER could lead to considerable cost reductions and environmental benefits. In order to augment the level of implementation and enforcement of the ER, it is important to try to understand why the ER are currently not implemented and enforced at a larger scale and what types of solutions could be developed or promoted.

The following challenges were identified:

- MS often lack the knowledge on how to implement/enforce the ER, sometimes this is also coupled with a lack of dedicated staff and finances
- Regarding enforcement, the vagueness of the formulations of the ER in the Directive do not enable a clear assessment of when a packaging is compliant or not (apart from the concentration limits of heavy metals). Without any quantitative benchmark, it is difficult to identify companies which do not comply with the ER. What also renders enforcement difficult from a practical point of view is that inspections are not necessarily performed by packaging specialists. Another challenge is the absence of a legal requirement to produce evidence that the product is conform.
- In several MS, it is considered that the industry has sufficient incentives to comply with the ER and that companies integrate considerations on the ER in their business anyway (mainly for cost considerations)

The following solutions could be means to address these challenges.

#### Policy-related solutions

Inclusion of the requirement to assess the conformity of the ER in the Packaging Directive

Even if the industry claims to have (partly) integrated the ER in their business and has also launched interesting voluntary initiatives, the ambitiousness and results of these could be controlled by the MS authorities. Making the assessment of the conformity with the ER mandatory would also enhance the credibility of initiatives launched by the industry if the outcomes of these initiatives are verified by the authorities. In addition, the requirement could also be included that assessments of hazardous substances have to be performed by independent laboratories (in the case they are not performed by the MS authorities).



#### Clarification of when a packaging is conform with the ER or not

The use of indicators would, amongst others, be helpful during inspections in order to base the assessment of the conformity with the ER on tangible grounds.

Several indicators or requirements related to packaging, either quantitative or qualitative, could be imagined for that purpose, such as:

□ a 'filling' indicator:

An indicator about the packaging quantity in proportion to the product it packs (in particular by setting a maximum weight and/or volume ratio between the packaging and the product it contains, this would be easily feasible for relatively simple packaging such as drinks, cereal boxes, etc.).<sup>19</sup>

$$\frac{m_{packaging}}{m_{product}} \le x\% \text{ or } \frac{V_{packaging}}{V_{product}} \le y\%$$

□ a secondary materials' indicator:

An indicator about recyclability (e.g., a minimum percentage of recyclable material in a packaging, at least for certain types of material).

□ a recycling efficiency indicator:

A list of materials which hinder recycling processes and which should therefore be avoided (either in the form of a negative list or with limit values).

Going further and analysing the feasibility and relevance of such indicators would require a dedicated study, as the definition of such indicators is a complex exercise considering the wide diversity of types of packaging. Another issue which needs to be explored as it could constitute an element of a possible solution is an idea which was discussed in a study in 2009 on a possible extension of the Ecodesign Directive<sup>20</sup>, namely to include packaging when developing eco-design criteria (with the limit that the Ecodesign Directive currently covers only energy-using products).<sup>21</sup>



<sup>&</sup>lt;sup>19</sup> An example of integration of indicators and benchmarks in the legislation can be found in Taiwan, where benchmarks for packaging/volume ratios and maximum numbers for the number of packaging layers for certain products are included in the regulation since 2006<sup>19</sup>. They are product or product category specific. Taiwan has for example set ratios for gift boxes (pastry, cosmetics, alcoholic beverages, processed food etc.) for which the packaging volume ratio has to be one or less.

The formula for calculating packaging volume ratio is as follows: Packaging volume ratio is equal to packaging volume divided by allowable packaging volume. More details are available at <a href="http://law.epa.gov.tw/en/laws/648849199.html">http://law.epa.gov.tw/en/laws/648849199.html</a>

<sup>&</sup>lt;sup>20</sup> Technical support for the assessment of the Eco-design Directive implementing measures, BIO intelligence Service for the European Commission DG ENV, 2009

<sup>&</sup>lt;sup>21</sup> It seems that most preparatory studies have not identified packaging as having a significant environmental impact compared to all other impacts of an EuP. This would have to be checked. It has also been suggested to further examine the benefit of defining a transversal group of product/packaging in order to define eco-design specific requirements.
#### Guidance at EU level

Guidance on implementation

FAQs and guidance packs (ideally translated into all EU languages) on the implementation in general could be provided. The guidance could for example take the form of the 'Correspondents' Guidelines'<sup>22</sup> for waste shipment, presenting the common understanding of the MS of how the different aspects of the Essential Requirements should be interpreted. The guidance packs could also include descriptions of possible ways of implementation and enforcement (based on an analysis of good MS initiatives). A Helpdesk could also be set up in order to deal with specific questions from MS (similar to the Helpdesk set up for the implementation of the Waste Shipment Regulation). The Helpdesk could also promote the exchange of good practices in implementation and enforcement.

Guidance for inspections

In order to ease the implementation of inspections, guidance documents for the competent authorities could be prepared at MS level which could contain: suggested frequencies of checks, questions to ask, a detailed list of material to be provided to the inspectors etc. As far as checks on heavy metal concentrations are concerned, the different possible means and their suitability for different purposes should be outlined (in the field inspections with adapted devices, checks by independent laboratories etc.).

Guidance on the functioning of producer responsibility systems

The effects and impacts of the different producer responsibility systems in Europe could be examined. The ER could be further enchanced by ensuring that the fees of the producer responsibility systems reflect the real costs of recycling and thus promote easily recyclable materials and encourage prevention). Also, related to inspections, in order to enable a fast exchange of information on inspection results throughout Europe (e.g. when a too high heavy metal concentration is detected in the packaging of imported goods), it would be useful to set up a rapid communication system at EU level, similar to the EU rapid alert system for dangerous products RAPEX.

#### **Recommendations for further work**

There is currently very little information available on hazardous substances in packaging and studies carried out by (few) MS on this matter are somehow contradictory. Therefore, the exchange of information on these substances among the MS (detected during inspections) should be fostered. This could be achieved by improving the collection and exploitation of the available information at MS level (e.g. by exchanging practices on the collection of data on hazardous substances and the subsequent sharing of these data with other MS).

<sup>&</sup>lt;sup>22</sup> <u>http://ec.europa.eu/environment/waste/shipments/guidance.htm</u>



# Annex 1: Current state of implementation and enforcement of the ER in EU-27

Table 5: Detail on current state of implementation and enforcement of the EU in the EU-27

Member State	Implementation and enforcement of the Essential Requirements
Austria	No specific/detailed implementation or enforcement procedure for the ER.
	52 importers of products (textiles, construction material, food and EEE) were asked for proof of compliance with the ER, and they all showed compliance with CEN standards EN 13427 and EN 13428.
Belgium	No specific/detailed implementation or enforcement procedure for the ER.
	Only inspection on art. 11 (heavy metals in packaging).
Bulgaria	Compliance with the ER is to be proven by signing a declaration. With regard to heavy metals, it needs to be signed by an accredited laboratory.
	No inspection has been carried out.
Cyprus	No specific/detailed implementation or enforcement procedure for the ER.
	Only inspection on art. 11 (heavy metals in packaging): 20 companies in 2008.
Czech Republic	Producers and importers need to show compliance by submitting technical documentation to the control bodies, or they can show compliance by using Czech national standards. The Ministry of the Czech republic mentioned one additional standard to the CEN standards on packaging, namely Č ČSN ČR 770052-2 [477/2001 - section 6)] on the marking of packaging with regard to recovery. Methodical instructions on compliance with the Essential Requirements are available on the website of the Ministry of environment. In 2008, the Czech Trade Inspectorate checked 19 companies who have placed packaging on the market (16 were producers and 3 were importers). There were 3 breaches of the Packaging on the market, but not being able to submit to the control bodies the technical documentation required for demonstrating the fulfilment of the duties stipulated in Sections 3 and 4 of 477/2001).
Denmark	No specific/detailed implementation or enforcement procedure for the ER.
	Only inspection on art. 11 (heavy metals in packaging).
France	Packaging manufacturers need to ensure and declare, according to internal manufacturing control procedures, that the packaging placed on the market complies with the Essential Requirements. The outcome of the self-assessment should be available in a file comprising a written declaration of conformity and technical documentation. Packaging in conformity with the CEN standards are considered to meet the requirements. Guidelines are available on the website of the French Packaging Council.



	No recent inspections have taken place.				
Germany	No specific/detailed implementation or enforcement procedure for the ER.				
	Heavy metals limit values are laid down in the German Packaging Ordinance. Companies have to perform continuous quality control and measurements. The competent authorities monitor compliance with the provisions of the Packaging Ordinance, mainly when required by circumstances and under control after the Food and Consumer Protection Law (inspection on heavy metals).				
Ireland	No specific/detailed implementation or enforcement procedure for the ER.				
	Update March 2011: The Irish inspection programme covers however all aspects of the implementation of the Irish Packaging Regulations. In 2009, in relation to compliance with the entire range of obligations under the Waste Management (Packaging) Regulations 2007, the primary focus of these inspections was to target producers / major producers suspected of 'free riding' rather than an explicit focus on the Essential Requirements. The inspections did however also look at compliance with essential requirements. No infringements were detected but there is a case currently being investigated of a company based in Ireland notified to the Irish authorities by the UK authorities.				
Latvia	No specific/detailed implementation or enforcement procedure for the ER.				
	Update March 2011: Additional CEN standards were transposed to national standards: "Packaging - Requirements for packaging recoverable through composting and biodegradation - Test scheme and evaluation criteria for the final acceptance of packaging" and "Plastics - Evaluation of compostability - Test scheme and specifications".				
Lithuania	No specific/detailed implementation or enforcement procedure for the ER.				
	Only inspection on art. 11 (heavy metals in packaging).				
	Update March 2011: A regulation and a responsible authority are foreseen for 2011 in order to implement procedures to prove compliance with the standards.				
Netherlands	Update March 2011: Until now, Dutch inspection of packaging was focused on heavy metals, export of packaging and recycling. Only recently, the Netherlands have started with inspecting on the ER. They have developed an inspection list with regard to ER (incl. recyclability/recoverability for packaging, use of CEN standards etc.) and also an Q & A for inspection officers. In a pilot phase (which started in February 2011), the inspection of the ER using this list were tested in a number of companies.				
Poland	Update March 2011: No specific/detailed implementation or enforcement procedure of the ER.				
	Compliance with the ER seem however to be assessed during inspections carried out by the Inspectorate for Environmental Protection in accordance with the PPWD. As far as heavy metals are concerned, companies have to submit an annual report on the content of heavy metals in packaging to the Ministry of the Environment.				



UK	In the UK, use of the CEN standards to prove compliance is encouraged, because they offer a consistent framework by which companies can assess their packaging. If a company does not use the CEN standards, it will need to demonstrate and convince compliance officers that their chosen route still allows them to show that the Essential Requirements have been complied with. The compliance officer will assess compliance in this area in accordance with procedures set out in general guidance. It is not government policy to suggest alternative compliance routes as that would risk conferring a status of a particular route to compliance. Only the use of standards provides for a presumption of conformity; other compliance routes can only be determined to be valid from a legal perspective, based on the evidence submitted. A company must submit within twenty-eight days of the date of the request technical documentation or other information showing that the packaging complies with the Essential Requirements and the regulated metals concentration limits. The company must also ensure that it retains the technical documentation or other information for a period of four years from the date that he places the packaging on the market. For heavy metals, at the request of the enforcement authority, the company must submit within twenty-eight days of the date of the annual declaration of conformity and other information. It is an offence not to comply with the information requirements. Several guidelines and publications are available.
	No central information available on inspection efforts.

Member States not presented in the table:

- have no specific/detailed implementation procedure for the ER and did recently not perform ER related inspection, OR
- no information was available on the implementation & enforcement of the ER (e.g. because inspection is a local or regional competence).



## Annex 3: Impacts of the implementation of the ER -Detailed analysis per scenario

### 5.1 Impacts of quantitative prevention

### 5.1.1 Weight reduction

#### SCENARIO DEVELOPMENT

Per capita wine consumption in the EU amounts to around 30 litres per year<sup>23</sup>, which translates into a high total quantity of wine bottles produced each year. In 2007, in the UK alone, 1,360 million 75cl bottles of wine were consumed. This generated almost 40% of all household beverage packaging, contributing around half a million tonnes of packaging to the household waste stream<sup>24</sup>.

Ways for reduction exist however. It is known for example that in many countries, producers have thick heavy bottles for the domestic market and ultra slim bottles for export (mainly to cut shipping costs), which shows that a weight reduction is technically feasible. Several successful examples have shown how the weight of a wine bottle can still be significantly reduced and that these strategies of lightweighting can result in substantial tonnage savings of glass. The weight of a 75cl wine bottle currently varies between 300g and 1kg (with an average of 500g)<sup>25</sup>. Within WRAP's Glass Rite Wine project, a collaborative industry working group has successfully shown how the lower benchmark weight can be implemented. The design instructions for the 300g bottle can be downloaded from the website<sup>26</sup>.

As far as sparkling wine bottles are concerned, they usually weigh around 900g (400g more than a standard wine bottle, for a 75cl bottle). Research has however shown that the carbon dioxide, contained in sparkling wine, actually does not prevent the use of lighter bottles, they can withstand high levels of internal pressure and impact during fermentation. The potential of reduction varies however between the four main fermentation methods that are used, which renders a quantification of possible savings more complex than for classic wine. Sparkling wine is therefore not included in this analysis<sup>27</sup>.

In this scenario, it is assumed that the current minimum possible weight (300g) is adopted for all wine bottles sold in the EU

<sup>23</sup> Agribusiness Handbook, Grapes Wine, FAO, 2009, <u>http://www.fao.org/docrep/012/al176e/al176e.pdf</u> .								
24	WRAP	(2008)	Lightweight	wine	bottles:	le	ess is	s more
http://	www.wrap.org	g.uk/downloads/	GlassRight Wine lig	htweighing	- web versio	n.a29f386	6e.5381.pdf	
<sup>25</sup> WRA	AP (2008) Light	weighting <u>http://</u>	www.wrap.org.uk/r	etail_supply	_chain/grocer	<u>y/drink/v</u>	<u>/ine/lightwei</u>	ghting.html
26	WRAP	(2008)	Groundbreakin	g 3	00g	wine	bottle	design
http://www.wrap.org.uk/retail_supply_chain/grocery/300g_lightweight.html								
<sup>27</sup> Gla	ss lightweight	ing potential in	the sparkling wir	ie sector, N	WSP Environ	ment &	Energy for	WRAP, 2010.
httn·//	http://www.wrap.org.uk/dowploads/Sparkling.Wine Report FINAL 5ca784ec 8303.pdf							



#### QUANTIFICATION

Wine consumption in  $2009/2010^{28}$  amounted to 160 million hectolitres<sup>29</sup>, which corresponds to 21.3 billion bottles<sup>30</sup>.

The quantity of glass currently used with 75cl bottles with an average weight of 500g amounts to 10.7 million tonnes<sup>31</sup>. When reducing this average weight to 300g, the total quantity of glass used would be 6.4 million tonnes<sup>32</sup>.

#### This scenario results in the saving of 4.3 million tonnes of glass<sup>33</sup>

#### **COSTS SAVINGS**

Glass bottles with reduced weight require less input of glass cullets or virgin material in the production process. Successful introduction of slimmer bottles therefore results in direct cost savings on raw material (=**avoided raw material costs**). Without ignoring potential drawbacks and production difficulties currently withholding producers to further reduce the weight of glass bottles, it is assumed that slimmer bottles can be produced without substantial changes or investments in the production process (e.g. new moulds) (=**packaging production costs**). Some business examples have demonstrated technical feasibility. The **packaging process** and filling of the bottles is assumed to be unchanged.

The basic idea of the Green Dot is that businesses with take back obligation contribute to the cost of recovery and recycling ('polluter pays'). The obligation rests on producers (or other actors) who have a degree of control over the quantities, composition and design of packaged products. The 'Green Dot' has evolved into a proven concept in many countries as implementation of Producer Responsibility<sup>34</sup>. The system is financed by an annual Green Dot licence fee paid by the producers of the products. In return of the fee, national collection and recovery systems take over the producer's responsibility for the collection and recycling of their products or packaging at the end of their life. Fees vary by country and are based on the material used in packaging (e.g. paper, plastic, metal, wood and cardboard). Lower unit weight of glass bottles would result in lower green dot contributions (**Green dot fees**) for businesses.



<sup>&</sup>lt;sup>28</sup> Marketing year August to July

<sup>&</sup>lt;sup>29</sup> EU-27 Wine Annual, Wine Annual Report and Statistics, Global Agricultural Information Network, 2011.

<sup>&</sup>lt;sup>30</sup> 160 million hectolitres/75cl=21.3 billion. Please note that this simplified calculation is based on the hypothesis that all 160 million hectolitres are sold in 75cl bottles (=average weight of a bottle), a certain quantity is in reality sold also in other bottle sizes (1 litre etc.).

<sup>&</sup>lt;sup>31</sup> 500g\*21.3 billion bottles=10.7 million tonnes

<sup>&</sup>lt;sup>32</sup> 300g\*21.3 billion bottles=6.4 million tonnes

<sup>&</sup>lt;sup>33</sup> 10.7 million tonnes-6.4 million tonnes=4.3 million tonnes

<sup>&</sup>lt;sup>34</sup> 'Green Dot' systems have become internationally recognised models that contribute to the successful implementation of producer responsibility by the companies involved. National (waste) recovery organisations are relieving industrial companies and commercial enterprises of their individual obligation to take back used sales packaging through the operation of a scheme which fulfils these obligations on a nation-wide basis on behalf of their member companies. The aim is to ensure the recovery and recycling of packaging waste in the most economically efficient and ecologically sound manner. For further information, see e.g. <u>http://pro-e.org/About.html</u>

#### CALCULATION OF COST IMPACTS

Cost savings for industry are primarily reduced material inputs and lower green dot fees:

#### Avoided raw material costs for packaging

The lower weight of glass bottles means direct cost savings on raw material for producers. It is assumed that glass bottle manufacturers use a mix of virgin material (35%) and recycled material (65%)<sup>35</sup>. The raw material prices (both virgin and recycled) used for all calculations are presented in Annex 4.

#### Impact on production and process cost of the packaging

For the purpose of this exercise, we assume that the production of the lighter wine bottles is technically feasible without (large) investments, without ignoring that such is not necessarily possible in the short run. No cost impact is calculated.

#### Impact on Green Dot fees

Businesses with take back obligation can lower their contribution to national collection and recovery systems if they succeed in lowering the unit weight of their packaging. The base for the fee is the weight of packaging brought on the market<sup>36</sup>. We included a cross-comparison of the Green Dot fees of different EU Member States for 2010 (see Annex 5). It is of note that it is difficult to compare costs of collection and recovery or Green Dot systems between different countries.<sup>37</sup> One important factor is that Producer Responsibility Organisations are for example highly dependent on the implemented collection system (e.g. by local authorities). The comparison in Annex 5 includes a weighted average of the fees that could be used for the purposes of this rough estimate. Weighting is based on generated packaging waste for several EU Member States, though the list is not exhaustive.

Weight reduction		Avoided quantity (tonnes)	Avoided Green Dot fees	Avoided packaging material	
Wine	Reducing weight of 75cl bottles to 300g				
	Saving glass	4 266 667	81 323 188 €	112 320 009 €	

#### Table 6: Avoided costs of weight reduction scenario

<sup>&</sup>lt;sup>37</sup> Arcadis & Eunomia. (2008). Optimising Markets for Recycling, study in demand of The European Commission – DG Environment.



<sup>&</sup>lt;sup>35</sup> See e.g. <u>http://www.kringloopglas.nl/?pageid=11</u>. The fraction of (recycled) cullets used by glass manufacturers for packaging glass ranges from 50 to 80%, depending on availability.

<sup>&</sup>lt;sup>36</sup> In the longer run, hypothetically, this could lead to higher annual green dot fees for glass if more producers shift to slimmer bottles and the collection and recovery costs would not decrease accordingly. National recovery systems are basing their fees a.o. on these costs. Another part of the contribution covers fixed costs like research (e.g. recycling techniques) and awareness raising.

#### **ENVIRONMENTAL IMPACTS**

The avoided production of 4.3 million tonnes of glass results in the following life cycle environmental impacts.

Weight reduction		Avoided quantities (tonnes)	GHG emissions avoided (tonnes CO <sub>2</sub> eq.)	Resource depletion avoided (tonnes Sb eq.)	Fossil resource depletion avoided (tonne oil eq.)		
	Reducing weight of 75cl bottles to 300g						
Wine	Saving glass	4 266 667	3 746 123	28 199	1 372 281		

#### Table 7: Environmental benefits of weight reduction scenario

#### 5.1.2 Reuse

#### SCENARIO DEVELOPMENT

Refillable glass bottles can be refilled up to 50 times<sup>38</sup>, refillable PET-bottles up to 15 times<sup>39</sup>. The use of refillables is not restricted to milk, mineral water and beer bottles (the most well known examples), but is also feasible for e.g. personal hygiene products (shampoo, shower gel, etc.) and cleaning products (detergents etc.). Among other options, a deposit system for the refillable bottles can be applied (such as in Germany where 98.5% of the bottles are returned by the customers) or bottles can be directly refilled in the shop by the consumer (such as in several regions in Italy for milk<sup>40</sup>). For hygiene products and cleaning products, the more widely used option is refillable bottles (or other solid packaging) which are bought once and are then refilled at home by the customer with the product bought in a refill pack (flexible pouch, sachet, etc.).

#### In this scenario, the following will be assumed:

Hygiene products: 50% of soaps sold in bottles with dispensing pumps are replaced by refill systems (plastic bags/pouches).

Household cleaning products: 50 % of bottles with dispensing pumps/triggers are replaced by refill systems (plastic bags/pouches).



<sup>&</sup>lt;sup>38</sup> IFEU - Institute for Energy and Environmental Research. (2008). Life cycle assessment of refillable glass and PET bottles for mineral water and soft drink

<sup>(</sup>http://www.ifeu.org/oekobilanzen/pdf/LCA%20fuer%20PET%20Einwegsysteme%20erstellt%20fuer%20PETCORE%20(S ept%202004).pdf), page III

<sup>&</sup>lt;sup>39</sup> German Environmental Agency (2002), LCA for Beverage Packaging Systems, (<u>http://www.umweltdaten.de/publikationen/fpdf-l/2180.pdf</u>)

<sup>&</sup>lt;sup>40</sup> Roberto Cavallo, 2011, International Pre-waste workshop: Sharing ways to tackle municipal waste prevention in cities and regions http://www.bruvelleconvicencement.bc/uploadedEilec/Contenu.du.cite/Deefectionencle/Corrections.et.cómionines/Contenu.du.cite/Deefectionencle/Corrections.et.cómionines/Contenu.du.cite/Deefectionencle/Corrections.et.cómionines/Contenu.du.cite/Deefectionencle/Corrections.et.cómionines/Contenu.du.cite/Deefectionencle/Corrections.et.com/Contenu.du.cite/Deefectionencle/Corrections.et.com/Contenu.du/Conten

http://www.bruxellesenvironnement.be/uploadedFiles/Contenu du site/Professionnels/Formations et séminaires/Co nférence\_Pre-waste\_2011\_(actes)/3b1-RobertoCavallo\_AvoidingPackaging.pdf?langtype=2060

#### QUANTIFICATION

#### Hygiene Products

720 thousand tonnes<sup>41</sup> of soaps (compact, liquid and shower gels) were sold in the EU in 2009.

Assuming an average weight per sold soap pack of 200g, this results in 3.6 billion packs of soap.

It is assumed in this scenario that 50%<sup>42</sup> of these soaps are sold in bottles with dispensing pumps which can be refilled.

Research has shown<sup>43</sup> that for one million primary packs, the amount of packaging waste saved will be ~25–40 tonnes for bulk refill (meaning that refill pack is not a 'same size refill' but contains more product than the primary pack, the saving is also due to the fact that a pump is only needed for the original pack while for the refill packs a cap or foil seal can be used). In our case, with 1.8 billion<sup>44</sup> primary packs, a switch to a refill systems would lead to savings of 45 000 to 72 000 tonnes of packaging waste (essentially plastic).

# The lower estimate will be used for the assessment; this scenario results in a saving of 45 ooo tonnes of plastics.

#### Household cleaning products

7.9 million tonnes of cleaning products were sold in 2009 (including all purpose cleaners and cleaners for sanitary facilities, detergents for dishwashing machines, hand dishwashing and laundry detergents)<sup>45</sup>.

The above mentioned products are, among others, sold in packs with dispensers (for hand dishwashing detergents, such as in the example of soaps, see above) or bottles with attached trigger dispensers (for all purpose cleaners and cleaners for sanitary facilities). It is assumed that these two kinds of packaging each make up half of the market (3.9 billion tonnes), and that they could be replaced by refillable packaging (25% by refill packs for dispensers with pump and 25% with refill packs for triggers dispensers).

Refill packs for dispensers with pumps can save around 25-40 tonnes of packaging waste (essentially plastic) per one million primary packs (see example of soaps above).

Refill packs for trigger dispensers can save around 20 tonnes of packaging waste per one million

<sup>&</sup>lt;sup>45</sup> Eurostat, PRODCOM code 20413250 (Washing preparations and cleaning preparations, with or without soap, p.r.s. including auxiliary washing preparations excluding those for use as soap, surface-active preparations): please note that the market is probably even bigger as not all products are necessarily included in the Prodcom code in question.



<sup>&</sup>lt;sup>41</sup> Eurostat, Prodcom code 20421915 (Soap and organic surface-active products in bars, etc, for toilet use)

<sup>&</sup>lt;sup>42</sup> As compact soaps are among this total amount of soaps, not the total amount can be switched towards refillable dispensers.

<sup>&</sup>lt;sup>43</sup> Potential refill solutions for the food and non-food retail sectors –feasibility study, James Ross Consulting and Butcher&Gundersen for WRAP, 2008.

http://www.wrap.org.uk/downloads/Refills\_o6\_food\_and\_non\_food\_Report.9c627617.5518.pdf

<sup>44 3.6</sup> billion\*50%

primary packs for same size refill<sup>46</sup>.

The average container size is assumed to be 500ml.

The switch to refill systems for the initial 3.9 billon 500ml dispenser pump containers and 3.9 billion 500ml trigger dispenser containers would result in packaging waste savings of 98.4 thousand to 157.5 thousand tonnes for dispenser pump containers and 78.7 thousand tonnes for trigger dispensers.

# The lower estimate will be used for the assessment; this scenario results in a saving of 177,100 tonnes of plastics<sup>47</sup>.

#### AFFECTED COST COMPONENTS AND ASSOCIATED COST IMPACTS

For hygienic and cleaning products, the proposed measure reduces the production of the number of HDPE primary packs with plastic dispensing pumps/triggers by switching towards larger refill bags/pouches (**avoided raw material costs**).

Industry can benefit additional cost savings from the fact that a lower number of packaging units is required to sell the same amount of final product. In the case of hygienic and cleaning products, lower quantities of triggers and pumps for primary packaging are to be used (impact on packaging production costs and **packaging process costs**).

#### CALCULATION OF COST IMPACTS

#### Avoided raw material costs of packaging

Raw material inputs for packaging material partly consist of (cheaper) recycled materials. For the purposes of this exercise, following repartition between virgin material and recycled material inputs in the final products will be used:

- HDPE bottles/flasks: 25% of the raw material consists of recycled HDPE<sup>48</sup>.
- HDPE foil/bags: virgin prices are used (no recycled material supposed).
- Paper/cardboard: 55 % of the raw material consists of recycled paper/cardboard<sup>49.</sup>

In Annex 4, international market prices for both virgin and recycled material are presented.

#### Impact on production and process cost of the packaging

No data could be found on potential savings on packaging process costs, as the production price

<sup>46</sup> Potential refill solutions for the food and non-food retail sectors –feasibility study, James Ross Consulting and Butcher&Gundersen for WRAP, 2008.

http://www.wrap.org.uk/downloads/Refills\_06\_food\_and\_non\_food\_Report.9c627617.5518.pdf



<sup>&</sup>lt;sup>47</sup> 98 400 tonnes + 78 700 tonnes = 177 100 tonnes

<sup>&</sup>lt;sup>48</sup> OIVO. (2009). Milieu-impact van verpakkingen. OIVO, Brussels

<sup>&</sup>lt;sup>49</sup>Arcadis & Eunomia. (2008). Optimising Markets for Recycling, study in demand of The European Commission – DG Environment

structure is confidential information and can differ significantly according to the product. Costs savings could not be estimated but are assumed to represent only a minor share of (saved) material costs.

#### Impact on Green Dot fees

The saved Green Dot fees are calculated based upon avoided packaging weight and the weighted average of the fees for 2010 presented in Annex 5.

Reuse		Avoided quantity (tonnes)		Avoided packaging material		
Hygiene Products	A switch from soaps sold in bottles with dispensing pumps to refill systems					
Hygiene Flodocts	Saving plastics (HDPE)	45 000	7 309 304 €	36 168 750 €		
Household	A switch from bottles with dispensing pumps/triggers to refill systems					
cleaning products	Saving plastics (HDPE)	177 100	28 766 173 €	142 344 125 €		

	Table 8:	Avoided	costs	of reuse	scenarios
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#### ENVIRONMENTAL BENEFITS

The resulting environmental impacts of the reuse scenarios take into account the avoided production and end of life of materials as well as the extra production and end of life of reusable packaging. Regarding the end of life, both non-refillable and refillable products are recyclable, and the end of life steps considered are based on EU-27 recycling/incineration/landfill rates.

Reuse		Avoided quantities (tonnes)	GHG emissions avoided (tonnes CO₂ eq.)	Resource depletion avoided (tonnes Sb eq.)	Fossil resource depletion avoided (tonne oil eq.)			
	A switch from soaps sold	A switch from soaps sold in bottles with dispensing pumps to refill systems						
Hygiene Products	Net plastics savings (HDPE)	45,000	145,351	1,417	68,915			
Household	A switch from bottles with dispensing pumps/triggers to refill systems							
cleaning products	Net plastics savings (HDPE)	177,100	475,760	4,327	205,535			



### 5.1.3 Avoidance

#### SCENARIO DEVELOPMENT

Possibilities exist to completely get rid of packaging, for numerous product groups, as already practiced in many organic and other stores throughout Europe, offering many products in bulk (such as pasta, beans, nuts, dried fruits, cereals etc.). Good experience has been made in Italy, where a supermarket chain has created an initiative in 2005, offering bulk products for dry food.<sup>50</sup>

Innovative solutions to avoid packaging can also be found through re-design of packaging:

Removing superfluous parts of the packaging<sup>51:</sup>

In Europe, Kraft changed the packaging of its Milka milk-chocolate tablet from an aluminium foil wrap in a cardboard sleeve to a flexible one-layer plastic flow pack. The redesign reduced the use of packaging materials by more than 50 percent<sup>52</sup>.

Re-using packaging with a different function:

A box for dishwash powder can be designed in a way so that it can be reused as a flower pot<sup>53</sup>.

- Re-using packaging as a part of the product:
  - The packaging of a lightbulb can be designed in a way so that it can be reused and transformed into a lampshade.<sup>54</sup>
  - □ A television box can be turned into a stand after a transformation following the unpacking of its contents.<sup>55</sup>

The case of the chocolate bars was not selected in this study as flexible plastic and not largely recycled in Europe yet. This example would then have been contrary to moving up the waste hierarchy.

The other two ways of packaging avoidance mentioned hereabove were not selected as well, due to the high variety of functions packaging can have (and the numerous products it can replace), e.g. the costs and environmental impacts of a flower pot would have to be assessed in order to be able to draw comparisons, which is out of the scope of this study.



<sup>&</sup>lt;sup>50</sup> EC (2009) Waste Prevention Best Practice Factsheets: Eco-Point initiative for Bulk Good Sales (Italy) http://ec.europa.eu/environment/waste/prevention/pdf/Ecopoint\_crai\_Factsheet.pdf

<sup>&</sup>lt;sup>51</sup> Eurostat, PRODCOM codes 10511133 (Milk and cream of a fat content by weight of <= 1%, not concentrated nor containing added sugar or other sweetening matter, in immediate packings of a net content <= 2 I) and 10511142 (Milk and cream of a fat content by weight of > 1% but <= 6%, not concentrated nor containing added sugar or other sweetening matter, in immediate packings of a net content <= 2 I)

<sup>&</sup>lt;sup>52</sup> PackagingWorld (2007) A Global Perspective on Sustainable Packaging from Kraft Foods <u>http://www.packworld.com/newsletters/sp-04-16-07.html</u>

<sup>&</sup>lt;sup>53</sup> Packaging Design Archive (2007) Flower pot dishwash powder <u>http://www.packagingdesignarchive.org/archive/pack\_details/1907-flower-pot-dishwash-powder</u>

<sup>&</sup>lt;sup>54</sup> International Council of Societies of Industrial Design (2010) Designing Sustainable Packaging http://www.icsid.org/news/year/2010\_news/articles1041.htm

<sup>&</sup>lt;sup>55</sup> WebUrbanists (2011) What if packaging were part of the product? 5 innovative industrial designs for ecological living <u>http://weburbanist.com/2008/02/01/what-if-the-package-were-part-of-the-product-5-innovative-industrial-designs-for-ecological-living/</u>

The following scenario will be assessed:

# 50 % of dry food (including some categories which are today already available in bulk in some supermarkets) are sold in bulk

#### QUANTIFICATION

Sold volume of some selected dried edibles in 2009<sup>56</sup> amount to:

- dried fruit and nuts: 257.5 thousand tonnes
- breakfast cereals and other cereal grain products: 2.3 million tonnes
- pasta: 3.9 million tonnes

It will be assumed that:

- dried fruit and nuts are sold in 250g packs
- breakfast cereals and other cereal grain products are sold in 500g packs
- pasta is sold in 1kg packs

The following quantities of packs sold are therefore estimated:

- dried fruit and nuts: 1.03 billion 250g packs
- breakfast cereals and other cereal grain products: 4.58 billion 500g packs
- pasta: 3.86 billion 1kg packs.

Regarding weight of these packaging, the following assumptions are made:

- dried fruit and nuts: 5g of plastic per pack
- breakfast cereals and other cereal grain products: 20g of plastic for inner bag and 85g of cardboard57 for outer layer (assuming that half of the market consists of a plastic bag with and additional cardboard around, such as for cornflakes, and that the other half only has a plastic bag)
- pasta: 20 g per plastic pack<sup>58</sup> and 40g per cardboard box (assuming that half of pasta on the market is packed in cardboard boxes and half of it in plastic packs)

<sup>&</sup>lt;sup>58</sup> Carrefour (2010) Roundtable OECD <u>http://www.oecd.org/dataoecd/35/13/45104041.pdf?contentId=45104042</u>



<sup>&</sup>lt;sup>56</sup> Eurostat, Prodcom codes 10392520 (Dried fruit (excluding bananas, dates, figs, pineapples, avocados, guavas, mangoes, mangosteens, citrus fruit and grapes); mixtures of nuts or dried fruits), 10613333 (Rolled, flaked, hulled, pearled, sliced or kibbled cereal grains (excluding rice)), 10613335 (Germ of cereals, whole, rolled, flaked or ground (excluding rice)), 10613351 (Muesli type preparations based on unroasted cereal flakes), 10731130 (Uncooked pasta, containing eggs (excluding stuffed or otherwise prepared), 10731150 (Uncooked pasta (excluding containing eggs, stuffed or otherwise prepared))

<sup>&</sup>lt;sup>57</sup> The Sunday Times (2009) Breakfast in the bag as box is binned <u>http://business.timesonline.co.uk/tol/business/industry\_sectors/consumer\_goods/article6544703.ece</u>

This scenarios result in the following savings:

If 50% of dried fruits and nuts on the market were sold in bulk, 2.58 thousand tonnes <sup>59</sup>of plastic would be saved.

If 50% of breakfast cereals and other cereal grain products were sold in bulk (replacing half of the packs including a plastic bag and a cardboard box and half of the single plastic bag packs), 45.85 thousand tonnes of plastic and 97.42 thousand tonnes of cardboard would be saved.<sup>60</sup>

If 50% of pasta would be sold in bulk (replacing half of the cardboard boxes and half of plastic packs), 19.31 thousand tonnes of plastic and 38.62 thousand tonnes of cardboard would be saved.<sup>61</sup>

#### AFFECTED COST COMPONENTS AND ASSOCIATED COST SAVINGS

By selling dry food in bulk, industry consumes less raw material inputs (avoided raw material).

#### ASSOCIATED COST SAVINGS AND CALCULATION METHOD

Avoided raw material costs of packaging

Following assumptions on the division between input of virgin material and recycled material are used:

- PP foil for dry food packaging: virgin prices are used (no recycled material supposed)
- Cardboard for dry food packaging: 55% of the raw material consists of recycled paper/cardboard<sup>62.</sup>

#### Impact on packaging process

No useful data to calculate producer benefits could be identified. Similarly to the defined reuse scenarios, it is assumed that these savings are minor compared to raw material savings.

#### Impact on Green Dot fees

The saved Green Dot fees are calculated based upon avoided packaging weight and the weighted average of the fees for 2010 presented in Annex 5.



<sup>&</sup>lt;sup>59</sup> 1.03 billion packs\*50%\*5g=2.58 thousand tonnes

<sup>&</sup>lt;sup>60</sup> 4.58 billion packs\*50%\*20g = 45.85 thousand tonnes; 4.58 billion packs\*50%\*50%\*85g=97.42 thousand tonnes

<sup>&</sup>lt;sup>61</sup> 3.86 billion packs\*50%\*50%\*20g= 19.31 thousand tonnes; 3.86 billion packs\*50%\*50%\*40g=38.62 thousand tonnes

<sup>&</sup>lt;sup>62</sup>Arcadis & Eunomia. (2008). Optimising Markets for Recycling, study in demand of The European Commission – DG Environment

Avoidance		Avoided quantity (tonnes)	Avoided Green Dot fees	Avoided packaging material			
	50% of dried fruits and nuts on the market would be sold in bulk						
Dry food	50% of cereal grain products would be sold in bulk						
	50% of pasta would be sold in bulk						
	Saving plastics (PP)	67 733	7 646 823 €	65 023 274 €			
	Saving paper/cardboard	136 045	7 709 520 €	52 499 845 €			

#### Table 10: Avoided costs of avoidance scenario

#### **ENVIRONMENTAL BENEFITS**

The resulting environmental benefits from the packaging avoidance scenario are detailed in the following table.

Avoidance		Avoided quantities (tonnes)	GHG emissions avoided (tonnes CO <sub>2</sub> eq.)	Resource depletion avoided (tonnes Sb eq.)	Fossil resource depletion avoided (tonne oil eq.)		
	50% of dried fruits a	nd nuts on the m	arket would be s	sold in bulk			
	50% of breakfast cel	reals and other c	ereal grain produ	ucts would be so	ld in bulk		
	50% of pasta would be sold in bulk						
	Saving plastics						
	(PP)	67 733	181 346	1828	92 121		
	incl. Dry fruits	2 575	6 895	69	3 503		
Dry food	incl. Cereals	45 845	122 746	1 237	62 353		
	Incl. Pasta	19 312	51 705	521	26 265		
	Saving paper/cardboard	136 045	204 769	1344	63 132		
	Incl. cereals	97 422	146 634	962	45 209		
	Incl. pasta	38 624	58 134	381	17 923		
	Net benefits	203 778	386 114	3 171	155 253		

Table 11: Environmental benefits of avoidance scenario



## 5.2 Impacts of the recyclability of packaging

#### SCENARIO DEVELOPMENT

The table below gives the recycling rate (per packaging material) in the EU<sub>27</sub> and in the 'best-performing' MS (highest recycling rate in the EU).

# What would be the gains if the highest recycling rate per material could be achieved across the EU27?

What has to be taken into account when analysing the recycling rates of the best-performers is the possible import of recyclable material which can falsify the numbers (i.e. in Belgium where the number is actually even higher than 100% as glass is imported to be recycled from other countries such as France). Nonetheless, these high recycling rates were taken as a reference of what can be achieved through (among other initiatives) improving the recyclability of packaging.

Table 12: Overview of the recycling rate per packaging material in the EU27 and in the 't	oest-
performing' Member States	

2008	•		
	Packaging waste generated (t)	Recycled (t)	Recycling rate
Glass EU 27 Highest recycling in EU 27: BE	16694142	11020119	66% 100%
<b>Plastic</b> EU 27 Highest recycling in EU 27: <b>SL</b>	14951908	4526082	30% 56%
<b>Paper and board</b> EU 27 Highest recycling in EU 27: <b>NL</b>	31243520	25273074	81% 96%
<b>Metals</b> EU 27 Highest recycling in EU 27: <b>CY</b>	4923487	3335961	68% 95%
<b>Wood</b> EU 27 Highest recycling in EU 27: <b>IE</b>	13407219	5143338	38% 77%

Per material, the following assumptions were made

- Glass: 50% white and 50% green glass gullets
- Metals: 81% steel and 19% aluminum
- Plastic: 73% PET and 27% HDPE
- Wood: potential cost savings for wood are not considered, as scrap wood and virgin



wood are two different products. They cannot be unconditionally substituted. Virgin wood is, amongst others, used as massive construction material, where scrap wood is mainly used in the fiberboard and power generation industry.

The repartition between materials within the aggregate material categories is based on figures from the Belgian packaging organisation Fost Plus <sup>63</sup>. In addition, paper and cardboard were assumed to be composed by 50% paper and 50% cardboard.

Table 13 below presents the cost impact when virgin materials could be replaced or supplemented by higher amounts of recycled material (lower bound raw material prices to determine the price gap).

Recycled material	Total recycled in scenario with 'highest recycling rate' (tonnes)	Total extra tonnes recycled compared to current EU situation (tonnes)	Minimum earnings per material compared with current situation
Glass	16,694,124	5,674,005	141,850,125 €
Plastic (HDPE/PET)	8,373,068	3,846,986	4,031,449,482 €
Paper and Board	29,993,779	4,720,705	2,841,864,530 €
Metals (aluminium/steel)	4,677,313	1,341,352	526,681,725 €
Wood	10,323,559	5,180,221	
TOTAL:			7,541,845,862 €

Table 13: Yearly cost impact in the 'highest recycling rate' scenario when replacing virgin material by recycled material (in € in prices of 2011, excl VAT)

The total impact of the 'highest recycling rate' scenario on material input cost savings is estimated at +/- **7.5 billion euro.** This result reflects the price gap between virgin and recycled material. Expressed per EU inhabitant the benefits could amount up to 15.2 euro per year. It is of note that the (increased) use of recycled material will not be suitable for all applications and the volatility of both virgin raw material prices and recycled raw material prices is inspired by several factors. One important issue for the (production) cost of recycled material that should not be ignored is the unstable supply and associated uncertainties for recyclers.

#### **ENVIRONMENTAL BENEFITS**

The benefits obtained when comparing the 'high recycling' scenario to the current situation are presented in the following table (using the method to assess the environmental impact avoided as described in section 3.3.1.3.

<sup>&</sup>lt;sup>63</sup> Fost Plus. (2010). Jaarverslag 2009. Fost Plus. Brussel



Recycled material	GHG emissions avoided (tonnes CO <sub>2</sub> eq.)	Resource depletion avoided (tonnes Sb eq.)	Fossil resource depletion avoided (tonne oil eq.)
Glass	74,823	750	38,781
Plastic	8,797,013	106,280	5,431,320
Paper and board	4,524,490	4,963	134,312
Metals	3,568,870	26,796	1,048,554
Wood	N/A	N/A	N/A
Total benefits	16,965,197	138,790	6,652,966

Table 14: Avoided environmental impacts associated with the recycling scenario



# Annex 4: Impacts of the implementation of the ER - Prices of virgin and recycled packaging materials

#### VIRGIN PACKAGING MATERIAL

Material	€/ton	Source		
Glass	59	http://www.wrap.org.uk/downloads/Glass_MSR_update_online.fc0fa2e8.6009.pdf	sept 2008	Clear glass gullets
	52	http://www.wrap.org.uk/downloads/Glass_MSR_update_online.fc0fa2e8.6009.pdf	idem	Green glass gullets
Paper-cardboard	/1/	http://www.paperage.com/foex/paper.html	28/11/2011	Coated Wood Free Paper
	776	http://www.foex.fi/index.php?page=pix-paper	3/11/2009	White top craftliner
	1100	(Arcadis & Eunomia, 2008)	1st quarter 2008	GC2 Virgin cardboard
	807	(Arcadis & Eunomia, 2008)	1st quarter 2008	Duplex GD 2
	4 7 7 4			
Aluminium	1774	http://www.metalprices.com/FreeSite/metals/al/al.asp#	16/06/2011	
	1719	http://www.lme.com/aluminium.asp	29/06/2011	LME prices
Stool	204		20/06/2011	I ME prizza
Sleel	394	nttp://www.ime.com/steel/latest_price.asp	29/06/2011	LIVIE prices
	630	http://www.worldsteelprices.com/	may 2011	
	641	http://www.meps.co.uk/EU%20price.htm	febr 2011	Hot rolled coll
				LI DPE HDPE injection and blow moulding
HDPF Plastic	990	http://www.icie.com/v2/chomicale/0076156/polyothylopo.low.donsity/pricing.html	mid febr 2011	arade
	1197	http://www.icis.com/vz/chemicals/307070/polyeurylene=low-density/piloing.html	16/06/2011	grado
	1200		17/06/2011	Furona
	1200		17/00/2011	Luiopa
PET Plastic	1700	http://plasticker.de/preise/marktbericht2_en.php?i=11&mt=5&guelle=byse	april 2011	Primary PET
	1550	ICIS price report	20/06/2011	RPET PELLETS – FOOD GRADE
LDPE Plastic	960	http://plasticker.de/preise/preise lme en.php?lastdat=2011-04-21&waehrung=EUR	21/04/2011	LME prices (London Metal Exchange)
	1300	ICIS price report	17/06/2011	Europa



Material	€/ton	Source		
Glass	34 12,5	http://www.wrap.org.uk/recycling_industry/market_information/materials_pricing_reports/materials_pricing_2.html#notes idem	13/04/2011 idem	Clear glass gullets Green glass gullets
Paper- cardboard	115	http://www.fostplus.be/SiteCollectionDocuments/Werking%20Fost%20Plus%20en%20partners/Recycleren/PC_pricesx.pdf	march 2011	Recycled Belgium
	136	http://www.wrap.org.uk/recycling_industry/market_information/materials_pricing_reports/materials_pricing_2.html#notes	13/04/2011	Recycled OCC
Aluminium	650 890 1080	http://www.fostplus.be/SiteCollectionDocuments/Werking%20Fost%20Plus%20en%20partners/Recycleren/ALU_pricesx.pdf http://www.letsrecycle.com/prices/metals http://www.wrap.org.uk/recycling_industry/market_information/materials_pricing_reports/materials_pricing_2.html#notes	march 2011 june 2011 22/04/2011	recycled (Gemiddelde contractprijs voor aluminium, af sorteercentrum) Old rolled aluminium
Steel	180 160	http://www.wrap.org.uk/recycling_industry/market_information/materials_pricing_reports/materials_pricing_2.html#notes http://www.letsrecycle.com/prices/metals/steel-cans	22/04/2011 june 2011	Steel can prices
HDPE Plastic	280 245	http://www2.fostplus.be/SiteCollectionDocuments/Werking%20Fost%20Plus%20en%20partners/Recycleren/HDPE_pricesx.pdf http://www.letsrecycle.com/prices/plastics	march 2011 june 2011	Recycled, Belgium HDPE mixed colour
PET Plastic	390	http://plasticker.de/preise/preise_monat_single_en.php	june 2011	PET Bales
	475	http://www.fostplus.be/SiteCollectionDocuments/Werking%20Fost%20Plus%20en%20partners/Recycleren/PET_pricesx.pdf	march 2011	Recycled, Belgium



## Annex 5: Impacts of the implementation of the ER - Green dot fees in EU-27

#### GREEN DOT FEES 2010 (Fees in € / tonne)

	Belgium	Bulgaria	Czech Rep.	Finland	France	Greece	Italy	Latvia	Lithuania
GLASS	18,4	32,21	58,67	10	4,5	10,9	10,32	48,95	57,34
PAPER/CARDBOARD	17,6	73,63	126,8	15	152,6	5²,5	22	16,5	13,03
ALUMINIUM	137,9	92,03	81,76	20	56,6	8,8	25,82	68,3	26,07
HDPE BOTTLES AND FLASKS	199,4	108,91	215,99	21	222,2	66	72,3	133,18	26,07
OTHERS RECOVERABLE	313,5	na	215,99	18	152,6	66	na	na	26,07

	Netherlands	Poland	Portugal	Romania	Slovenia	Spain	Sweden	UK
GLASS	71,8	10,6	18,3	16,29	31,5	32	na	23,29
PAPER/CARDBOARD	79,5	2	86,3	13,26	56	68	52	3,8
ALUMINIUM	950,6	13,5	164,4	10,27	53	102	252	16,1
HDPE BOTTLES AND FLASKS	470,5	1,3	228,2	11,68	78	377	137	5
OTHERS RECOVERABLE	na	1,6	260	na	33	472	na	na

#### Weighted EU Average (Fees in €/tonne)

GLASS	19,06
PAPER/CARDBOARD	56,67
ALUMINIUM	112,95
HDPE BOTTLES AND FLASKS	162,43
OTHERS RECOVERABLE	112,90



# Annex 6: Impacts of the implementation of the ER - LC inventory data used for the environmental impacts

In the table below the Life Cycle Inventories (LCI) of various packaging materials, i.e. the unit factors for the calculation of the environmental impacts, are presented.

They include the following steps: raw material production, packaging production, and end of life steps (recycling, incineration, landfill). Packaging filling and transportation were not taken into account across all scenarios considered. Packaging filling was not considered as energy used to fill the packaging. It can be assumed to be the same regardless of the type of packaging, therefore its impact is cancelled out across all scenarios considered. Transportation accounts for only 2% to 5% of the life cycle impact, and has been left off since it is considered to have a minor impact on the overall environmental impacts. The system boundaries used for assessing the scenarios considered can be found in Figure 5 and Figure 6. Recycling, incineration, and landfilling rates split out by material are illustrated in Table 4 (2009 Eurostat data).

Three environmental indicators were retained and evaluated to assess the benefits of the scenarios:

- Green House Gases Emissions (expressed in tonnes CO2 equivalent)
- Natural resource depletion (expressed in tonnes Sb equivalent)
- Fossil resources depletion (expressed in tonnes oil equivalent)

The database used for the LCI is Ecoinvent v2.2, which is recognised by experts worldwide as one of the best data sources for LCI and LCA. In terms of the quantities of energy and heat produced by the incineration of each material, data was used from the Ecoinvent database.

In the table below, optimal recycling indicates the application of higher recycling rates in line with the rates achieved by the highest performers in the EU-27; such recycling rates are only applied in the recyclability scenario.

Table 15: Life cycle inventories used for environmental impact assessment of scenarios

Material	Green House Gases Emissions	Natural resource depletion	Fossil resources depletion
	kg CO ₂ eq	kg Sb eq	kg oil eq
1 kg clear glass	0,893	0,007	0,325
1 kg clear glass, reused 50 times	0,893	0,007	0,325
1 kg steel	2,626	0,020	0,817
1 kg PP spray pumps	3,444	0,034	1,669
1 kg PP film	2,677	0,027	1,360
1 kg PEHD flask	3,230	0,031	1,531
1 kg PEBD corks	3,595	0,034	1,655
1 kg PEBD film	2,832	0,027	1,346
1 kg PET bottle	4,363	0,038	1,736
1 kg cardboard	1,505	0,010	0,464
1 kg clear glass, optimal recycling	0,888	0,007	0,323
1 kg steel, optimal recycling	2,291	0,017	0,718
1 kg PEHD flask, optimal recycling	2,686	0,024	1,161
1 kg PET bottle, optimal recycling	3,758	0,030	1,375
1 kg cardboard, optimal recycling	1,384	0,010	0,474



## Annex 7: Best practices - Brief presentation

Enforcement : 8 selected examples								
Country	Type of institution	Type of product	Type of measure	Essential Requirement concerned	Description			
UK	MS	General	Regulatory - Inspection	Packaging prevention/Minimisation of hazardous substances/Recycling	The toolkit, which was rolled out to the enforcement body, contains a checklist, information and examples of good packaging design, links to WRAP data and case studies, information on past prosecutions, flow charts and standard forms to use. The idea is that this pack helps the inspectors understand the area better as most enforce a wide range of legislation, so are not packaging specialists.			
FR	MS	General	Regulatory - Technical documentation & declaration of compliance	Packaging prevention/Minimisation of hazardous substances/Recycling	Use of self-declarations: ensure and declare that the packaging placed on the market complies with the ER. Outcome of the self-assessment: written declaration of conformity and technical documentation. Includes information on the type of technical documentation and a model of the declaration of conformity. Controls are performed within 2 calendar years following first placement of packaging on market.			
NL	MS	General	Regulatory - Inspection	Packaging Prevention/Minimisation of hazardous substances	The Dutch lenM developed an inspection list to help officers inspect compliance with the Essential Requirement on packaging minimisation. Includes the inspection list used by the enforcement officers.			
BE	MS	General	Regulatory - Inspection	Minimisation of hazardous substances	Portable X-ray fluorescence (XRF) analyzers, or XRF guns, are used to test the chemical composition of materials (toys, electronics, paint). The Belgian Inspectorate applies this device to test the heavy metal content of packaging. Includes the costs of such an instrument.			



UK	MS	General	Regulatory - Prosecution & caution	Packaging Prevention	Enforcement of ER based on criminal prosecution, local approach. There have been 5 prosecutions so far - four of them used the 'misleading packaging' regulation in addition to the ER. But one case was completely made up on the ER. It was a case of 10% product and 90% packaging (in Lincolnshire).
UK (Trading Standards Institute Lincolnshire County Council)	MS	General	Informational/Promotio nal - Encouragement of consumers to challenge excess packaging	Packaging prevention	Lincolnshire County Council implemented a successful awareness campaign: within less than two years, over 100 complaints of excess packaging were made by consumers using the new communication channels offered by the county services.
BE	MS	General	Regulatory - Obligatory waste prevention plans	Packaging prevention	Belgium has obligatory packaging prevention plans for companies (e.g. which are producing more than a specific annual tonnage of packaging or exceeding material-specific packaging levels). The companies have to report on their prevention efforts. The prevention plan comprises reduction objectives and the measures to achieve these objectives. It needs to be approved by the authorities.
			Informational -	Packaging	Guidelines providing an outline of a documentation system a company can establish with the aim of being able to provide documentation upon request (elaborated by the Danish EPA in cooperation with the Danish industry), including the level of detail of the information. The following elements should be part of the documentation system: knowledge from the primary development process, experience from packaging production, experience from filling process, experience from distribution, dialogue with sales points, dialogue with end-users and consumers. The documentation should include
			Informational - Technical	prevention/Minimisation of hazardous	knowledge about good and bad properties of a given packaging together

substances/Recycling



DK

MS

General

documentation

with the corrective actions taken.

Enforcement : Non-selected examples							
Country	Type of institution	Type of product	Type of measure	Essential Requirement concerned	Description		
FI	MS	Plastic pockets and folders / nursing pillows	Regulatory - Inspection	Minimisation of hazardous substances	Detection of non-compliant imported packaging through border controls as well as efficient use of RAPEX (EU rapid alert system for the rapid exchange of information between Member States via central contact points). Example: Packaging of nursing pillows (produced in China, imported by a Danish company) with high cadmium levels was detected at the Finnish border. Import was rejected by Finnish customs authorities, plastic bags were removed under customs' supervision and replaced with packaging in accordance with the regulations. <i>Not a very strong example as the products were only detected in the course of a normal inspection (random selection)</i> .		
LV	MS	Glass processing	Regulatory - Documentation on heavy metal concentration	Minimisation of hazardous substances	Glass processing companies are obliged to measure the heavy metal concentration in glass production and notify the State Environmental Service in writing if the concentration level has exceeded the norm. Together with the notification, companies submit information on the content of heavy metals; a description of the measuring methods utilised; the possible reasons for exceeding the heavy metals content norm; and the measures performed in order to reduce the content of heavy metals. <i>After contact with the Latvian authority it is clear that it there is only a literal translation of Decision 2001/171/EC, but without further practice. No reporting has resulted yet.</i>		



Implementation : 12 selected examples								
Name	Country	Type of institution	Type of product	Type of measure	Essential Requirement concerned	Description		
UNESDA/ RECOUP	EU	Industry	General	Informational - Guidelines for waste prevention (enhancing recyclability)	Recycling/ recoverability	Recyclability guides for plastics packaging allow designers to make packaging (more) recyclable.		
DANONE	EU	Industry	Food	Packaging reduction through avoidance	Packaging prevention	Small quantity yogurts are usually sold in small plastic cups with a cardboard sleeve around. Danone successfully abandoned the paper wrap: the reduced packaging is well accepted by consumers and resulted in high savings of resources.		
IKEA	EU	Industry	Home furniture & accessories	Packaging minimisation through redesign	Packaging prevention	IKEA involves a packaging technician early in the product development process and existing packaging is continuously improved: for instance, IKEA switched from bulk packaging to staple packaging for its tea lights. This had a positive impact on logistics and sales price.		
KRAFT	EU	Industry	Food	Packaging reduction through avoidance	Packaging prevention	Kraft successfully replaced the double layer paper and aluminium packaging of the Milka and LEO chocolate bars by a hermetical flow pack. The change in packaging material resulted in savings of more than 60% in material weight.		
Eco- emballages	FR	Green-dot organisation	General	Promotional - Packaging prevention through eco- modulation of green dot fees	Packaging prevention, recyclability	Eco-Emballages will consider the recyclability of packaging materials in its collection and recycling fees in order to achieve a recycling rate of 75% for consumer products packaging by 2012.		



WRAP/DHL/P				Informational - Benchmark	Packaging	The UK Packaging Benchmark is an indication of the lightest weight
Datastore	UK	MS	General	database	prevention	packaging for a number of products found on the UK supermarket shelf.
Alcatel	EU	Industry	Telecommu nication	Supplier restrictions for substances of environmental concern	Minimisation of hazardous substances	Alcatel gives substance restrictions to its suppliers. They apply for products and packaging as purchased by, or used by, Alcatel-Lucent, as well as products for which Alcatel-Lucent has contracted the design and the use of certain substance in manufacturing operations. A comprehensive document provides supplier with requirements for the ban, restriction, and tracking of substances of environmental concern.
Optipack	Scandinav ia	Industry	General	Toolbox helping to be in accordance with the PWD	Packaging prevention	Opti-Pack is based on national projects in Denmark, Norway and Sweden, focusing among others on the support of companies in order to be in accordance with the PWD. It provides a toolbox with a number of support sytems: a tool for evaluation and documentation of packaging optimisation, a tool for packaging design (and assessment) and also research findings on production protection, marketing, user acceptance etc.
Alcan Packaging/A mcor	UK	Packaging manufacturer	Food	Packaging waste recycling through biodegradability	Recycling/ recoverability	Alacan packaging has developed a compostable laminate for use in food packaging as a substitute for plastic films. Introduced in the UK with the relaunch of ceral maker Jordans' organic range, the packaging is made up of two different certified compostable films, one derived from GM- free wood pulp and the other derived from GM-free cornstarch.
Unilever	Global	Industry	Cleaning products	Packaging minimisation through redesign	Packaging prevention	Movement from diluted liquid laundry detergents to concentrated formulas, leading to a 70% savings in gallons of water used during production (24 million gallons), 66% reduction in gallons of diesel used for transport (1.3 million gallons), 66% reduction in number of trucks used for transport (6000 trucks), reduction by 10 million lbs of plastic resin used and reduction in out of stock situations by 50%. Unilever offers both 2x and 3x concentrated detergent products, both of which



						lead to savings in packaging.
Ciclus	Spain	Industry	Drinks (Wine)	Packaging reduction through redesign	Recycling/Reuse	Cavallum Wine Lamp: a box of wine which transforms into a lamp.
		,			, 3	PUMA and fuseproject have collaborated in order to convert the
Puma Fuse				Packaging reduction	Prevention/Reus	conventional shoebox into an environmentally-friendly reusable
Project	US	Industry	Shoes	through reuse	e	product.



Implementation : Non-selected examples								
Name	Country	Type of institution	Type of product	Type of measure	Essential Requirement concerned	Description		
Marks and Spencer/Plan tic Technologies Limited	UK	Industry	Food	Packaging waste recycling through biodegradability	Recycling/ recoverability	Use of tray for chocolate packaging which is compostable and can dissolve in water; made of a starch-based material. The try can dissolve in water in a few minutes and be composted in 3 weeks. <i>Not selected in</i> <i>order to avoid over-representation of the food sector.</i>		
Lahti University of Applied Sciences, Institute of Design, PACKLAB	Finland	University	Food	Waste reduction via packaging reuse	Recyclability/ Reuse	Gingerbread dough is sold in an alumnium canister which functions as a cookie cutter; when not full the cookie cutters are stakable: http://www.packagingdesignarchive.org/archive/pack_details/1492- gingerbread. <i>Innovative, but not selected because of too little impact</i> .		
Tom Ballhatchet	UK	Designer	Home furniture & accessories	Waste reduction via packaging reuse	Recyclability/ Reuse	Usage of television packaging as a television stand following unpacking: http://weburbanist.com/2008/02/01/what-if-the-package-were-part-of- the-product-5-innovative-industrial-designs-for-ecological-living/. Innovative, but not selected because of too little impact.		
Cargo PlantLove	Global	Industry	Personal care	Waste reduction via packaging reuse	Recyclability/ Reuse	Make up products for which the packaging paper is impregnated with seeds which can be planted: http://packaginguniversity.com/blog/2010/01/11/2010-packaging- trends-2-green-is-no-longer-on-the-fringe/ <i>Innovative</i> , <i>but not selected</i> <i>because of too little impact</i> .		



Tectubes/FK uR/Allveggie	Sweden	Packaging manufacturer/l ndustry	Personal care	Packaging waste recycling through biodegradability	Recycling/ Recoverability	Development of a plastic tube for toothpaste which is biodegradable using biopolymers developed by FKur and used in packaging created by Tectubes; the resin used for the production of the tube results in good mechanical properties. The packaging is used for a natural toothpaste developed by Allveggie. <i>Not retained as another example on biodegradability was selected (Alcan)</i> . Development of a sturdy messenger bag to be used as packaging for
						laptops; the messenger bag serves as packaging and the computer is directly sold to consumers in the messenger bag, thereby avoiding
						packaging and providing consumers with a reusable/useful computer
						bag. No additional packaging is required when placing laptops into
						boxes for transport and all accessories and instruction documents are
					Recycling/	placed in the messanger bag. Bags are made of 100% recycled material;
				Packaging reduction	,	this approach reduces standard notebook packaging waste by 97%. Only
HP	US	Industry	Electronics	through avoidance	Reuse	a limited production run for a US retailer 3 years ago.
						Reuse of a container for coffee: once the content is consumed, the
Politecnico di						package can be reused as a pair of cups, which in turn, through cap joint,
Milano,					Decusions/	can be used as a shaker:
Facoltà del				Waste reduction via	Recycling/	http://www.packagingdesignarchive.org/archive/pack_details/1428-
Design	IT	University	Food	packaging reuse	Reuse	ingombri-utili. Only a concept design which does not exist on the market.



Annex



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