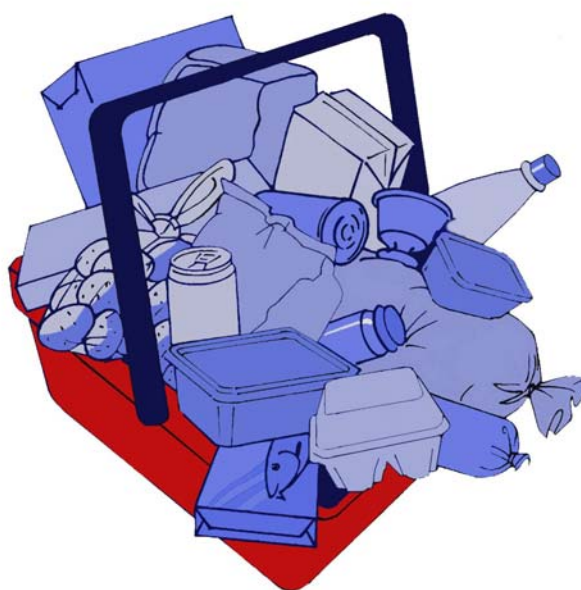


## Public Report



# The European Shopping Baskets

**Packaging Trends for Fast Moving Consumer Goods  
in  
Selected European Countries**

**Part 1: First data collection**

**March 2009**

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**Packaging Trends for Fast Moving Consumer Goods in Selected European Countries**

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## Public Report

This is the publicly available report of the European Shopping Baskets first data collection on: *Packaging Trends for Fast Moving Consumer Goods in Selected European Countries*. The Full Report, containing the data and tables described in the contents pages is available for purchase from EUROOPEN or STFI-Packforsk.

Price €2000

To purchase a copy of the Full Report, please contact either:

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# EXECUTIVE SUMMARY

The aim of the ESB Program is to generate data that will foster an improved understanding of the drivers of packaging development and demand applicable to fast moving consumer goods (FMCGs) sold in Europe. To achieve this, a novel methodology has been developed that defines typical shopping baskets in the selected countries containing the most commonly purchased items. To store and analyse the detailed information about the packaging for these products (about 45 000 data entries) a database has been built.

Five key packaging characteristics (packaging key values) have been calculated for each product and compared using a variety of filters, eg by category, by format, by packaging level, by material type, etc.

In this first phase of the study, full packaging data sets were obtained for 468 products. These cover 54 product categories and correspond to about 98 billion articles sold annually and to about 8.5 million tonnes of packaging. The items selected correspond to non-food, food and beverage products and / or those stored under ambient conditions.

Initial analysis has revealed interesting and sometimes surprising findings, including:

- On average 80% of the weight of a packed pallet is product, which is quite high. Average volume efficiencies are much lower, typically about 50% indicating an area for further investigation and potential improvement in logistics.
- In this study Italy showed the lowest usage of packaging per capita, even when trippage rates for reusable primary and secondary packaging used in the other countries studied are taken into account. This result contrasts with European Commission figures covering all packaging, due probably to differences in reporting methodologies. Nevertheless, the ESB results for Italy are unexpected and certainly worthy of future examination. In Estonia and Finland packaging per capita is the highest when trippage is not taken into account but this reduces significantly when trippage is accounted for.
- Plastics (PE, PP, PET) are the dominant primary packaging material for the products in the basket (about 44%) with paper & board next (about 23%).
- Overall less than 10% (by number) of products in the ESB use glass, aluminium or steel as the main materials for their primary packaging.
- Use of reusable primary packaging across countries is very polarised: Estonia, Finland and Poland have a high level of reuse (50-70 weight %) while Italy and the UK use virtually none.

An important goal of the ESB Program is to correlate packaging data with social-demographic influences. Initial analysis has confirmed that finding such connections is difficult but perhaps not impossible. Thus far, only a small number of potential co-relationships has been identified. Strongest links found to date are between packaging usage and population, packaging usage and average household size and packaging per capita and employment rate. This work also indicates an inverse link between household size and per capita packaging use. Further statistical support and more sophisticated statistical analyses are needed to determine whether significant co-relationships can be confirmed / uncovered

In summary the ESB database makes available, for the first time, comprehensive data on packaging use in Europe based on both qualitative and quantitative facts. This can support stakeholder dialogue about packaging in areas like sustainability, consumption patterns, and differences between countries, etc. Such dialogue need no longer be conducted without sufficient facts to support decisions.

Further details about the Program can be found on the European Shopping baskets website:

<http://www.europeanshoppingbaskets.org>

# 1 INTRODUCTION

Until now a vast amount of data published in Europe on packaging's environmental impact has been about waste and its management by recycling and other forms of recovery. This has largely been driven by EU and national packaging legislation which sets quantifiable targets for this activity.

Now, for the first time, the European Shopping Baskets Program looks at packaging in its functional role. It reports data that describe packaging not as a waste statistic but as a protector of more valuable resources such as the food and beverages we consume and the products we depend on to maintain the living standard we are privileged to enjoy in Europe.

This report summarises key findings from the first phase of an on-going Program which studies the packaging system used for products in a typical household shopping basket in selected European countries. The collection of data is intended to be repeated at two-year intervals to permit changes and trends which may be occurring to be identified. The findings of the ESB Program help us see the big picture of packaging, its relation to products we consume and its vital function in that capacity.

The scope of this Phase I report is limited to explaining the Program methodology and the initial key findings. Because of the powerful database created for the Program, much greater detail will be available for the benefit of all stakeholders as further interrogation and analysis of findings is carried out. Potential links between the packaging data generated and existing socio-demographic data for each country will be explored in particular in the next stage of this project.

At a time when sustainability and sustainable development are words very much on everyone's lips, packaging is inevitably part of that discussion. The Program supporters invite representative groups of various stakeholders including regulators, consumer organizations and environmental NGOs to put this report's findings to work to help all interest groups to better understand the function of packaging and its role in our society. Readers are cautioned however that without a comprehensive understanding of the methodologies used in the research, care must be taken with interpretation of results.

## 2 THE ESB PROGRAM

### 2.1 Aims and Objectives

The Shopping Basket method has been designed to measure the composition and monitor the changes in the packaging of the most common FMCG<sup>1</sup> products sold in major retail outlets across Europe over a succession of years. The primary, secondary and tertiary packaging used to protect these products has been studied. Trends in the usage of different packaging types, packaging materials and changes in packaging design are followed and the results presented in an easy to understand way. To achieve the desired objectives has required methodology development and the creation of a database tool.

The ESB Program is unique because it combines all of the following factors:

- It is representative of the most common products a consumer regularly carries home
- The packaging of a very large number of products (target 500) is studied
- The whole packaging system (primary, secondary, and transport packaging) is studied (see Figure 1).
- The products and their packaging are to be studied over a succession of years.
- Calculations are scaled to the number of articles sold per year in each product category.
- The influence of reusable<sup>2</sup> and reusable packaging is considered when calculating the results.

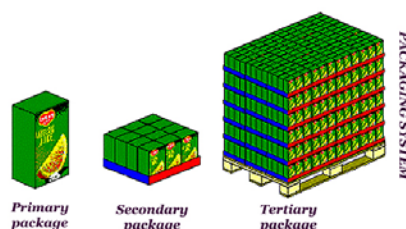


Figure 1. Example of a packaging system for juice

#### 2.1.1 Country Selection

The following five countries were selected for this study:

Estonia
Finland
Italy
Poland
United Kingdom

These were considered representative of the whole of the EU in terms of demographics, cultural diversity, geography, economics...etc.

<sup>1</sup> FMCG refers to Fast Moving Consumer Goods

<sup>2</sup> Reusable packaging is packaging that is used again for its original purpose after collection and cleaning operations (eg refilling of beverage bottles).

Chapter 3 of the full report includes a sub-section per country giving a short overview about the Geography, Demographics, Economy & Industry, Retailers, Consumers, Communication & Transportation and Packaging data (where available from the Member State / European Commission) in each country.

## 2.1.2 Product Selection and Data Collection

Each national Shopping Basket contained approximately 100 FMCG products that mirror what a person typically brings home from supermarkets over a specified year. For this first phase of data collection, data corresponds to the period 2005 / 2006.

Product selection was carried out with the help of AC Nielsen. Products chosen were selected from the following set of 54 categories:

ESB PRODUCT CATEGORIES		
Alcoholic drinks <small>excl. beer &amp; wine</small>	Cooking oil	Pet food
Baby care product	Dairy products <small>excl. cheese, milk &amp; yoghurt</small>	Ready cooked meal (chilled)
Baby food	Dental products	Ready cooked meal (dry)
Baking products	Desserts	Ready cooked meal (frozen)
Beer	Egg	Sauces (dry)
Biscuit, crackers & crisp bread	Fish & Shellfish	Sauces (wet)
Body products	Fruit & berries	Snacks
Bread (soft)	Hair products	Soft drinks
Breakfast products	Health products	Soups
Butter & Margarine	Household products <small>excl. laundry, clearing agents</small>	Spices & stocks
Cheese (hard)	Ice cream	Sugar products
Cheese (soft)	Jam & Marmalade	Tea
Chewing gum & sugar products	Laundry products	Tobacco
Chicken & other poultry	Meat	Vegetables
Chocolates	Milk	Water
Cleaning agents	Non carbonated drinks	Wine
Coffee	Pasta & Rice	Yoghurt
Condoms & pregnancy tests	Pastries	Other*

\* National Coordinator allowed to choose one additional category if considered important and not already covered.

The leading size for one leading brand (in terms of units sold) was selected for each product category. To complete the Basket additional products were selected from the top 50% of categories on a pro rata basis to number of units sold. Products selected were then taken as being representative of all the products and sales in each category.

Once the 100 leading brands and sizes were selected, the product producers/fillers were contacted and asked to provide the relevant product and packaging data through completion of a questionnaire. If a company was unable to participate in the ESB Program, this company's item was replaced by a suitable alternative.

The ESB Program relied on a National Co-ordinator (one in each country) to help with product selection, liaison with product manufacturers and national institutions, data

collection, critical review of data quality, national data interpretation, etc. In the UK, this role was split between INCPEN and DHL-Exel with DHL-Exel being used as the primary data provider through their established links with the companies.

To ensure that the data were consistent and robust, the database includes a number of internal checks. In addition, data were checked upon entry into the database by the National Co-ordinator and finally the data for the top 30 products in each country (covering ca 50% of sales) for this first round collection were subject to an additional independent check.

## 2.2 Filtrations

The ESB database is unique in the sense that the number of analyses that can be made is almost unlimited. A wide variety of filtrations and calculations can be performed. Filtration can be performed on properties in Figure 7:

Properties	Examples
Packaging system	Primary, secondary, tertiary
Country	Italy, Finland, Poland, Estonia and UK
Condition	Room temperature, chilled and frozen
Product category	54 product categories, both food and non-food
Packaging type	Bags, bottles, cans, cartons, flexible packaging, jars, etc
Packaging material	Plastic, glass, steel, aluminium, paper, cardboard, corrugated board, etc

Figure 7. Filtration parameters possible in the ESB database

Two or more filters can also be combined but in this case the number of products captured decreases and thus the statistical validity of any conclusions is reduced. Where appropriate calculations with and without trippage rates being taken into account are shown in parallel.

## 2.3 Packaging key-values (PKVs)

Five packaging key-values – PKVs - (see Figure 9) have been calculated using data collected and stored in the database.

No	Packaging key-values (PKVs)	Number of trips taken into account	Unit
1a-1c	Packaging weight / Product weight	Yes and No	g/kg
2a-2d	Weight distribution in the packaging system	No	weight-%
4a-4b	Product volume / Packaging volume	No	volume-%
5a-5c	Reusable packaging	No	weight-%
6a	Total basket weight	Yes/No	tonnes

Figure 9. Calculations performed and presented in this report

In general, key-values are presented for each of the three different packaging levels (and in one case the product is included) which generates a total of 16 key-values. A further five additional filtrations can be performed on these values resulting in more than 80 key-values that can potentially be studied and analysed. Pie charts and histograms are used to present the initial findings in the results section of the report.

Further information about the methodology used can be obtained from the ESB website and is described in detail in the full Part 1 ESB report<sup>3</sup>.

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<sup>3</sup> The European Shopping Baskets, Packaging trends for fast Moving Consumer Goods in Selected European Countries – Part 1: First Data Collection, December 2008

## 3 COMPOSITION OF ESB

### 3.1 Overall breakdowns

Of a total of 500 products originally selected for the European Shopping Baskets, full data sets were obtained for 468. Although 32 products short of the target, these 468 products are representative of the most common products, packaging types and materials found for FMCG products across Europe. Of the 468 products selected, 402 were food products (86%) and 66 (14%) were non-food. 68% are stored at room-temperature, 24% are stored chilled and 9% are stored frozen. In terms of annual sales, the Shopping Baskets represent sales of some 98 000 000 000 articles distributed across 54 product categories, the top 20 of which are shown in the table below:

ESB Product category	Relative size according to number of articles sold / year (%)
Bread (soft)	8,2
Chocolate	6,2
Milk	5,9
Tobacco products	4,7
Beer	4,4
Non-carbonated beverages	4,4
Meat	4,2
Water	4,2
Yoghurt	3,8
Snacks	3,7
Soft drinks	3,7
Chewing gum & sugar products	2,9
Pasta and rice	2,6
Vegetables	2,6
Biscuits, crackers and crisp bread	2,4
Pastries	2,2
Butter and margarine	2,1
Pet food	2,1
Cheese (soft)	1,7
Wine	1,7
Other	26,3

Figure 27. The 20 most common product categories in the ESB

The statistics used for FMCG products sold in the grocery trade are defined by AC Nielsen locally and typically are for shops with an area of greater than 100 m<sup>2</sup>. As a consequence, specific category data were missing in some countries where this product category was not generally sold from these outlets or not sold at all due to cultural habits (for example: wine is sold in special outlets in Finland, vegetables/fruit/eggs/meat/bread are sold at open markets or in special shops in Poland/Estonia ).

The results presented are almost all a quantified average. This means that the most common products and the packaging used to protect those influence the result the most. Plastic bags for bread, flowpacks for chocolate and beverage cartons for milk are some examples of such packaging types.

Primary, secondary and tertiary packaging is generally composed of a number of components, often made from different materials. In the analyses, the “main packaging material” for the primary, secondary and tertiary packaging respectively is defined by the respective component that weighed the most. For example, where the primary pack is a bottle and the bottle weighs more than the associated cap and label, the “main packaging material” is the material of the bottle. In addition, for the purpose of this analysis, the weight of the cap and label are combined with the weight of the bottle and this overall (primary) packaging weight ascribed to the packaging type and main material.

Knowledge of the packaging system, the weights<sup>4</sup> and the number of units sold in the collection year (2005) allowed the total annual weights of packaging associated with these product systems to be estimated<sup>5</sup>.

Packaging level	Amount of packaging material in the ESB basket	Weight (%)
Primary	3 600 000 tonnes	42%
Secondary	1 800 000 tonnes	21%
Tertiary	3 100 000 tonnes	36%
All	8 500 000 tonnes	100%

Figure 28. Total packaging weight in the ESB (nearest '000 tonnes)

### 3.2 National baskets

In this section of the full report, the top 15 categories in the baskets for each country are highlighted (presented as a pie chart) together with the total annual sales they represent (typically 60-70% of the total FMCG sales for the categories selected).

<sup>4</sup> Trippage rates are not taken into account for this calculation.

<sup>5</sup> In these calculations, products are taken to be representative of their category and thus figures are scaled using the sales for the total category and not the individual product. Where a category is represented by more than one product, weights are scaled on a pro rata basis to relative sales. Reuse is not taken into account.

## 4 Results

### 4.1 How to use the results

Care is required when carrying out calculations and interpreting the results from any interrogation of the ESB database.

It is important to decide which key-values are appropriate when comparing different packaging materials because the density of the product and/or packaging material can influence the results.

It is not always useful to compare weight-key-values based for glass packaging with those for plastic. In some instances, it would be more relevant to compare key-values based on volume. An alternative is to compare averages for a suitable product category, packaging type or packaging material.

To get a fuller, more holistic picture, a country (product category, packaging types, etc) should be described by more than one key-value. Considering only the results for weight distribution in the packaging system is not in itself sufficient because this key-value does not consider the number of trips and is based only on weight. Comparisons should also be made with other key-values.

### 4.2 Findings

Appendix C lists the diagrams used to summarise the breakdowns of the composition of the ESB and the results of the various analyses.

The following diagrams and information are typical of those provided within the full report.

The weighted average (scaled to sales) for the ESB (all 468 products) is shown below (Section 4.1 / Figure 40 in the full report).

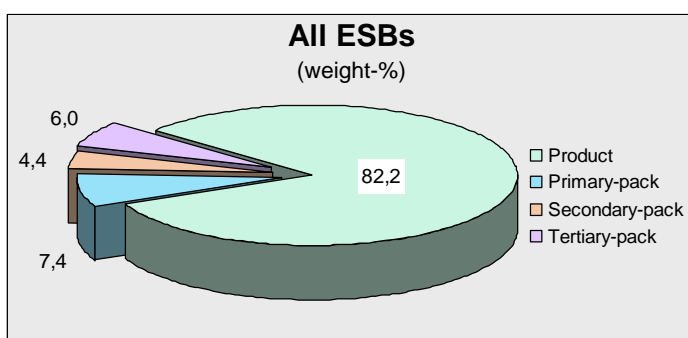
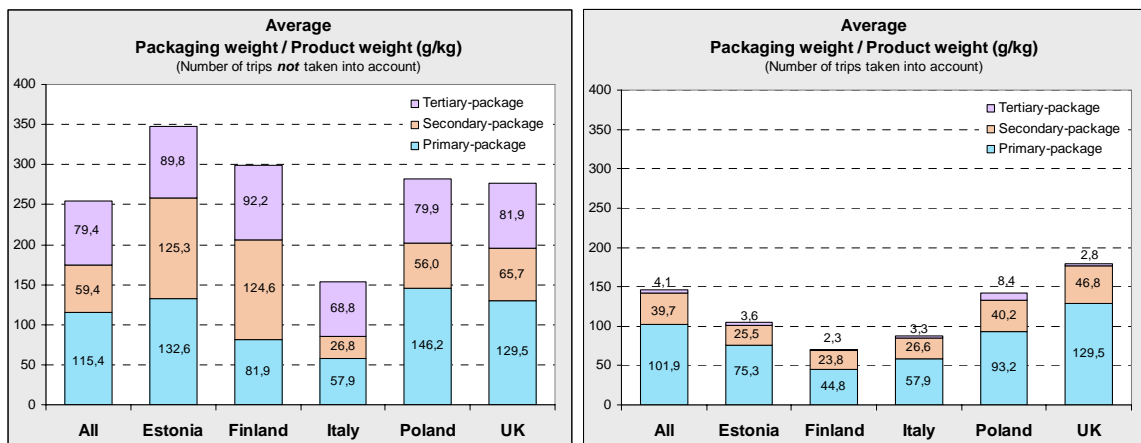


Figure 40. Average weight distribution (%) of product and packaging for the ESB

Overall, 82,2 weight-% of the tertiary unit corresponds to the product. The primary packaging corresponds to 7,4 weight-% which is higher than the figures for both secondary (4,4 weight-%) and tertiary (6,0 weight-%) packaging.

For the Baskets selected, large differences for the PKV *Packaging weight/Product weight* are found between countries (Section 5.3.1 / Figures 43a and 43b in the full report).

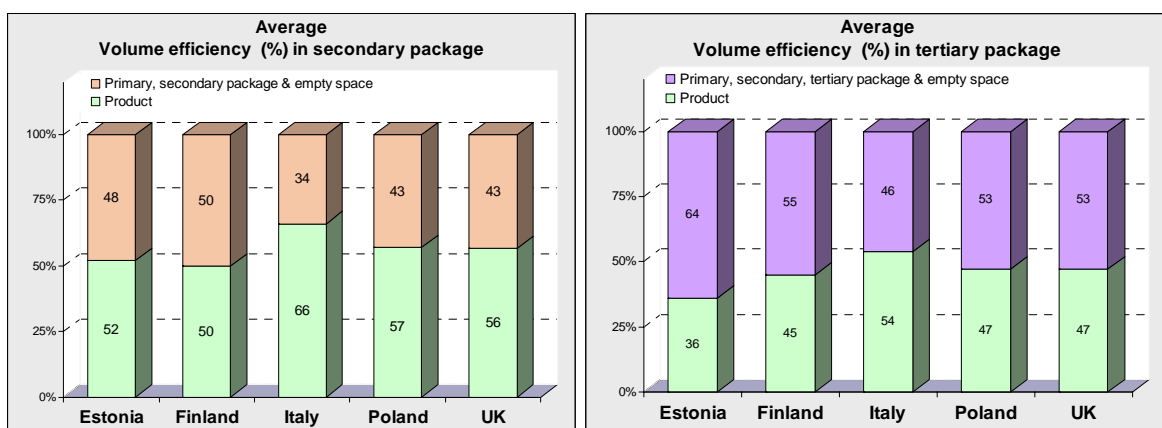
When the number of trips is not taken into account, Estonia and Finland have the highest use of packaging material/kg product in their respective Baskets which is probably explained by the high incidence of the use of reusable packaging. In contrast Italy does not use any reusable primary or secondary packaging and in consequence, the Italian Basket gives the lowest average figure of packaging material/kg product.



Figures 43a and 43b. Average packaging weight / product weight (g/kg) for ESB countries

When the number of trips is taken into account (see Figure 43 b), Finland and Estonia are now found to display low values for this key value. Rather surprisingly, even when the number of trips is taken into account, Italy is still found to generate a low figure for this key value relative to the other countries (believed at least in part to be due to the high consumption of water in Italy). In contrast, Poland and the UK display the highest usage of packaging material per kg product when the number of trips is taken into account.

Comparison of the PKV *Product volume / Packaging volume* across the five countries also shows interesting differences (Section 5.3.1 / Figures 45a and 45b in the full report).





Figures 45a and 45b. Average volume efficiency (%) in secondary/tertiary packaging for all five countries

Products in the Italian basket fill the secondary packaging more than in the other countries chosen. The countries having the lowest PKVs for product volume / packaging volume are Finland and Estonia, due in part to the high use of reusable packaging and bottles. A similar picture emerges when tertiary packaging is studied (see Figure 45b).

### 4.3 Statistical analysis

One of the most important goals of the ESB Program is to understand why packaging is designed the way it is in the context of current social and demographic trends.

SOCIETY & CONSUMERS		PACKAGING	
	Single person household		Small packaging sizes
	Families		Big pack
	Demography		Easy to open and seal
	Young people		Trendy
	Poor/Rich		Cheap
	Health conscious		Hygienic
	Environment conscious		Environment friendly
	Under stress & lack of time		Luxurious
	Living in city/ countryside		Simple & durable
	Extensive legalisation		Good barrier properties
SOCIAL DATA		PACKAGING KEY-VALUES	

A four step methodology was developed and key social data that could influence packaging demand were collected (see Appendix E). Correlationships between consumer behaviour (social data) and packaging appearance (packaging key-values) were then investigated using statistical methods of analysis.

Thus far, examination of potential linear relationships between many individual PKVs and socio-demographic data sets has proved of limited use. The strongest links found to date were between packaging use and population, packaging use and average household size and packaging per capita and employment rate.

The Program's Management Committee recognises the benefit applying more sophisticated statistical analyses but this may not be possible until either more data are collected or more countries are covered.

## 5 SUMMARY OF FINDINGS

The primary aim of the ESB Program was to generate data that would foster an improved understanding of the drivers of packaging development and demand applicable to the most common FMCGs sold in Europe. Social, economic and demographic influences on consumption patterns, new products to match changing life styles and new material technologies continuously affect the type and the amount of packaging needed and represent the main drivers being investigated in this study.

To help understand what drives demand, a novel methodology has been developed that defines typical Shopping Baskets across five representative countries in Europe. A robust database has been built to hold and analyse the detailed information collected about the complete packaging systems for each product in the Baskets. Five key packaging characteristics (packaging key values) for each product were calculated and compared in a variety of ways.

### Database

The database can be used to illustrate what a consumer normally buys over a year from retail stores typically of at least 100 m<sup>2</sup>. The opportunity now exists to examine the information collected in numerous ways and draw conclusions. Some examples are:

- It shows the differences between the packaging systems used in the five European countries studied and links this to underlying consumption patterns.
- It covers the whole packaging system including primary, secondary and tertiary packaging for 468 leading brands in 54 different product segments with the possibility to explore the interaction between primary and secondary packaging when considering the amount of material used and required product protection.
- It highlights the differences between reusable packaging and reusable packaging systems both from the perspectives of packaging material use and weight/volume efficiency during transportation.
- In showing the differences between packaging systems in the countries studied, a first ever attempt is made to find a statistical link between packaging data and social drivers like GDP, age, demography, etc.
- It offers the possibility for individual companies to benchmark their own packaging against the Basket data and averages.
- It provides a clear insight into the utilisation, both in weight and volume, of the load carrier (commonly a European pallet) and offers many possibilities for improvements.

**In summary the ESB database makes available, for the first time, comprehensive data on packaging use in Europe based on both qualitative and quantitative facts. This can be used to support stakeholder dialogue about packaging in areas such as sustainability, consumption patterns and differences between countries, etc. Such dialogue need no longer be conducted without sufficient facts to support decisions.**

### A Snapshot of Findings

This report of Phase 1 of the Program contains a large quantity of information from which many conclusions may be drawn. Some examples are:

- 1) Importantly, the ESB Program looks at the total packaging system used for each product, ie primary, secondary and tertiary packaging. Interrelationships between these three levels of packaging have been explored. In general primary packaging contributes most to the overall weight of a system, especially after trippage rates are taken into account. It is a commonly held view that the weight of primary and secondary packaging is generally inversely correlated, ie heavy primary packaging requires lighter secondary packaging and vice versa. Qualitative analysis of the ESB data appears to support this view. However further statistical validation will be needed before any firm conclusions can be drawn.
- 2) As might be expected, important differences in packaging are observed between countries, in particular levels of reusable packaging, packaging weight per kilo of product and packaging used per capita.
- 3) Surprisingly, and in contrast to the European Commission's figures covering all packaging, this study found that Italy has the lowest usage of packaging per capita even when trippage rates in other countries for reusable primary and secondary packaging are taken into account. Packaging per capita in Estonia and Finland is the highest when trippage rates are not taken into account but this decreases significantly when trippage rates are accounted for.
- 4) Plastics (PE, PP, PET) are the most common primary packaging material for the products in the Baskets (approximately 44%), and paper and board are the second most common primary packaging material (approximately 23%).
- 5) Glass, aluminium and steel represent less than 10% of the main primary material for any of the products in the Baskets.
- 6) Glass is the heaviest material followed by plastics and then paper.
- 7) The level of reusable tertiary packaging (generally a pallet) is high across all countries but levels of reusable primary and secondary packaging are high only in Estonia, Poland and Finland. They are low in the UK and zero in Italy.
- 8) On average 82% of the weight of a packed pallet is product, a relatively high value. However, average volume efficiencies are much lower, typically around 50%, which indicates an area for further investigation and potential improvement in logistics.
- 9) In general, plastic bottles, beverage cartons and beverage cans show high product weight efficiencies on a tertiary unit and low packaging / product ratios.
- 10) Food cans, tubs/cups/trays and flexibles tend to show weight efficiency values between plastic bottles, beverage cartons/cans and glass containers.

- 11) Glass bottles and jars show lower weight efficiencies and higher packaging / product ratios than alternatives.
- 12) The packaging / product PKVs for secondary packaging made from paper and board are in the order 20-80g packaging / kg product and this is unaffected when trippage rates are taken into account as these systems are in general non-reusable.
- 13) Packaging / product PKVs for secondary crates and trays made from plastic are in the order 180-230g packaging / kg product but this reduces to ca 1-2g packaging / kg product when the high trippage rates are taken into account.
- 14) The corresponding PKV for plastic shrink film, is ca 7 g packaging / kg product. This system is not reusable and thus the figure remains unchanged when trippage rates are taken into account.
- 15) The results indicate that more packaging tends to be used to distribute non-food products than food products. This is probably related to product density and the additional number of functions that this packaging has to satisfy, eg dosage control, sell product, application aid ...etc.
- 16) Comparison across more than 10 product categories using the defined packaging key values show interesting differences in a number of areas which in general can be related to packaging density and shape. For example, because of their higher weight / density, glass bottles tend to be inefficient in terms of weight and volume compared to other liquid containers, such as cans, plastic bottles and beverage cartons. Packaging for bread is inefficient because of the empty space left in the reusable (secondary) crates used to transport the product.
- 17) Frozen products were found to have one of the most weight and volume efficient types of packaging.
- 18) Reusable packaging can be found at all three packaging levels: reusable tertiary packaging (generally a wooden pallet) is common in all five countries (overall average is 96 weight-%), while the presence of reusable secondary packaging is much more variable (range is 47–88 weight-%). The data also show that reusable secondary packaging usually holds reusable primary packaging.
- 19) There is a complete polarisation between countries in the use of reusable primary packaging: Estonia, Finland and Poland have a high incidence (50-70 weight- %) while Italy and the UK use virtually none<sup>6</sup>.

As expected, reusable packaging systems use less packaging material when trippage rates are taken into account. In contrast, reusable packaging systems in general were found to be heavier and less volume efficient than non-reusable packaging systems.

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<sup>6</sup> As already pointed out, this has important implications in terms of packaging material use, weight distribution on a pallet and volume efficiencies. Analysing the results by taking trippage rates into account or not allows the influence of reuse systems on PKVs to be investigated.

## **Social and Demographic Influences**

One of the most important goals of the ESB Program is to correlate packaging parameters, as measured by the PKVs, with social-demographic drivers. A qualitative methodology has been developed to investigate likely relationships. Socio-demographic key values that could potentially influence the PKVs were identified and relationships with relevant PKVs subsequently tested using a linear regression technique. It was recognised at the outset that such correlations are very complex and that it would be difficult to separate one influence from another.

Thus far, examination of potential linear relationships between many individual PKVs and socio-demographic data sets has proved of limited use. However in a small number of cases potentially interesting co-relationships have been identified. The strongest links found to date are between packaging use and population, packaging use and average household size and packaging per capita and employment rate (possibly related to number of women working).

To make further progress the Program plans to seek additional statistical support. This will be part of Phase II of the Project. In particular, the Program's Management Committee recognises the benefit applying more sophisticated statistical analyses to determine whether significant co-relationships can be uncovered but this may not be possible until either more data are collected or more countries are covered.

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## Appendix C: Benchmarking of individual packaging

The key-values for a specific packaging system for a plastic bottle filled with soft drink are calculated. These figures are then compared with the average for all bottles, all plastic packaging or all soft drinks. If the base is sufficiently large, the average for all plastic bottles could also be compared. To make the most accurate comparison between product categories, conditions, packaging types or packaging materials, more than one key-value should be used.



**Benchmarking  
against  
Average Packaging Key-Values**

- **Basket**
- **Packaging materials**
- **Packaging types**
- **Product categories**

Packaging materials		Aluminium, Cardboard, Corrugated board, Glass, Paper, Plastic, Steel, Wood, Other					
Primary packaging types (prim.)		Beverage cans, Blisterpacks, Bottles, Cans, Flexibles, Folding cartons, Jars, Tubes, Tubs/Cups/Trays					
Secondary packaging types (sec.)		Boxes/Cases, Crates, Display boxes, Shrink films, Trays					
Tertiary packaging types (tert.)		½ pallets (600x800), Brewery pallets (1200x900), Europallets (1200x800), Finn/Chep pallets (1200x1000), Non reusable pallets					
Product categories		All 54 product categories (see Figure 4 on page 12)					
ESB Key-value	Unit	Packaging System	Key-value Beer (5.3%). 0.5 l	Average Key-value			
				Basket	Packaging material Glass	Packaging type Bottles	Product category Soft drinks
1a Product weight Tert. unit weight	Weight-%	-					
1b Prim. pack. weight Tert. unit weight	Weight-%	Primary					
1c Sec. pack. weight Tertiary unit weight	Weight-%	Secondary					
1d Tert. pack. weight Tert. unit weight	Weight-%	Tertiary					
2a Prim. pack. weight Product weight	g/kg	Primary					
2b Sec. pack. weight Product weight	g/kg	Secondary					
2c Tert. pack. weight Product weight	g/kg	Tertiary					
2d Total pack. weight Product weight	g/kg	All					
4a Product volume Sec. pack. volume	Volume-%	Secondary					
4b Product volume Tert. pack. volume	Volume-%	Tertiary					

## **Appendix D: Complete overview of all key values for the respective countries in the study**

The following key values are summarized using a separate page per country in Appendix II of the full report.

- 15 Most important product categories (pie diagram)
- Average weight distribution in the packaging system (%) overall, split by product and primary, secondary & tertiary packaging
- Average weight distribution in the packaging system (%) for the specific country, split by product and primary, secondary & tertiary packaging
- Average Packaging weight / product weight (g/Kg) with / without number of trips taken into account for overall basket and for specific country.
- Average Volume distribution (%) in ESB Baskets for (a) primary, secondary and tertiary packaging and empty space and (b) primary and secondary packaging and empty space both for overall basket and for specific country.

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