

# **Reuse of Primary Packaging**

## **Final Report**

### **Part I - Main Report**

**Study contract  
B4-3040/98/000180/MAR/E3**

**Abfallberatung  
Müllvermeidung & Recycling**

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## **Abstracts**

### **Status quo of reuse primary packaging**

Reuse packaging is mainly a domain within beverage packaging. Some smaller reuse systems within dairy products, sweet preserves and vinegar/oil exist in some member states. Reuse packaging for non-food products is even smaller and is mainly used as refill packaging in small independent retailer's or green shops.

Reuse packaging is subjected to two current trends simultaneously: on the one hand, a change from glass packaging to reusable plastic bottles, and on the other hand a steady growth of one-way packaging which forces reuse packaging to retail channels which are under the control of the fillers themselves, hotels, restaurants and catering (HoReCa).

This trend has proceeded in the EU-member states to differing degrees. Accordingly, three types of status quo can be identified:

1. Countries like the U.K., France and Ireland, have reuse systems which have almost disappeared from the market and only cover market shares of under 5%. There are left only a few systems used for hotels, restaurants and catering.
2. Countries like Belgium, Greece, Portugal, Italy and Spain, where reuse has disappeared in some product areas. In other branches reuse systems still hold steady, mainly in carbonised beverages or in wine.
3. Countries like Finland, Germany, Sweden, Austria, Denmark and the Netherlands, where reuse systems exist for all beverages and all retail channels. Along side of the reuse systems, one-way packaging also exists to a varying extent, anywhere from 10-50%. One-way packaging is growing steadily where there is no strict legislation (Austria, Germany and the Netherlands).

### **Reuse systems for beverages**

Reuse packaging, unlike one way packaging, has to circulate within the retail chain from filler to retailer and the same way back. Therefore, reuse packaging needs a system of technical, organisational, and economical arrangements/contracts to work in a proper way.

Thus, what is needed are:

- technical specifications (unity) of primary, secondary and tertiary packaging
- technical rules for treatment at filling and distribution
- quality tests and insurance
- ownership and reinvestment of the packaging
- deposits and fees for services within the pool
- data control and support to the pool organisation

Six different types of systems are described which are preferably used for different goods. These systems are normally organised based on private contracts within the branches and markets where contractors are in direct competition to one another. These reuse systems are

difficult to build up and maintain. Each legal instrument and regulation must be aware of these existing structures so as not to hinder or destroy the functioning of the reuse systems.

### **Calculation of number of trips or rotations**

The more often an individual reuse packaging is reused, the greater the environmental and economic benefit. The average number of trips or rotations is one of the most relevant parameters of reuse systems under Life Cycle Assessment and consequently, are called for in the EU-Packaging Directive.

An overview of published data on number of trips/rotations is given in relation to the technical and organisational parameters of the reuse systems analysed. These figures give an impression of the variety of the number of trips in the many differently structured reuse packaging systems.

The measuring and calculation of that average figure is something which is under continual critical discussion. It depends on the data available in a reuse packaging system which, in turn, is again a matter of the organisational structure of the individual reuse packaging pool.

Three different methods for measuring and calculation are described and evaluated for use within the legislation. The technical and organisational demands are outlined for each method.

### **Internal trade and reuse packaging**

The consumption pattern of beverages is somewhat different in each of the EU-member states. The cross-border product flows of water, milk, dairy products, soft drinks, beer and wine are described. Beverages, the most relevant products for reuse primary packaging, classically are regional products which are produced near the market and are distributed over short distances. With the exception of wine, all of the other beverages are consumed to more than 90% to 95% in the country where they are produced. Only wine travels across borders 19% of the consumed quantity in the EU-internal market while around 40% of that amount is exported in bulk containers and bottled in the area of consumption.

Since statistical data is very poor on cross-border flows of goods in reuse primary packaging, an estimation of those flows is made based on several single sets of data of the branches mentioned above. The actual total amount of goods filled in reuse primary packaging which goes across the border in the EU internal market is around 133 million litres. The estimated amount of beverages which might possibly be sold in the future in reuse primary packaging and distributed cross-border in the internal market (mainly mineral water and beer) should increase ten-fold; to between 1,13 billion and 1,86 billion litres each year.

### **Costs and constraints**

Costs and constraints which influence the use of reuse primary packaging in the market are described and evaluated under four aspects:

- the retail systems
- technical standards for reuse primary packaging
- deposit systems

- the costs of reuse systems versus one way packaging

### **The retail systems**

Retailers are the most important decision makers concerning the use of reuse packaging systems. Within the last three decades most retailers have developed their distribution of industrially produced goods for use with one-way packaging. All of the costs for reuse related services (retake, redistribution) have been reduced to a minimum. A concentration on international brands and long distribution distances in the retail channel are other reasons retailers prefer one-way packaging. The appearance of discounters has therefore put an end to reuse packaging as they have greatly optimised their distribution on the basis of one-way packaging. In all of the countries where there are no legal laws restricting one-way packaging, discounters have become one of the catalysts in forcing reuse systems from the market.

### **Technical standards for reuse primary packaging**

One of the aspects being focused on the most in public discussions is how to promote standardisation of reuse packaging. In reality, standards are just one of several items within reuse packaging systems. The most important aspect of standardisation is to make the technical treatment of packaging in the filling and distribution/redistribution easily manageable. The control of technical standards within the pool organisation is most important. Consequently, a legalised trust is necessary.

Public standards, available to everyone, can be counter-productive for reuse pool organisations. This is one reason why public standards have more or less disappeared and have been replaced by private standards of pool organisations available only to contractors (closed loop systems).

In the case of open loop systems, as with wine bottles where reuse packaging is circulating free and there isn't a pool organisation controlling the whole distribution and redistribution line, public standards are a very important tool. Existing standardisation in the producing countries has been misused primarily by the glass manufacturers to hinder the free market. A harmonisation of national standards by the CEN has not been achieved for many years.

### **Deposit systems**

Deposit systems are instruments for organising economic interests within reuse packaging pools. They give incentives or disincentives for retake and reconditioning of used reuse packaging as well as for reinvestigation of new packaging to a pool. When using compulsory deposits as a tool of legislation, these relationships have to be considered carefully.

### **Costs - A comparison of reuse versus one-way packaging**

The detailed analysis of costs for one-way and reuse packaging among the filler's and retailer's companies shows that:

- Reuse packaging is the most profitable for the fillers.
- One-way packaging lends the highest advantage to retailers by minimising their handling costs.
- The investments for reuse packaging systems are 1,5 to 5 times higher than for one way packaging. Unstable legal frames support one-way packaging.
- The currently very inexpensive costs for energy and raw materials support one-way packaging whereas the labour costs cause reuse packaging to be at a disadvantage.



The needs for a larger work force for reuse packaging systems is much higher than for the production of one way packaging. Supporting reuse provides a double benefit to the government. Reuse gives people the opportunity to work & pay income taxes while lessening the demand for unemployment benefits.

### **Practical suggestions to encourage the use of reusable packaging**

Following a systematic evaluation of legal instruments, the legal instruments actually in force in the EU-member states are described and evaluated. There are just a few command and control instruments:

- bans of some one-way packaging in Denmark
- compulsory orders for reuse packaging by the retailers
- permits / quality control for reuse systems in Finland and Denmark

Economic instruments are used mainly in Scandinavia:

- Taxes on new one-way packaging (Belgium, Denmark and Finland)
- compulsory deposits on one way packaging (Germany)

The most effective instruments are bans where costs for implementation and control are very small. For instance, in Portugal the retailer's compulsory orders for reuse packaging along with their offers for one-way packed beverages is very difficult to verify and to control in the market. Permits for reuse systems are instruments of quality control which make sense when combined with tax reductions for reuse systems.

Taxes on new packaging are very efficient if they can balance out to a certain degree the benefits retailers gain from using one-way packaging. Compulsory deposits on one-way packaging which would force retailers to take back discarded one-way packaging has not been put into place yet. Market analyses show that it will have a reverse effect, because retake will be taken out of the business from retailers to service companies while the costs will be covered by the lost deposits, which are not paid back to the consumers.

Legal instruments not in use in the EU-member states are described and analysed:

- Tradeable permissions for one-way packaging
- Standardisation of reuse packaging

Tradeable permissions for one way packaging are discussed in several studies on legal instruments for packaging legislation. Two aspects make tradeable permissions useless for the beverage packaging market. The control of billions of packaging units within an internal EU-market is impossible. The first emission of the permissions would cause several problems which would defeat the interest in supporting reuse packaging in the market.

A standardisation of reuse packaging is useful for open loop reuse systems. Standardisation which followed the new approach procedure set out by CEN failed because of the interest of packaging producers in one-way packaging.

The political instruments outlined in the EU-Packaging Directive 62/94 EC are very vague and focus on setting common targets for recycling and incineration. These instruments only provide a very small amount of incentive to engage in reuse packaging by internalising a small part of the environmental costs of one way packaging.

The economic instruments which are explicitly allowed under Articles 4 and 5 are not outlined and therefore are not harmonised but are under political pressure.

As one practical suggestion, the author proposes a double-track set of legal instruments. In order to reach an indirect internalisation of external costs, on the one hand, ambitious recycling targets should be implemented establishing reuse and one-way packaging. On the other hand, a tax scheme for all packaging which is brought onto the market should be established to get full internalisation.

Initially, the tax should be fixed according to the amount (kg) of packaging material brought into the market and should later be reduced in relation to the recycling results. A further reduction should be established for reuse packaging.

Command and control instruments should be kept to support reuse as long as the internalisation of external costs has not been realised.

Technical support should cover the following:

- qualification of "reuse" by setting qualified requirements for reuse packaging systems
- the standardisation of wine bottles
- the establishment of a common marking indicating "reuse" to facilitate easier handling of the reuse packaging in the internal trade of goods.

## Foreword

Packaging is one of the most important parts of the transportation chain of goods. It is closely related to the transport logistics, the storage and the packed goods themselves. Packaging influences economic and ecological efficiency of the distribution of goods, and at the same time is determined by the set conditions of distribution; of which: transport distance, transport duration, conservation techniques and handling conditions are some of the most important ones.

As packaging is part of a very differentiated system of logistics to distribute products from the production facility to the customer over various stations of treatment and sale, it is not easy to optimise the system to reach an optimum overall economic efficiency and at the same time maintain an overall sustainable ecological balance. Since many players such as producers/fillers, transporters, wholesalers, retailers, and last but not least, the consumers are influencing this system, the process of optimisation can not be considered just a technical struggle, but as a social one as well.

In former times, villages were deserted and people moved simply because their water sources had fallen dry. Today, in the European Union drinking water is transported from FRGermany to Portugal, or from Turkey to Denmark over distances of more than 3.000 km. As long as the decision for these transports is not questioned, any discussion about the ecological relevance of the packaging is senseless. The ecological damage has been done with the transport of the water.

There are even tendencies to distribute everyday essentials over long distances, as well as initiatives to form European brand names. Fortunately, most food and beverages are available in the EU from regional and local sources. These regional sources are at the same time the basis for a high variety of goods for personal preference.

Within this network of regional products and the intermediate scale of distribution, the optimisation of packaging, serving economic and ecological demands, calls for reuse packaging systems. The somewhat uniformity of the packaging shape, which is necessary for the reuse systems to function in that network, guarantees that a high variety of different goods will be available.

Reuse packaging systems call for a totally different behaviour to the players within the transportation chain than one-way packaging does.

Within the last few years the users of one-way packaging have become responsible for the packaging waste after usage as regulated by law in most EU-member states. The users now started to take that responsibility by coming up with recovery schemes with different degrees of success. However, most of the one-way packaging is still travelling the old route via the municipal household waste to dump sides or incineration plants. The overall economic and ecological benefit of dual systems continues to be under hard scrutiny.

At the same time, reuse systems, which considered that responsibility to be a most natural thing, have been destroyed and eliminated out of the retailers listing and therefore are no

further available for most of the customers in some of the EU-member states. This process took place despite a clear EU-policy during the early 80's which called for legal support of reuse packaging systems; at the very least reuse for beverage products. Currently, it must be decided, based on the revision of the 1994 EU Packaging Directive 94/62/EC, whether or not reuse packaging systems should be allowed to be demolished in some of the countries where they still exist, or if the economic and ecological interest of reuse packaging systems would be worth protecting.

As a first step, this study shows the tendencies in the development of the reuse packaging systems in the EU as a whole (see chapter 1) and in each individual member state (see country reports). The second step of the study is to show which are the streams of goods of the EU-internal trade relevant for reuse packaging (see chapter 4). The third step is the detailed analysis of the players and their activities as well as the background conditions in which they decide to use or not to use reuse packaging systems (see chapter 5). Finally, but not any less important, the different legal activities of the 15 EU-member governments are analysed under the aspect of how they support or hinder reuse packaging and to illustrate which ones are the most efficient and successful instruments to stabilise and to support reuse packaging systems (see chapter 6).

At this time, please allow me to also extend my thanks to all of the people who have supported research to that study such as national researchers, as well as sources within industry and trade. Much of the information, which is available in industry and trade was not made available. This confirms that while reuse systems are a sensitive matter of discussion inside industry and trade, they are matter of public interest too.

## **1. Status Quo of reuse primary packaging in the European Community**

In order to discuss the situation of packaging and reuse packaging in particular in Europe, it has to be realised that there are big differences and peculiarities between the member states relating to:

- consumption pattern / product mix
- preservation of food and beverages
- different shopping / retail systems

In the following sections, the actual and historic importance of packaging systems and materials will be discussed as an overview for the overall EU-member states and in more detail for beverage packaging specifically. For detailed discussion see the country reports in annexe.

### **1.1 Statistics on packaging in Europe / Data - Supply, -Quality, Comparability**

Unfortunately to gain an accurate picture of packaging production and consumption in the EU, the data supply is very poor. Eurostat, the European department for statistics, collects data from each member state, but it is in continuous reorganisation, so that delay in data support from the member states can cause delays in completion of For example production figures of up to three years.

Data from industry can be received only for some national organisations, while most European organisations do not or do not publish data any longer which is relevant to packaging issues. In some countries, even in those where co-operative political solutions are asked for (i.e. the Netherlands), no data at all is published as agreed upon by the industries. In other countries, where concentration in production and filling is very high there isn't any data being published either.

Other problems result from basic statistical aspects; like unclear definitions and/or different branches producing the same or similar products (i.e. soft drinks). They can hardly be assigned to a common statistical product group or are split in different groups while handled and traded as the same product in the market.

For all these reasons, statistical data on packaging have to be dealt with most carefully. Most data sources can not be directly correlated to each other and therefore can only give a relative impression of historic developments (but not measurable quantities each in itself).

### **1.2 Packaging consumption in the EU**

The total figures for packaging consumption in the EU can hardly be determined since there are import and export streams of new packaging on the one hand and packaging export/imports via packed goods to a further extent on the other hand. Not all packaging is a matter of discussion for reuse and even less of it constitutes primary packaging.

### **1.3 Reuse primary packaging in the EU**

The typical product streams which are predominantly reusable are mainly rigid packaging which has in most cases a second function to be stored at the consumers place until the packaging is emptied. Examples of these packaging are:

- Glass bottles and jars
- Plastic bottles and jars

- metal cans (aluminium and tin)

Metal cans and plastic bottles however are subject to some technical restrictions which limits their use as reuse packaging. Metal cans are mainly used for preserves which, in turn makes it necessary to have need a hermetic closing on the packaging. Since metal cans are semi-rigid, resealable closures are not very easy to produce/use. Therefore reuse metal packaging just is (constitutes) big volume tertiary packaging such as casks, barrels, boxes, IBCs or pallets.

Plastic packaging does have the characteristics, that the aromatic organics of the contained good can move into the plastic material of the packaging and is therefore a potential source for contamination of the good filled in afterwards. To control these intermediate influences is certainly a big obstacle and makes it difficult for plastic bottles and jars to be used as reuse packaging.

Glass bottles are the most predominant type of packaging for reuse. As glass packaging has been used for more than 2000 years as reuse packaging, one-way use is a very new aspect starting from the late 60's. Glass reuse packaging systems have been common for all liquid and paste products for a long time.

Container glass production in the EU 15 actually is around 16 million tons each year (1.1) (see table 1.1). It increased continuously until the beginning of the 1990's and has been more or less consistently stable within the past ten years. The actual European figures on the sharing of reuse / one-way system have not been made available by the European Container Glass Federation (FEVE). As the example of FRGermany shows, the quantity of packaging produced and discarded for one-way packaging in 1997 was more than 25 times as much than for reuse packaging of the same filling quantity (1.1).

For both types, plastic and metal packaging, examples of reuse packaging systems exist as well. The relation between one-way and reuse packaging concerning material consumption, production emissions and waste are similar to those of one-way and reuse glass.

### **1.3.1 Non food packaging**

Reuse packaging for non food packaging in most cases is restricted to big volume primary packaging such as buckets or crates. It is also used as refill packaging where consumers refill their reusable packaging at a bulk tank in the retailers shop.

The second case is restricted to green shops or independent retailers while all other retailer. Meanwhile, organisations have widely changed to self service systems offering mainly one-way packaging. Ecologically oriented retailer chains who are producers or sellers of their own brands and therefore control the whole distribution chain, also run reuse/refill systems to a certain extent.

The most common products offered in reuse/refill packaging are:

- detergents and cleaning chemicals and
- body care products

The market share of these products in reuse/refill packaging is very small. Only very few of these products are offered in the internal trade of the EU. Quantified data for these products/packaging is not available.

### **1.3.2 Food packaging**

Reuse packaging for paste or dry food are also not very common. Most of them are for paste food preserves such as:

- apple purée
- honey
- jam and marmalade
- dairy products like yoghurt, quark etc.
- vinegar, oil

Most of these reuse packaging are used by just a few fillers each. However there are some cases where these are reuse pool systems with a certain number of fillers. This occurs mainly when they are part of a greater reuse pool system like the dairy product jars as part of the German MMP milk bottle pool (see report FRGermany) or the vinegar bottles as part of the Finish Primalco pool (see country report Finland).

The market share of the reuse systems is small. Some just reach a market share of up to 5%.

### **1.3.3 Beverage packaging**

Reuse packaging has the most important relevance in beverage markets. Reuse glass bottles, reuse Polycarbonate (PC) bottles and reuse Polyethylenteraphtalate (PET) bottles are used in all EU member states for several types of beverages. Consumption patterns are very different in Europe (see Table 1.2 and Chart 1.2 in Annex).

Table 1.2 shows the beverage consumption per capita per year. Total consumption varies from 240 litres in Greece to more than 460 litres in Austria and Ireland.

Bottled water shows the biggest variety in consumption. While in the North, most people drink tap water, in the south and in central Europe, quantities of over 50 litres are normal are even rise to 124 litres in Italy. Flat water is a domain of France, Spain and Italy.

Milk consumption does not vary as much. With the exception of Greece (47 litres), all EU-member citizens drink on average more than 80 litres of milk each year; with the peak being reached in Scandinavia of up to 199 litres in Finland.

Juices and wine make up the smallest quantities of beverage consumption. Fruit juices are also more likely to be preferred in the north with a peak being set in FRGermany.

Wine consumption is the highest in France, Italy, and Portugal, which is also where most of the wine is produced. Wine consumption is around 60 litres per capita on average, while in Scandinavia and United Kingdom it is between 5 and 13 litres.

Soft drink consumption is biggest in United Kingdom, Ireland, and Austria.

Finally beer consumption is highest in Ireland, FRGermany, and Denmark; while the typical wine consuming countries like Italy, France, and Greece only drink small quantities of beer.

The change from reuse to one-way packaging coincides with different developments in the market:

- Non carbonated beverages, without pressure inside the packaging, can change to light weight materials and even can use flexible packaging like beverage cartons.
- The acceptance of new conservation techniques like UHT for milk and juices do not make hot fill resistant rigid packaging necessary anymore.

- The national industries and company strategies have another big influence. In the north, where paper industry is very strong, beverage cartons always have had an extraordinary position in governmental policy (exemptions from duties/taxes). In FRGermany, one-way glass has a very high image because the glass industry was the first industry which started recycling activities in FRGermany in 1974. One-way glass therefore has a very high acceptance.

Many other interests influence the beverage packaging market. The most important ones will be discussed in chapter 5. The various habits of development in the different countries and market segments will be discussed in the following sections.

#### **1.3.3.1.1 Mineral water**

The statistical basis for showing the packaging structure for bottled water is very poor. First of all, each producer organisation covers only part of the market (mineral water, table water, spring water) and secondly they stopped publishing detailed figures on reuse and one-way packaging many years ago. For example the statistics of Groupement International et Union Européenne des Sources d'eaux Minérales Naturelles (Gisem/Unesem) only shows glass packaging and plastic packaging statistics, but does not verify if it is one-way or reuse packaging.

The same is true of the Eurostat data. They only show packaging volumes (see chapter 4). National empiric studies on the packaging mix only exists in very few countries (Austria, FRGermany).

For all that, qualified long term intervals of packaging data for bottled water does not exist on the European level. To get an impression of the actual situation, production data of Unesem-Gisem have been modified with Eurostat-Export data to calculate consumption quantities. On the basis of these calculated consumption figures Table 1.3 in Annex shows the domestic packaging.

Since there isn't any qualified data available for Belgium, the Netherlands, or Greece; these countries comprising 6% of the EU-15 total consumption were taken out of the calculation. The influence of these three countries on the overall outcome would not be that great since these three countries combined show a similar development like the average EU country did.

The overall consumption of bottled water (mineral water and all other kinds of unflavored waters) is about 25 billion litres. In 1997 a full 41% of that quantity was filled in reuse bottles, plastic bottles account for 46%, and 11 % were bottled in one-way glass (see Table 1.4 in Annex). Big volume packaging (casks) for HoReCA are not relevant since they account for less than 1% of the overall market. These average figures do not reflect the real situation which is characterised by a significant division amongst the EU-countries. Well functioning reuse systems now only exist anymore in Austria, Denmark, Sweden, Finland, Netherlands, and to a certain extent, in Italy. On the other hand, some countries are clearly dominated by one-way packaging like Italy, France, Spain, United Kingdom, Portugal, and Ireland.

In the reuse block of countries, FRGermany is without a doubt the dominating market leader with reuse accounting for more than 74% of all fillings; followed by Italy and



Austria. This is the reason for the tremendous pressure the packaging industry exerts to try to destabilise the reuse systems in FRGermany. If that market of more than 7 billion litres could be conquered by destroying the reuse system, it would result in a 35% increase in one-way packaging production within a few years.

### 1.3.3.1.2 Soft drinks

Soft drinks are a very confusing product range, even more so than waters. Depending on the different statistics soft drinks can include the following product groups:

- Sweetened and flavoured waters (mineral, spring, and table water)
- Fruit juices pure or mixed with different shares of water
- Milk containing non alcoholic drinks and/or flavoured
- Others like Ice tea, Energy drinks (caffeinated) etc.

Another hurdle for qualified statistics are the different groups of producers which are organised in many overlapping producer organisations of various product ranges.

Within that statistical jungle, there are three kinds of sources available to differing extents:

1. National statistics based on an analyses of production/consumption (FRG, AU)
2. Statistics of the Union of EU Soft Drinks Associations (UNESDA), the European producers organisation which covers mainly carbonated soft drinks, but excludes mineral water, fruit juices and milk based drinks.
3. Private market observers like Zenith and Canadean, which cover mineral water to a certain extent but exclude milk based drinks.

All of this data can not be compared to each other and certainly can be approached in direct relation to the Eurostat Import and Export figures. In order to show any trends, each set of data has to be analysed separately.

In contrast to the water market, soft drinks do have a much higher consumption rate (see table 1.2).

The basic situation concerning reuse and one-way packaging systems is similar to the water market since a very big share of the production is coming from mineral water fillers and breweries. However the typical differences are:

- Reuse systems for soft drinks are based on glass and PET bottles.
- The North European soft drink market is highly dominated by reuse packaging
- Non carbonated soft drinks are mainly packed in beverage cartons. Only very few reuse systems exist for theses beverages.
- For carbonated soft drinks, the Coca Cola Company largely dominates the market where it holds a market share of >50%.

The packaging mix is shown in Table 1.4. Since harmonised statistics on packaging for the product range of soft drinks does not exist, a spot light data collection of several sources has been arranged. It lacks certain components, (i.e. Belgium, Ireland, Italy and Netherlands) and therefore covers only 88% of EU-15 soft drink market. For detailed trends and developments within the packaging mix for soft drinks see country reports in Annex.

In 1996, 38,5% of the quantity EU soft drinks consumed was sold in reuse bottles, 32,9% was in glass reuse bottles and 5,6% was in REF-PET bottles. One-way packaging accounted for 61,5% of the total and it was led quite convincingly by plastic bottles (33,6%) followed by cans, beverage cartons, and one-way glass bottles, each of which ranged between 8 and 10%.

Well developed reuse systems still exist in the Scandinavian countries, in the FRGermany and in Austria. Even Though the Portuguese and Spanish reuse systems are on the decline, they are still realising reasonable filling quantities. The Scandinavian reuse systems have changed from glass to PET for about half of their filling quantity whereas the Austrian and German Reuse systems are just at the beginning of that change.

Plastic bottles are the preferred one-way packaging type for soft drinks, making up 33,6% of the total consumption. The French soft drink market is the El Dorado for one-way plastic bottles for a total of 47% or 7,7 billion litres. Spain and United Kingdom follow with 3,9 and 3,0 billion litres. Italy has a rather big share, detailed figures are unavailable.

One-way glass is a domain of the French and German soft drink market covering nearly 10% of each market. Juices and Cola products are the dominating beverages in that packaging segment.

Beverage cartons only have a significant market volume in Austria, France, FRGermany and Spain mainly used for the packaging of juices and nectars.

Cans play the biggest role in the United Kingdom and France.

Despite the fact that the restrictions for one-way packaging in FRGermany are often criticised, cans do comprise the third biggest market volume in FRGermany with only beverage cartons and one-way glass being sold in FRGermany more often.

The amount sold in casks for HoReCa is very small even if it is higher than the 723 Mio. litres shown in the Table 1.5 in Annex The German figures do not include premix/draught. This would probably double the total amount which would likewise raise the share up to 2,5% of total consumption.

#### **1.3.3.1.3 Beer**

The packaging data has been collected and published by the European Brewers Association CBMC continuously since 1979. As in most countries, breweries have to pay taxes for alcohol. Data is available in breweries anyway.

Beer consumption (see Table 1.2 in Annex) varies anywhere from over 100 litres per capita in Austria, Belgium Denmark, FRGermany, Ireland and United Kingdom to under 40 litres per capita in the wine growing countries of the south of France, Greece, or Italy. The Scandinavian states, which have high taxes on beer, are in the middle range.

Other than soft drinks, which are beverages that are mainly consumed in the homes, beer is drunk in pubs and restaurants to a great extent. One third of European beer consumption is draught beer (see Table 1.6 in Annex). Drinking beer in pubs is very popular in Ireland (80%) and the United Kingdom (65%), while in Sweden, and Denmark, as well as in Italy

and Greece, people prefer drinking beer at home. In these countries figures for draught beer is under 20%.

With the focus on primary packaging, reuse covers about 60% of packed beer. In nine member states the reuse quota for beer in primary packaging is significantly over 70%, even though only three countries have legal instruments established to support reuse (see Table 1.6 in Annex). In most countries, where reuse systems for soft drinks have disappeared from the market, reuse systems for beer keep up a certain quantity like in Spain, Greece and France.

One-way packaging mainly one-way glass bottles and cans. Both of them total about 20% of the EU beer market in primary packaging. One-way glass bottles dominate in France, Italy and Spain, while cans have an advantage in the United Kingdom and Sweden. Still, the biggest beer can market is FRGermany with more than 1,6 billion litres or 4 billion cans.

Even reuse systems for beer are established in most EU-member states, a continuous decline of market share has to be faced (see Table 1.7 in Annex). Whereas reuse glass bottles made up 81% of the market share in 1979, figures fell below the 60% mark in 1997. The filling quantity for reuse glass bottles has followed the overall growth of the beer market at a slower rate. Market growth boosted up one-way packaging with a growth of nearly 100% for each of them in the time span between 1979 and 1990.

#### **1.3.3.1.4 Milk**

The availability of milk packaging data is very poor. Where any, statistics on milk packaging in just a few of the countries exist, it has been aggregated. In most of the countries, there are only rough estimations available from trade people. Official statistics are therefore focused on milk production and the various processing of milk to dairy products and the market regulations.

Milk drinking consumption in the European Union covers a wide range from under 50 litres in Greece up to 199 litres in Finland (see Table 1.2 in Annex). Generally people in the north drink more milk than people in the south with the exception of Spain, where the per capita milk consumption is even approximately 120 litres per year. UHT milk, which is very familiar in the southern states and in FRGermany has no market relevance in the north.

All of the reuse primary packaging for drinking milk vanished from the market with the exception of two countries (Belgium, United Kingdom) in the middle of the 1960's. The whole market was dominated up until then by beverage cartons and in some countries by plastic bottles. Pouches, as a third one-way alternative, were introduced in the market in the late 1970's but disappeared again because of declining consumer acceptance.

The come-back of the reuse bottles started in the late 1980's following an intensive discussion on the environment. In FRGermany, the reintroduction was bound to a high price policy coupled with a "Good old days" image. Therefore the reuse bottle was an old fashioned glass bottle optimised with a resealable screw cap. In the Netherlands and in Austria, the reuse bottle came back as a modern high tech solution, a Polycarbonate block

bottle. It was not launched with extremely high prices like it was in FRGermany. The high price for milk in reuse bottles, which costs up to three times as much as UHT milk in beverage cartons, is the reason for the low (6%) market share in FRGermany. The Netherlands and Austrian reuse systems for milk have stabilised at about 15-20% (see Table 1.8 in Annex).

Coinciding with the come back of the reuse bottles, an immense change from fresh pasteurised milk to UHT milk took place. This "milk" is sold at the lower price and got a market share of up to 70% in some member states. Beverage cartons and one-way plastic bottles are dominating in that segment.

The old fashioned reuse systems in Belgium and in the United Kingdom are under steady pressure by the retailer chains and declined to a level of 6% in Belgium and around 30% in United Kingdom (see Table 1.8 in Annex). Both systems have not been developed in their technical aspects. Both use non-resealable glass bottles. In Belgium only sterilised milk is offered in reuse bottles.

Actually the overall market share is around 9%, beverage cartons make up 74% and plastic packaging, bottles, and pouches have 17% of the share.

#### **1.3.3.1.5 Wine**

Similar to the extreme variety of the water consumption, wine has a totally different consumption character in the EU-member states. In the North, especially in Scandinavia, wine is consumed as a speciality, while in the south wine is considered an everyday beverage. While average people in France and Italy drink more than 60 litres of wine per year, Irish and Finnish people drink less than 6 litres of wine per year.

As wine is only grown in the Mediterranean countries, in Austria and in FRGermany, it is a big matter of internal trade in the EU (see therefore chapter 4.1.7).

The data on wine packaging is as poor as for milk. Too many wine growers/producers and bottling companies exist. Most of them are smaller than official statistics register. Qualified statistical data only exist in a few countries. Definite figures for production quantities for reuse or of one-way glass bottles exist for some countries, but in others, it is undecided how much wine is bottled in a reuse bottle in its overall life time. In the Nordic countries, where states have monopolies for alcohol, the existing data on wine packaging is available and is of good quality. Much like in Sweden where these monopolies have disappeared the packaging mix data from the beginning of the 1990's has changed rapidly.

The variety of packaging used in the market is not as big as it is for soft drinks. Glass bottles dominate wine primary packaging to a very large extent. Beverage cartons and plastic bottles only entered the market some years ago. To determine the reuse quota for wine bottles is not easy, as most glass bottles can be used as one-way or as reuse packaging. Only very few light weight glass bottles, which are also new on the market cause problems in the refilling process. To get a realistic impression of the reuse primary packaging on the market, an analysis of the reuse systems has to be done (see therefore country reports in the annex).

The 1994 packaging mix in the wine market is shown in Table 1.9 in Annex. The overall consumption of wine of about 12 billion litres is sold to around 17% in reuse glass bottles and on additional 10% in carboys and barrels mainly for HoReCa. Two thirds of the consumption quantity was filled in one-way glass bottles. The reuse share does include reused one-way bottles which are not part of an organised redistribution chain (for further description see chapter 2.1.5).

One-way beverage cartons and plastic bottles were very limited in 1994 but they are increasing rapidly. Particularly in France, inexpensive table wine is actually sold in one-way PET bottles in a steadily growing share.

**Sources:**

(1.1) BVGlas, Bundesverband Glas, Düsseldorf, 1998.

## 2. Reuse systems for beverages

Reuse packaging, like any other packaging has to fulfil it's obligation to make the transport, storing, trading and use of goods possible. Therefore, all of the packaging has to follow the technical specifications of the producers, the logistics, the trade and the consumers in addition to the specifications of recycling and waste treatment.

Unlike one-way packaging, reuse packaging has to run through the delivery/consumption chain not just once but many times. Unlike one-way packaging, reuse packaging has to follow the same chain of redistribution back from consumer to filler. This additional redistribution chain needs additional logistics and organisation work in order to be done.

There is a great variety of different reuse systems on the market which differ in:

- organisational structures
- economical arrangements
- technical standards
- logistics
- public relations

To discuss the advantages and disadvantages of typical economic situations, the typical characteristics of the main reuse systems for sales packaging (primary packaging) shall be described.

### 2.1 Type A - Individual reuse packaging system

#### **Technical Standards:**

The packaging consists of an individual shape and technical specification and is used only by one company, or only for a specific brand mark of one company. The design of that individual packaging is owned by the filler or by the producer of the packaging and is lent to the filler exclusively.

Individual reuse packaging systems often are combined systems, where the sales packaging is a publicly available standard type while the secondary packaging (crate etc.) is individual. In that case, the packaging system (i.e. bottle and crate) have to be handled as an individual reuse packaging in the distribution and redistribution chain. Pallets used for this type of reuse system are of open loop type.

#### **Examples:**

Individual company owned glass bottles for mineral water in France. The different shape and brand marks in the glass makes it impossible to transfer them from one company to another (see report France 4.2).

About 1000 brewery owned individual crates of different shape and colour/print using the same standardised bottle in FR-Germany for beer (see report Germany 5.4). All the different crates have to go back to the individual brewery even though the bottles in the crates are standardised.

Several Austrian mineral water bottles of individual shape. PET-Bottles and glass bottles have to go back to the filler.

**Logistics:**

Sales packaging is used in combination with reusable transport packaging such as crates and pallets.

Distribution is done via all of the available channels:

- Direct delivery to the customers (private households, catering companies) using the own facilities or haulage companies
- Stop to stop delivery to retail outlets
- Delivery to the distribution centres/central warehouses of the retailers and wholesalers.

Redistribution follows the same way back, while the sorting and aggregation of the unit loads is done as a service by the retailers, distribution centres, and wholesalers. The sorting of sales packaging (bottles, jars etc.) has to be done in the retailer's outlets or at the filling plant.

**Organisational Structures:**

There is no additional organisation or arrangement with other fillers conducted. All decisions can be done independently by the company, which means that decisions can be made at a faster speed. A maximum of differentiation to competitive packaging (shape, colour etc.) can be reached.

Because there are additional services in redistribution (sorting, storing capacity and management) which have to be allocated at the retailer and/or wholesaler levels, bilateral contracts have to be arranged.

The individual reuse packaging can only be returned by the consumer to those retail outlets which sell the same type of packaging. This is a clear restriction to the consumer, which can only be minimised if there is a high coverage of the market area by the filler.

**Economical Arrangements:**

The deposits for the sales packaging and transport packaging are fixed by the filler and charged to each trading partner in the distribution chain.

The expenditure for sorting is increasing through the use of individual reuse systems which has to then be calculated and allocated within the distribution chain. These costs often are the reasons for difficulties and restrictions in getting individual reuse packaging systems listed by retail companies.

**Public Relations:**

To launch a new individual reuse packaging system onto the market, customers/consumers have to learn to identify it as reusable and have to be aware of the deposits and the locations/conditions when returning the items. The investment that needs to be spent on PR is very high and is allocated mainly to the filler.

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## **2.2 Type B - Standard pool system (company owned)**

In most cases these systems are run by multinational companies holding international brand marks and giving franchise contracts to single individual companies.

### **Examples:**

The biggest Type B pool is the Coca Cola Company owned bottles and crates pool. It covers a range of 8 glass bottles starting from 0,2 litres to 0,5 litres. and REF-PET bottles from 0,5 to 1,5 litres. Some of these pools are organised only for one or several countries others are used all over Europe. The pool covers bottles for carbonised and non-carbonised soft drinks and water. All licensed franchise companies filling Coca Cola products can use the contracted packaging systems.

A similar system exists for the PEPSI Company. Three different REF-PET bottles are part of the company pool system. The pool system is established in Central and North Europe.

### **Technical Standards:**

Technical specification is laid down by the assigning company.

The standard covers not only the type and shape of the packaging, but also technical specifications and regulations for the use of additional packaging components (labels, closures etc.) and the treatment of the reuse packaging in the filling plant and on the distribution/redistribution chain.

### **Logistics:**

Logistics is the same as with Type A reuse systems.

Depending on the big market share of these systems and the very high coverage of the market, the requirements for sorting, storing and management are not that large.

Exchange of empty packaging can be organised centrally which keeps the stock of reuse packaging in the chain to a minimum.

### **Organisational Structures:**

The structure of the internal organisations is based on the franchise contact which includes the regulations for the reuse packaging system.

The conditions for external organisations are dealt out by the filler franchise contractor or the central trading organisation.

Depending on the highly centralised decision making process, these closed systems are very prosperous in renewing and developing the reuse packaging system.

### **Economical Arrangements:**

A minimisation of the number of packaging circulating in the pool lowers the investment costs.

Additional costs for sorting do not have to be allocated within the distribution/redistribution chain.

### **Public Relations:**



Because of the co-operation of many franchise partners, the PR-investments and continuous expenditure for advertising and public relations is very high (Coca Cola is the brand/company with the biggest budget in PR/advertisement world wide).

### 2.3 Type C - Standard pool system (branch)

These pools often exist for a very long time and have been installed by the branch organisations, in some cases as long as 100 years ago when packaging was much more expensive than today.

#### Examples:

The full description of the branch pool systems can be found in the different country reports. Here only branches by country are listed:

Belgium	UHT-milk, beer,
Denmark	beer, soft drinks, mineral water
Finland	wine, beer, water, soft drinks
France	beer
Germany	beer, mineral water, soft drinks, juices, milk, diary products
Greece	beer
Italy	beer, mineral water
Netherlands	milk
Portugal	beer, mineral water, soft drinks
Spain	mineral water
Sweden	beer, soft drinks,
United Kingdom	milk

#### Technical Standards:

The technical specifications are laid down by the pool organisation.

The standard covers not only the type and shape of the packaging, but also the technical specifications and the regulations for the use of additional packaging components (labels, closures etc.), and the treatment of the reuse packaging in the filling plant and in the distribution/redistribution chain.

#### Logistics:

Sales packaging is used in combination with reusable transport packaging like crates and pallets.

Distribution is done via all of the available channels:

- Direct delivery to the customers (private, catering companies, canteen and restaurants) using their own facilities
- Stop to stop delivery to the retail outlets
- Delivery to the distribution centres of the retailers and wholesalers.

Redistribution follows the same way back.

The sorting is done mainly by retailers and wholesalers. Where different reusable packaging are used coincidentally, the final sorting is done by the fillers.

**Organisational Structures:**

Branches which run reuse pool systems usually put together many small and medium sized fillers. The biggest pools organise more than 400 fillers, while other branch pools cover only 5-10 fillers in their pool organisation. These organisations have democratic structures which causes slower decision making processes than franchise pools or single company reuse systems.

All of the companies which are contractors to the pool run their own businesses as independent enterprises and are competitors to each other. Co-operation is restricted to the running of the reuse packaging system.

**Economical Arrangements:**

Internal arrangements are based on the pool contract. Renewal and restructuring of the pool and the packaging in the pool have to be paid by for the contractors in relation to the share of their use of the pool packaging. In that situation, the fixing of the deposit is of high relevance because it is the comparison factor for reinvestment in packaging. In branch pools the deposit normally is fixed lower than the price of any new packaging.

External arrangements with retailers and wholesalers can not be arranged by the pool organisation or is restricted to an agreement in the name of the pool, which is not so easy to bind to the pool members.

**Public Relations:**

The responsibility for public relations for the reuse pool is or is not part of the pool contract. Besides PR is not that easy because it is restricted to the packaging itself. For this reasons PR has to be „neutral“ and can not be bound to the image and PR of a certain trade mark/filled good. This weakens its position in comparison to company pools (Type B) or individual reuse packaging (Type A).

**2.4 Type D - Open loop system**

Only very few open loop systems for sales packaging still exist any more on the market. Many of them are residues of former branch systems which did not succeed in developing. They are often used by small companies which distribute only in small market areas and which control the distribution of their goods to a great extend.

**Examples:**

A typical system for Type D systems are wine bottles and crates in Portugal, Spain, France and Germany. As there are so many users this pool of bottles works without a central pool management. The shape of the crates are standardised on national level but of individual colour and print. This does not disturb the system because wine bottles are offered to the customers without crates (see country reports).

Rests of former Type D systems for beer (Euro I and II beer bottle and standardised crate) still are on the market in Germany and the East European countries.

**Technical Standards:**

Technical standards are often based on „official standards“ set by the national standardisation bodies (members of CEN). They do cover only the specifications of the packaging itself without the frame regulations for additional packaging components and rules of treatment.

Many of these national standards have been withdrawn in the last; however some still exist on the market.

**Logistics:**

Sales packaging is used in combination with reusable transport packaging like crates and pallets. In some cases, this packaging is used as one-way packaging for „export sales“ where only a rudimentary redistribution system exists.

Distribution is mainly done via:

- Direct delivery to the customers (private, catering companies, canteen and restaurants) using their own facilities
- Stop to stop delivery to retailer outlets

Redistribution follows the same way back. The sorting is done mainly by retailers and wholesalers.

**Organisational Structures:**

Organisational structure do not exists any longer. In some cases, some main users maintain and develop standards but without any binding power to the rest of the users. Since there is no contracting organisation anymore, the reuse packaging develops into a cheap non individual company pool.

**Economical Arrangements:**

The deposits are fixed by the filler. In some cases, the deposits are part of the national standard. Frequently, these reuse packagings are sold with the filled good for one price and retake is done similar to, what occurs in a re-buy system.

Since open loop reuse packaging can often be „bought“ in the market very cheaply or even for free (in the case when fillers leave the system and have to destroy the old reuse packaging), it can be an economical and beneficial way of packaging for companies who are less prosperous.

**Public Relations:**

Public relations usually does not exist in those systems. Since most open loop systems are still well known in the market there is no need for continuous public relations.

**2.5 Type E - Reuse to refill system**

Reuse to refill systems are normally used to fulfil just one part of the requirements in the distribution chain. They are used to transport bulk goods to the retailer´s shop or to the stock piles of big customers. The filling of the ready to use packaging units takes place at the retailer´s outlet (often self service) or at the place of business. Ready to use packaging

is refill packaging which is the property of the consumer and for which he/she is responsible for proper use. There is a wide range of refill packaging systems on the market especially for packaging combined with dispensers, sprays etc.

**Examples:**

One part of the systems are launched by single companies who run own retail shops like Bodyshop who operates in all European countries. The other is mainly restricted to green shops where single companies distribute their assortment to like Ecover and others.

**Technical standards:**

The reuse packaging of Type E is an individual company owned packaging. In some cases, it is a standardised bulk packaging based on a national standard.

likewise the refill packaging depends greatly on the consumer. It could be one-way packaging which is durable for many uses, or reuse packaging of type A-D which is given back to the pool after use for other purposes.

**Logistics:**

The reuse bulk packaging typically only circulates between the filler and the retailer, sometimes via wholesalers or haulage conterplayers.

Redistribution is going back the same way.

**Organisational Structures:**

The system is run like an individual reuse system of Type A. Any external arrangements are done bilaterally between the filler, the customer and/or the wholesaler.

**Economical Arrangements:**

Some systems use deposits others calculate the packaging into the price for the goods (one price) and re-buy the reuse packaging when it is redelivered by the customer.

**Public Relations:**

Public relations are done individually by the filler and by the retailer. The retailer's advantage is a special offer/service for his customers with those goods/packaging (ecological reasons, freshness, price).

**2.6 Type F - Reuse of reusable one-way packaging**

Many of the one-way packagings are durable and can be used more than one time like wine bottles, champagne bottles, glass jars, or plastic bottles and pails. The reasons why they are used as one-way packaging is the lack of a reuse/redistribution system, either because it does not exist anymore or never existed in the first place. The reasons for the lack of classic redistribution are numerous. The most important one is the large variety of individual shapes and types of packaging which have been brought onto the market.

**Technical standards:**

Only in some cases is reusable one-way packaging following a national standard. In most cases, they are individual shapes and types based on designs owned by the packaging

producers. In many cases, they are part of a trademark and are under copyright from the filler/producer company. In the case of wine bottles they often have typical shapes of particular wine regions, which are not allowed to be used in other regions or only by a trusted quality standard of wine (i.e. AOC, AC or quality wine).

### **Logistics:**

A distribution chain for this kind of packaging is very long and/or is going through retail systems which only handle one-way packaging like discounters would.

For example wine, especially quality wine, is traded over long distances. Storage amounting to several years and very differentiated distribution chains make the redistribution to the distribution chain and vice versa ineffective.

Redistribution exists independently from the distribution chain in a company owned redistribution chain. In some cases the return of the empties is located in retail outlets or in collection stations (bring back) similar to those of recycling systems like bottle banks. In some cases, collection recycling systems For example bottle banks, where reusable bottles, jars etc. are sorted out before the cullets are transported to the glass smelter.

Those systems can only exist when they cover a range of about 40-90% of the individual packaging shapes/types of a specific packaging range (i.e. wine bottles) which are collected together in one collection system. The existing sorting facilities for wine bottles cover between 50 to 60 different shapes of wine bottles.

### **Organisational Structures:**

The redistribution starts from the public collection systems or from the retake in retail outlets as a mixed quality and demands very little work force input for retake. The organisational structure occurs in three different ways:

1. Packagings are collected in recycling bottle banks. Before being destroyed to cullets, non damaged packaging is sorted out of the cullets and sold to fillers. Cleaning and final quality control are done by the sorting facility or by the filler itself. This depends on the technical equipment available at the fillers plant (filling plant for reusable packaging or one-way plant). In this system, up to 50% of bottles can be sorted out as good saleable packaging.
2. A separate collection scheme is installed where a selection of different bottle shapes is collected. In this system, up to 90% of bottles can be sorted out as good saleable packaging.
3. Retake occurs in the retail outlets. The mixed packaging is given to sorting facilities. The retake option is offered as a service to customers in the hopes of binding them to the store.

There aren't technical restrictions are laid down in the lists of duties / pool contracts, which cause a typically high loss of packaging within the process of reconditioning (about 5-8%). In closed loop reuse systems this share is around 1-2%.

### **Economical Arrangements:**

In none of these subsystems, except fore Denmark, is it actually possible to obtain a refund or deposit repayment. The whole costs of the system has to be covered by selling packaging to the fillers. In some cases, where local authorities are paying subventions to recycling

systems (bottle banks), these additional benefits can be calculated to cover the costs of collection, sorting and trade.

The prices for new glass bottles and jars are very low. Therefore these systems are only able to compete when they received direct public subventions, indirect subsidies via recycling charges, or have an advantage from packaging taxes put on one-way packaging such as is the case in Denmark.

**Public Relations:**

If collection systems are operating within existing recycling schemes, then separate public relations are not needed. The selling of the used packaging is more often likely to be a problem to be solved by consistent PR (quality insurance).

Separate collection systems and retake systems need public relations even more, because customers have to participate actively (sorting and separately handling of special packaging). When systems work on a local or regional basis, the PR should be focused on that level.

### 3. Calculation of Number of Trips or Rotations

The most important requirement a reuse packaging has to fulfil, as it's name immediately indicates, is, that it „...has been conceived and designed to accomplish within it's life cycle a minimum number of trips or rotations...“ (Article 3 (5) EU-Packaging Directive 94/62/EC). Which means that it has to be used several times before it becomes waste. The European Parliament and Council did not agree in their decision making process how often a reuse packaging should be used. They did not define the minimum number of trips or rotations.

**Remark:** The not defined expressions „trip“ and „rotation“ which were not defined and have been logically connected with „or“ to emphasise that these are two different things, which caused a great deal of trouble in the CEN standardisation process. It results in three meetings (which costs of about 80.000 ECU) to find a definition for these two expressions.

The CEN standard on reuse packaging systems pr EN 13429 (3.1) in it's actual state does not clarify what is meant by the „minimum number of trips or rotation“ and has not even been established procedures on how to calculate it.

#### 3.1 Calculation of number of trips/rotations

Before the different procedures on how to calculate the „number of trips or rotations“ (referred to in the future as “circles“) are discussed, some basic characteristics of reuse packaging systems have to be described. On the one hand they influence data collection demands on the other hand, they affect data quality.

Reuse packaging pool systems are systems of several independent companies along the distribution chain connected by contract or trade relations in different ways. They more or less act together as an organised group and follow certain dynamics. A third party, which is bound to the system, is the consumers, who use reuse packaging in a somewhat foreseeable way and therefore influence the system as well.

Some of the most important players of these dynamics are:

- 1- growth and decline of packaging systems
- 2- external stock of packaging outside the professional use (intermediate private use)
- 3- the consumption characteristics of goods traded in reuse packaging (fast or slow selling).
- 4- seasonal peaks of consumption or production.

To calculate the real number of circles completed, one must exclude the influence of all these factors. In reality, this is impossible, and has to be solved by statistical means. The relevance of each of these factors is very different and can be balanced by taking into account experiences made in several research studies.

### 3.1.1 Growth and decline of packaging systems

New types/models of reuse packaging are brought into and taken out of the market in short time spans. It is in the interest of each company, not to run different reuse packaging systems simultaneously because this causes enormous costs for the additional handling and the stock piles etc.

For closed loop reuse systems (Type A + B), which are run only by one decision maker, the dynamics of ageing can be seen in chart 3.1. In the initial short time span, new reuse packaging is brought into the system within a number of weeks. If the system is closed down, this will be done totally within the short term as well.

In all reuse packaging pools where numerous independent companies act individually (Type C+D), the launch of a new type of packaging takes place within 3-6 years (see chart 3.2). After a starting phase of 1-2 years, the main input takes place in the 3<sup>rd</sup>-5<sup>th</sup> year. After that time, the input quantity becomes stable and is more or less only determined just by the loss of packaging or the continuing growth/decline of the production quantity as a whole. When similar reuse pools substitute in new types of packaging, the input rate goes down rapidly. Consequently the packaging in the pool grows older on average because the losses can no longer be compensated for with the used packaging which was used by the companies which have left the pool.

After the initial input, the input rate of new packaging is determined by three things:

- the external use of packaging, outside the system (intermediate use by private means)
- the external loss of packaging which directly goes to the waste stream
- the internal loss of packaging, damaged in the filling line or discarded there because of damage caused externally.

The external use of packaging outside the system, from an environmental point of view can be disregarded, as long as the packaging comes back to the filler and is not going directly to the waste stream. The reuse packaging in that case substitutes for other products / packaging which therefore does not have to be produced. The external temporary depot can be seen as a widening of the reuse system. The amount of packaging in that depot can in some cases vary from year to year, depending of seasonal variations; for example after a good harvest of private gardens. These variations mean that there are peaks after a harvest and lows in the early summer month. The overall quantity of the external depot varies greatly with the type of packaging and the distribution/redistribution system.

The amount of packaging going into that depot is determined by the technical ability of the packaging to be used by private households and the amount of the deposit in relation to the prices customers paid for the packaging/products of the same quality. For example glass bottles with wide-mouth screw caps which can be used for home-made preserves can be obtained by paying a deposit of 0,15 ECU, while the same bottles cost four times as much in the stores. New standardised screw caps can be acquired very easily from the reuse system for free.

External loss is caused mainly, when one-way and reuse bottles can not be detected as such by the customer or when retake facilities are not convenient enough (deposit too small / retake not available). This loss has to be compensated for directly by the filler by bringing in new packaging.



It is a constant figure/share which does not change too much within the overall lifetime of the reuse packaging system. It only grows very little when it reaches the average age of the packaging pool, because most of the damages consistent with the technical age do not lead to total damage of the packaging. In most cases, only lesser damages (toward the end) are caused which are then detected on the filling line and therefore ending up there as an internal loss.

The internal losses consist entirely of packaging which has been detected as not been suitable for use in the filling line. This loss can result from technical requirements (burst test, sniffer etc.) or from PR-requirements, when packaging is considerably not appealing enough (scuffing). The second case is a very individual aspect which depends on the decision of the filler. The internal loss increases steadily for about two years after the system has begun to a level which is attained when the average age of the packaging pool is reached. It then stays at that level steadily until the system is closed down.

Internal loss also covers as well most of the external damages (mentioned above). The estimated share of internal losses is around 70-80% of total loss.

### **3.1.2 Amount of packaging in reuse packaging systems**

The amount of packaging in a balanced reuse packaging system, which is not influenced any more by growth or decline, can basically be calculated by the annual filling capacity divided through the average number of circles a packaging is running in a year.

In reality, the total amount of packaging in a reuse packaging system is much bigger than that because of the following influences:

- seasonal peaks of consumption inside and outside the system (see above)
- type of product which is sold (fast or slow selling)
- stock piles in the distribution/ redistribution channel

Seasonal peaks influence most packaging systems. Some have seasons of consumption such cold drinks in the summer time; or seasons of production such as natural food and beverages in autumn. The packaging has to be available on demand. In both cases it leads to a packaging quantity higher than average demand oriented at the peak demand times. During the rest of the year packagings are standing in stock piles with the fillers, traders and/or consumers.

The type of product (fast selling / slow selling) depends on the preserving technique, which determines the duration in which the stock can be kept. For example, pasteurised milk has to be consumed within 10 days. The reuse packaging returns to the filler shortly thereafter whether if it is full or emptied. Juices, on the contrary, can be stored in bottles for more than two years making stock piles possible at each stage of distribution. For this reason they do not circulate very fast (see Table 3.1). Small fillers and wholesalers often keep up whole season production lots in primary reuse packaging, which is sold throughout the year and therefore circulates only 1-2 times per year.

Another effect is the quantity per sales unit which is sold to the customer. If 24 bottles are sold crate-wise, Then the length of the time it takes, until the last bottle is emptied and the crate is returned back to the filler is going to be much longer than if the same bottle is sold

as a single unit/bottle in the convenience market and comes back to the filler within one week.

Stock piles in the distribution/ redistribution channel also influence the speed of circulation. Individual reuse packaging (Type A) with a low density in distribution causes much longer collection times in the redistribution (retailers, wholesalers).

In terms of the average number of circles per year, the following figures have been measured/calculated for different beverages/reuse packaging systems:

**Table 3.1: Characteristic figures of several reuse packaging systems**

No.	Source	Standard	Product-duration in days	Sales unit	External use	Distr. max. km	System age * in years	Circles per year	Circles total
1	(3.6)	<b>Glass bottle</b> individual	beer 150	20	resealable	300	13 -	4,8	32
2	(3.8)	individual	beer 150	20	non reseal.	700	4 <<		10-32
3	(3.12)	standard	beer 150	20	non reseal	300	30 >	5,6	35
4	(3.2)	standard	juices 300	12	non reseal.	50	18 >	9,5	
5	(3.9)	standard	juices 300	6	resealable	600	18 -	4,3	20
6	(3.3)	standard	past. milk 10	1	resealable	200	3 <	15	20-27
7	(3.4)	standard	water 500	12	resealable	50-600	30 -		39-42
8	(3.7)	<b>PET-bottles</b> standard	soft drink 90	12	resealable	300	4 >		15
9	(3.10)	standard	soft drink 90	12	resealable	300	2 <		56
10	(3.11)	individual	soft drink 90	20	resealable	200	5 -	n.c.	20

\* (-) balanced system with no significant growth/decline

(<) actual growth of system

(>) actual decline of system

n.c. = not calculated

With the exception of the beer bottle system [1], all other figures were analysed / calculated with the Substitute Input Calculation.

### 3.2 Systems for calculation

In practice, there are three procedures for calculating the average number of circles that packaging lasts within their lifetime in reuse packaging systems. The demand for data is the bottleneck which is determined by the relative costs of data collection and the co-operation of companies, as these data show their economic activity.

The following procedures are available:

1. **Circulation Time Calculation**
2. **Substitute Input Calculation**
3. **Individual Accounting Procedure**

#### 3.2.1 Circulation Time Calculation

Circulation time calculation is obtained by multiplying the **annual circulation** with the **overall duration time** (years) of the reuse packaging; in other words the average number of circles per year multiplied by the average age of the packaging.

The average number of circles a packaging runs in a certain system can only be determined sufficiently by analysing a large representative sample of bottles coming back to the filling line. One technical hurdle is that existing reuse packaging in most cases is not dated at each filling. In some cases the „best before“ date has been used for the analysis (3.6). This type of labelling/dating is not standardised and therefore can only be utilised and read for packaging which comes from known fillers, where the filling date can be calculated from the "best before" date. "Best before" dates are printed in letters on the label, which can not be read by machines. This results in a big manual handling effort which causes investigation costs to explode.

The average age of bottles are the second figure necessary for this calculation procedure. Theoretically it can be derived from calculating or measuring.

The calculation of the average age demands that there be a complete set of data on:

- all packaging which have been brought into the pool since its early beginning,
- all packaging which has been taken out of the pool and has been loss.

Both sets of data are only available in well organised closed loop systems of Type A and B where the purchasing is done centrally or data collection and registration is well developed (see as well chapter 3.2.2).

The average ages of bottles can also be measured by empirical means. Therefore the age of a representative sample of bottles leaving the system as internally loss has to be detected. Those which are externally loss can not be detected, but they are similar to the average age of the packaging in the system.

Some packaging producers date each of the packaging, whereas others do not. Much like the case with the coding of "best before" dates, no standardised marking system exists. One exception is the coding system for rigid plastic packaging (crates, drums, etc.). This coding system is used for primary packaging only to a much lesser extent.

The calculation for the circulation time is based on empirical investigations for circulation time where the age of the packaging pool has not been done in many cases. Research based on manual handling is not very attractive and is very costly. In the area of the German brewing industry two investigations are known (3.6, 3.13).

The data derived within a closed loop system (Type A) can be seen as reliable because external influences in a well-balanced "old" reuse system can be disregarded.

A sampling from within the new expanding reuse systems or multi-company systems (Type B and C) would be much more difficult. Mistakes and distortions than can only be prevented by spot checks at several check points and with bigger samples. To make such investigations profitable, a standardised marking system becomes a basic necessity.

### 3.2.2 Substitute Input Calculation

The Substitute Input Calculation is the calculation of the relationship between the number of fillings and the number of loss packagings. The greater the loss of packaging in correlation to the number of fillings, the smaller the average total circulation rate of a reuse packaging system.

To calculate this quota the following data have to be investigated:

- the number of fillings and
- the number of the total loss (internal and external)

Both figures cause several problems:

The number of fillings has to be determined in the respect to the influence of production growth or decline. Therefore, data for each type of packaging has to cover a time ranges for as long as possible. The data basis should cover all of the fillers of the pool. In some cases, these number into the hundreds.

If data is not available, because there is no central purchase of the packaging, a statistical representative has to do spot checks To exclude the influences of different companies prosperity and distribution structures in big pools, the sampling of spot check is very sensitive and needs additional data about the companies. In most cases, this data can not be obtained that easily.

In a second step, the total losses have to be calculated via the demand for substitutes, which are brought into the pool by each company. This gross input quantity includes real losses and the actual growth of the pool - growth of sold production and growth of external temporary depots (see chapter 3.1.1).

To get the net input figures caused by real losses in the system, the input caused by the known (registered) actual growth within the investigation period has to be subtracted from the gross input. To calculate this share, the amount of growth has to be set in relation to the annual circulation rate of the reuse packaging system.

As small as the annual average circulation rate is, much of the packaging of the gross input is caused by the growth and therefore does not account as an external loss. The faster it takes the reuse packaging to come back to the filling line within the investigation time, the fewer are the number of the packaging which are temporarily in the pool. At this stage of the calculation, nobody can prove just how big these shares are.

The effect of the annual circulation rate has a decisive influence on the outcome of the calculation of the total average circulation rate (3.9).

The measuring/calculation of the annual circulation rate can be done in two ways: by using the Circulation Time Calculation (see above chapter 3.1.1), or by taking the Substitute Input Calculation again. In the second case, systematic mistakes are usually not resolved, but are levelled off to a certain extent. Levelling off rarely depends on the time range which the investigation covers.

Especially in product ranges, where return times are very long and are subject to several seasonal or annual influences, a short term investigation of less than three years can cause massive mistakes (3.7, 3.8, 3.9). When changing the annual circulation rate from 5 to 7, which is well within the annual oscillation in slow circulating systems the outcome of that calculation method varies between 33 and 40 (3.9). Short term calculations of up to five years within slow circling reuse packaging systems can be look upon as playing dice (3.7).

Experiences with the Substitute Input Calculation show that:

- Statistics have to be developed to an optimum extent.
- Access to data is very difficult
- Short term (one or two years) investigation shows massive variations in results
- External influences and characteristics of slow-moving systems can hardly be resolved.

The minimum requirements / conditions for using the Substitute Input Calculation are:

Conditions:

- minimum age of the system has to be 3 years for a single company or franchise system and 5-6 years for multi-company pool systems. (When system growth has stopped, see chart 3.1 and 3.2).

Requirements:

- the time range for investigation should at least cover data of 3 full years
- the samples for spot checks have to cover all types of companies in multi-company pools.
- the annual circulation rate has to be measured by Circulation Time Calculation or be validated by a long term investigation

The outcomes therefore are:

1. Only in balanced old reuse systems (see Chart 3.1 and 3.2), with a high annual return rate and small external depots, can the losses be calculated on the basis of the new packaging brought into the pool as substitutes.
2. Substitute Input Calculation is useful only for closed loop reuse systems in individual companies or in reuse pools with a highly developed data collection and control system.

### 3.2.3 Individual Accounting Procedure

The individual accounting procedure is a direct measuring procedure. All packaging running in a reuse pool system is earmarked individually after each filling in the bottling line. The earmark has to be fixed on the packaging and be made irreversible at each filling. This technique has been developed and tested for PET-beverage bottles in Scandinavia to a great extent. Each PET- bottle has got a small laser mark printed on the bottom ring of the bottle. The initial interest in this marking system was not to evaluate the circulation rates but to designate which bottles had once contained a product (flavour) so as to support the sorting process along the bottling line. Similar systems exist with EAN-Codes, which can also be read easily by scanners.

The earmarks are accounted for each individual bottle by machines by telling the actual number of circles the individual packaging has undergone up to this moment.

Accounting the individual lifetimes at a certain moment does not give real information on how long the packaging will run after being investigated.

To get the real circulation rate, only packaging which has been sorted out of the system and considered an internal loss is investigated. In that case, the average circulation rate of external losses has to be stated as equal to that of the internal losses. This is correct as packaging users deciding on external losses do not have the chance to discard only packaging of a certain circulation age.

In the case where specific packaging does have a high damage rate (breaking to pieces) which is caused by age of the packaging, producers use testing the procedures before filling because of producer's responsibility. Therefore external losses based on technical ageing are minimised anyway.

In balanced systems, a spot check sample of a certain quantity gives a real picture of the average number of circles the packaging had run in its lifetime. An investigation of big samples is very easy and can be done without relevant costs.

The only requirements to be solved are to develop standardised earmarking systems and facilities.

### 3.3 The CEN Standard EN 13429

In this standard, the essential requirements for reusable packaging which are actually covered are:

- the decision / intention of the filler to run reuse systems or not
- technical durability and properties of the packaging to undergo reconditioning
- the existence of a system for collection and redistribution

What is still missing is the responsibility of the filler, to collect and report data to make it possible to prove the success/outcome of the reuse system. One of the most important questions therefore, is how often the reusable packaging is reused on the average.

The data for measuring and calculating of these figures are not be checked on the new packaging coming from the factory itself, for instance the technical durability. They have to

be measured within the reuse system by the filler company, and/or organised group of filler companies, and/or third parties who run the reuse system (redistributors, reconditioners).

It is not the job of the CEN to quantify the minimum number of trips for all or any packaging covered by that standard. This can only be done by a political decision based on scientific studies and under the responsibility of a legal body.

The purpose for the CEN might be to lay down the possible and available procedures for data collection and implement technical support (marking systems) in an EN standard.

### **3.3.1 Proposal for an additional paragraph to prEN 13429**

#### **Data collection concerning number of rotations - requirements for measurements**

The filler/packer shall make sure that a set of arrangements (organisational, technical) are in place, which make it possible to prove the average number of rotations of reusable packaging within the system that is in place. The set of arrangements should correspond with the requirements for one of the following:

1. Circulation Time Calculation
2. Substitute Input Calculation
3. Individual Accounting Procedure

#### **Circulation Time Calculation - Technical requirements:**

Each individual reusable packaging part of a reuse system has to bear the date (year/month) of production and the date of the last filling. The stamp of the date of the production year of the packaging has to be irreversible over the whole lifetime of the packaging. The stamp for the filling date has to be placed on the packaging so that it is removed in the reconditioning process (i.e. print on one-way labels or closures).

The marks have to be standardised and must be readable by technical means. The standard for technical rules for markings have to be part of the pool contract of closed loop systems.

#### **Substitute Input Calculation - Technical requirements:**

The following data have to be registered so that they can be checked:

- Production quantities for each type of packaging on a monthly basis
- Quantities of new packaging brought into the pool, resolved from company stock, on an annual basis.

#### **Individual Accounting Procedure - Technical requirements:**

Each successfully filled and packed reuse packaging has to be earmarked. This mark has to be placed on the packaging in an irreversible way so that the sum of the marks shows the number of fillings the packaging has been used for.

Facilities for automatic reading/accounting of the earmarks have to be in place.

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#### 4. Internal trade and reuse packaging

The free internal trade of goods within the EU is the first and fundamental idea of the EU contract. The utilisation of reuse systems, especially when it is required by law, is seen as a restriction or burden to internal trade.

In order to achieve a mutual and acceptable basis for discussion, a study is obligated to show:

- How many goods which are able to be filled/packed in reusable packaging are part of trade/good flows between the EU-member states?
- How many of these flows is actually packed in one-way packaging, reuse packaging or in bulk?
- What is the quantity of goods which, under acceptable conditions, can be traded in reuse packaging or may be transported in bulk and filled in consumer packaging (primary packaging) in the area of consumption?

Since the opening of the common market in January 1993 and the loss of customs data for trans-border transports of goods, the data/statistics available has become much poorer in quality. Product flows since that time have to be declared by each company selling or buying products from abroad. The real product flow then is no longer under the control of the states statistics authorities. There are several reasons for non declaration or incorrect declarations. Some of them are listed in the EUROSTAT monthly bulletin „Außenhandel“ (4.1):

- Different minimum limits for declaration
- Time lacks of different national data collection systems
- Double accounting of the same products while passing through third countries intra and extra EU
- Tax evasion
- Mistakes and omissions in declaration
- Car boot imports which are organised systematically

Additional problems are caused by the harmonisation of very different data collecting systems within the member states, which lead to further lacks of data and non-compatibility to the national statistical systems which still exist. Declining enthusiasm at some companies to declare product flows which are not able to be controlled makes it even more difficult to get close to a correct picture of the real situation.

Additional problem result from the exemptions from declaration duties for small companies, small quantity transfers, and permission to declare only summed quantities of different goods.

Aside from these struggles, the combined nomenclature (KN), which is used for European trade statistics, is usually not set up to show packaging issues, but to indicate economic value, quality, and technical aspects of the goods themselves

#### 4.1 Status quo of transnational product flows packed in sales packaging

The total flow of goods in the EU is very diversified. In COMEX data bank (4.2), the EUROSTAT statistics for internal and external trade of the union, more than 10.000 groups of goods are listed. This is just a small sample of the actual and much greater number of different goods.

Basically, all goods which are delivered in primary packaging, with the exception of just a few goods, can technically be packed in reusable packaging. There are several restrictions for reuse packaging (see chapter 5) where are caused mainly by non-technical aspects such as:

- the length of time and the distance between places where the production/packing and the consumption of packaging takes place *For example goods which are produced/packed in Portugal in the summer and delivered to Finland for consumption in the wintertime.*
- increasingly differentiated goods along with a declining quantity of batches from industrial production (non-ability to standardise packaging; *for example the actual number of shampoos available in a central European drugstore is somewhat more than one hundred different types and scents.*
- the rising handling and reconditioning costs/requirements for the declining size of packaging; *for example convenience packages for 3 grams of sugar are much more difficult to handle than a 3 kg pack of the same product.*

Therefore, the focus has to be directed to goods which follow a continuous and somewhat unique mass flow in the traditional regional markets which take up a short time span between the production and the consumption of the goods and which are predestined for standardised packaging systems. Non-rigid, liquid or paste goods, which need rigid packaging for transport and for storage until their consumption comprise the most profitable goods for which reuse packaging can be used.

The following types of goods can be handled well in reusable packaging:

liquid and paste food

- diary products
- ready-to-eat products and meals
- all beverages

liquid and standardised non food products

- Motor oil
- washing and cleaning detergents
- technical solubles

As is the case with many of the goods, EUROSTAT-data only exist for raw materials or semi-finalised goods and does not differentiate as to the packaging (primary packaging). Statistical analysis has been restricted to the following product groups:

**Table 4.1: List of product groups for data screening**

	COMEX (4.2)	PRODCOM (4.3)
mineral water	22.011.011 - .99	
table water	22.019.000	
milk		15.51.11.30 - .67
yoghurt		15.51.52.43 - .45
lemonade	22.021.000 22.029.010 - .099	
apple juice	20.097.011 - .030	
orange juice	20.091.111 - .999	
mixed juices	20.097.093 - .099	
grape juice	20.096.011 - .090	
nectars		15.98.12.551 - .554
juice drinks		15.98.12.591 - .596
beer made from malt	22.030.001 - .010	
vinegar	22.090.011 - .099	
wine	22.042.110 - .999	
Champaign	22.041.011	
sparkling wine	22.04.10.19 - .099	

Dependent on the location of production areas and the most important consumption areas, the intra-EU trade for goods suitable for reusable packaging is very different.

Only a relatively small share of the overall production is sold abroad traditionally regional products such as non-alcoholic beverages, milk, and beer. Under normal conditions, the transport of low price food/goods is too expensive for long distance distribution. The greatest benefit to be derived in sales abroad remains confined to a distribution area near the border.

#### **4.1.1 Mineral Water**

According to European law, mineral water by has to be bottled at the source. Bulk transports are not allowed. For that reason all natural mineral water listed in COMEX-data are bottled in primary packaging. Only artificial mineral water (mineralised table water) KN No. 22.011.091 can be transported in bulk, and it is normally bottled at a few bottling lines. Most of that water belongs to Coca Cola's „Bonaqua“ which is sold mainly in FRGermany. For this reason exports are not significantly high (see Table 4.1.1-5 in Annex).

The total exports in intra-EU trade is around 1.9 billion litres which accounts for about 7% of the total consumption. France's share alone of total exports in intra-EU trade amounts to more than 60%. Most of these exports go to Belgium/Luxembourg, FRGermany, and the United Kingdom. Since Belgium exports 202 Mio litres back to France and some 167 Mio litres further north to the Netherlands, this must include a big share of re-imports and transit-exports (see Table 4.1.1-1 in Annex).

Exports from France and Italy to FRGermany total around 492 Mio. litres. These exports go to a great extent to the HoReCa and to the "green" shops. They are mainly bottled in reuse glass bottles. Additionally about 25 Mio. litres go into reuse bottles from FRGermany to Benelux. (see for detailed discussion Report FRGermany in Annex).

A third important importing country is the United Kingdom. Mineral water was very unfamiliar in the United Kingdom for a long time, but that actually changed. Imports from France and Ireland now account for 214 Mio litres .

Most of the exported mineral water is not carbonated or aerated (74%). Most of the carbonated mineral water is going from Belgium to the Netherlands and from Italy to FRGermany (see Table 4.1.1-2,-3,-4 in Annex).

#### **4.1.2 Drinking Milk**

EUROSTAT-data for drinking milk, especially for packed / bottled drinking milk is not available within COMEXT and PRODCOM. Statistics focus on the totals of raw milk and product flows in regards to the highly regulated milk and diary products markets. Bulk transports of fresh milk in different qualities and processes of raw materials are reported to an large extent.

To get an estimation of the flows of bottled/packed drinking milk, data of the German Milch Industrieverband (MIV) (4.4) are used. This data is based on several specific data

collections of EUROSTAT and statistics from the German Ministry of Agriculture (BML) (4.5). Both sources are not based on the same sample and statistical boundaries, but each shows, respectively the quantitative relations between the production and internal trade and the regional distances of the main flows.

The total production and sales of drinking milk amounts to 33 billion kg in the EU-15 member states, while only 1,58 billion kg (4,8%) were exported in 1995 (4.4).

87% or 1,38 billion kg of the exports originated from four member states; Luxembourg, Belgium, France and the FRGermany, while 42% of the imports can be attributed to the same countries. An additional 50% of the imports go to the immediate neighbour states (Spain, Italy, Netherlands and UK) of these four countries (4.4).

Based on the national statistics (4.5), the German exports of packed/bottled drinking milk (643 Mio kg) account for 40% of all EU-15 member states exports. Table 4.2 shows, that about 267 Mio. kg go to the Benelux, 158 Mio. kg go to France, and a further share of 161 Mio kg and to Italy.

**Table 4.2 Exports of packed / bottled drinking milk from FRGermany**

importing country	Export in Mio kg	Imports in Mio kg
Belgium/Lux.	98	4,6
France	158	0,9
Italy	161	0 (+)
Netherlands	169	0,3
Denmark	0 (+)	2,9
Others	20	0

These statistics do not show the transports of retailer organisations which work on a transnational basis; especially discounters, which distribute milk using their own logistics and commencing primarily from FRGermany. Since the distribution of these companies rose very quickly in the last five years, especially in UK, France, Spain, Italy and Portugal, the distribution distances have become much longer for the flow of those goods(see chapter 5.1.2).

### **4.1.3 Dairy products - fermented milk / yoghurt**

Diary products are typically distributed in the region of production. While allocations of production facilities have been highly concentrated and the distribution of retailer organisations demands the European Brands, the European distribution of dairy products increased.

Some dairy products, primarily sweetened yoghurt, is sold to a large extent not as a bulk ware but in primary packaging of up to 10 litres volume. Keeping that in mind the COMEX-data on sweetened yoghurt can at least be recognised as data of product flows in primary packaging.

The total production of fermented milk products in the EU-15 was 4,55 million tons in 1995. Of that amount 0,38 million tons or about 8% were part of intra-EU trade. An additional 0,078 Mio tons were sold to third countries outside the EU (see Table 4.1.3-1,-2 in Annex)

Flavoured or sweetened yoghurt (0,38 Mio tons) was exported more often than natural yoghurt (0,082 Mio tons) without flavour. Imports (874 tons) from outside the EU can be neglected.

The export of sweetened/flavoured yoghurt to countries outside the EU states rose rapidly in 1996 (0,14 Mio. tons) when exports from FRGermany to Russia were started and supported by security assurances (Hermes) of the German federal government (see Table 4.1.3-3 in Annex).

Data on the type of used packaging are not included in the official statistics. At any rate, the number of exports in reuse glass jars is probably very small in comparison to the overall export quantity.

### **4.1.4 Soft drinks**

The total consumption of soft drinks excluding juices and nectars in the EU is around 27 billion litres per year (4.6). Internal trade, based on COMEX-statistics accounts for 1,2 billion litres or 4% (see Table 4.1.4-1 and Table 4.1.4- 2...6 in Annex). This quantity includes the more regional exports from Northern Ireland to Ireland, Austria to FRGermany, and from France to Luxembourg/Belgium and the Netherlands. Excluding these streams, the export share is only 2% of intra-EU consumption.

Soft drinks can be seen as a very regional product even though there is a very intensive centralisation within the market dominated by the Coca Cola Company.

Coca Cola had a very decentralised bottling and distribution structure until the middle of the 80's in Italy, France, and FRGermany, when it had 50 to 100 contract bottlers in each country. Since that time, the organisation has changed more or less from a multi-company franchise organisation to a single company share holder organisation. The concentration of the company's organisation was followed by a centralisation in the bottling plants.

One of the most important steps was the construction of the Bergues plant in the north of France. In accordance with the planning at Coca Cola, the European market will receive its deliveries from that immense canning plant. The French exports (see Table 4.1.4-2 in Annex) stem largely from that plant.

Almost all the exports from that plant in Bergues are one-way cans.

#### 4.1.5 Juices

COMEX-data do not show the type of packaging for any juices.

Within Tables 4.1.5-1,...-7 in Annex list the amounts of the most important juices which are exported from EU-member state. The total amount of non frozen juices and concentrates in intra-EU-trade (see table 4.1.5-1 in Annex) is 627 thousand tons. Compared to a total consumption of 8,13 million tons in 1996 (4.7), the export quota is around 8 %.

#### 4.1.6 Beer

After wine, beer has the most differentiated beverage market in Europe. Some 1.700 breweries produce some 10.000 different beers. More than 32 billion litres of beer are produced in the EU. 7% of the production or 2,3 billion litres are sold abroad to the EU-15 member states. The packaging mix for exports of beer is shown Table 4.3.

**Table 4.3: Packaging for beer exports intra and extra EU-15**

	in million litres	in % of production
total production	33.188	
total exports	4.017	-
thereof:		
extra EU-15	1.710	
intra EU-15	2.307	7,1%
thereof in:		
bulk, kegs, casks	1.061	3,3%
cans	621	1,9%
glass bottles	624	1,9%

This data has to be handled with care. When interpreting the COMEX-data it should be kept in mind, that there are many exceptions and special situations which are characteristic of the beer market. Some of the most notable aspects that are typical for the beer market in addition to those discussed under 4.1 are listed below (4.8):

- Small and medium size breweries, particularly in FRGermany do not run their own can filling machines. They export bulk ware to the Netherlands, France and

Belgium to get the beer canned by contract fillers. These transactions are therefore listed twice as bulk exports from FRGermany, and as can exports from the (NL, B, F) to FRGermany.

- In some countries (B, NL), import warehouses exist for imported beer from extra EU countries which come into the EU. Beer from these central warehouses to the countries of consumption are registered as exports from (B, NL) to the EU-15 member states (internal trade).
- Exports from Denmark to FRGermany in cans include to a great extent beer which is sold in border shops and ferries and is re-imported by day-trip custom travellers. The driving force behind this is the tax in Denmark (see Table 4.1.6-5 in Annex).

Those streams do not belong to the production figures of the countries mentioned.

Aside from the uncertainties of the available data, the basic message of the COMEX-data (see Table 4.1.6-1,...-4 in Annex) can be drawn up as follows:

- The main exporting countries are FRGermany, Belgium/Luxembourg, Ireland, the Netherlands, and Denmark.
- Most of the exports go to direct neighbour states. The United Kingdom and France are the biggest importing countries, accounting for 46% of the EU-intra beer imports. The most important export streams go from:

Ireland -> United Kingdom	244 Mio. litres
Belgium -> France	212 Mio. litres
FRGermany -> Italy	156 Mio. litres

As outlined above the packaging mix of the exported beer has to be handled with care. Since the special effects of contract filling (bulk export and re-import of cans and vice versa) are counted twice, the base figure of total exports is driving upwards, and the relationship between the bulk and primary packaging figures can not be pinpointed as accurately. For this reason relative figures (%-ages) may be nearer to the real situation:

- 46% of all exports are done in bulk or kegs/draught (see Table 4.1.6-4 in Annex). There are two reasons for this; on the one hand, short distance distribution to neighbour countries are dominated by draught beer consumption (GB, IRE, B), and on the other hand, long distance exports with the bottling of beer commencing in the area of consumption is more customary in Italy or south of FRGermany.
- Fillings of imported bulk ware can go into one-way packaging, as well as in reuse bottles or kegs. Examples for both are given. Clear figures about the shares are not available. The effects of these bulk exports are low costs for the long distance part of the distribution and an enormous reduction in the environmental impact resulting from the exhaust systems during transportation.



COMEX-data do not make a distinction between reuse and one-way bottles. A rough estimation based on the volumes going to importing countries with a high reuse share shows that the share of reuse bottles for export may be under 10% of the total exports in bottles. It certainly shouldn't be less than that, because many exports occurring in markets which are close to the border are done by wholesalers and small home service companies who do not register their exports.

- Exports in one-way bottles account for about 25%, while cans make up another 27% of the share of all intra-EU exports.
- The most important exporting countries for one-way glass bottled beer are FRGermany, France and the three Benelux countries. The most important importing countries are the United Kingdom and Italy (see Table 4.1.6-2 in Annex).
- The most important exporters of cans are the Netherlands, FRGermany, Belgium/Luxembourg and Denmark (for exports from Netherlands and Denmark remember remark above). These exports are mainly destined to France, FRGermany, Spain, and the United Kingdom. (see Table 4.1.6-3 in Annex)

#### **4.1.7 Wine**

Wine, as a high price product, is sold over very long distances within Europe. The main production areas are the south of France, Italy, Spain, the south of FRGermany, Portugal, and Greece, while non-producing areas such as Scandinavia, the United Kingdom, the north of FRGermany, and the Benelux are „importing“ areas.

Total production of wine within the EU-15 member states was around 17,6 billion litres in 1996 (4.9). According to the COMEX data, 26,4% are exported. Of that amount, 1.286 Mio. litres were to third countries outside the EU, and 3.380 Mio litres or 19,1 % were to other member states (see Table 4.1.7-1 in Annex).

The most important exporting countries are France, Italy, Spain, Portugal, and FRGermany. The most important importing countries are FRGermany, the United Kingdom, and France.

In intra-EU-trade, primary packaging is used for the export of 55% of the silent wine, along with another 6% for sparkling wine and champagne. 39% of wine exports are bulk ware, 3% of which are grape most for final fermentation in the importing country (see Table 4.1.7-2, ...-4 in Annex).

Primary packaging in the COMEX data bank does not distinguish between the many different types of packaging, among which there are glass bottles, beverage cartons and plastic bottles as well as bag in box systems. Since all of the packaging except glass bottles is very limited in the importing countries, these types of packaging may account for only a very small extent of the exports. The packaging mix of one-way glass bottles for wine is very similar in all European importing countries. The packaging structure of primary wine packaging in FRGermany is shown in Table 4.1.7-5 in Annex.

Since a bottle volume of 0,76-0,8 litres can be calculated for much of that packaging mix this leads to an average glass weight of 0,58 kg per litre. Based on a total export volume of 1,85 billion litres of wine in intra-EU trade, the total demand for the calculated 2.244 Mio. bottles means that 1,04 million tons of glass are used respectively (see 4.1.7-6 and -7 in Annex)

The most important flows of wine in bottles go from:

France	->	United Kingdom, FRGermany, the Netherlands, and Belgium
Italy	->	FRGermany and the United Kingdom
Spain	->	FRGermany, the Netherlands and Denmark
FRGermany	->	The Netherlands and the United Kingdom
Portugal	->	France and the United Kingdom

The percentage of bottled wine in respect to the total volume of wine exported by each of the big producing countries varies very much. Italy (39%) and Spain (40%) export less than the average (55%) in bottles; while Greece, France, FRGermany, and Portugal export up to 77% of their wine in bottles. There are various reasons for that. One reason may be the big quantities of cheap wine which is exported from Italy and Spain in bulk to countries where big importing companies run their own filling lines. Another reason is the exports to Scandinavia where the bulk ware is bottled in reuse wine bottles (see Table 4.1.7-4 in Annex).

EUROSTAT figures for bottled wine do not separately show wine which is bottled close to the border as separate figures. Especially in the case of France, bottling plants near the border to FRGermany exist. Wine from all over France is transported for the long journey in bulk tanks. Just a few our later this wine is exported in bottles to FRGermany, Scandinavia, and the East as „original fillings“. The producer is usually a shareholder (with very little shares) of the filling company and can therefore print on his bottle label „bottled in own cellar“ or make similar statements. An estimated quantity of about 250 Mio. litres is passing through in this way each year.

The benefit derived from this border-line-bottling is the very inexpensive transport needed for the long distance bulk destined for export from the south or the west coast of France to the east, and the inexpensive bottling costs at the highly rationalised filling lines in these contract filling companies.

One-way wine bottles do not differ very much from reuse wine bottles. In many cases, they are the same. A small share is composed of light weight glass bottles, which have been brought onto the market within the last few years. These bottles can only be used up to 4 times. Since most of the wine bottles from a technical point of view could be used again as reuse bottles, it really only depends on the existence of redistribution systems in the consuming countries. For a detailed discussion, see the country reports and chapter 5.

#### **4.1.8 Vinegar**

Wine vinegar and vinegar substitutes in containers  $\leq 2$  litres are listed in the COMEX-data bank. The total amount of intra-EU trade was 36 million kg. The most important exporting countries are Italy, FRGermany, and the Netherlands (see Table 4.1.8-1 in Annex).

Since many exports from FRGermany go to the Netherlands and from the Netherlands to Belgium, of transit transports might be counted twice.

The type of packaging used is not shown in COMEX. Since there aren't any reuse systems known for vinegar, the dominant type of packaging is glass and plastic bottles.

#### **4.2 Private imports of one-way packed goods (car boot imports)**

As described above, distribution in small quantities (smaller than 1000 kg) and private exports of goods are namely not registered by name in the official statistics.

In some situations, where an economical incentive is the driving force behind the action, private exports/imports can add up to a considerable mass flow.

Such situations commonly occur with neighbouring countries where the taxes for alcohol and beer differs greatly; for example, the Scandinavian countries when compared to Denmark, FRGermany, and the Baltic states (see Table 4.1.6-5 in Annex). As an example, the price difference for one 0,5 litre can of beer between FRGermany and Finland is 0,71 ECU; which is even half of the Finnish price when it is bought on a ferry boat. A similar situation exists between Denmark and Sweden/Norway where ferry trips (return trips) between the countries are very short and don't cost a lot of money.

The prime movers of these customs trips are the ship owners who sell the tax-free goods. They organise one day bus trips from some city to the border, where private people purchase articles for their own consumption and buy small merchandise for commercial trade.

#### **4.3 What is going across the border in reuse packaging**

Specific data on goods in reusable primary packaging are not available in EU-statistics. Information about these streams can only be requested at the company level and because of competition and tax secrets, they are not for public access.

Contained within the research in the 15 EU-member states is a qualitative analysis which was done through spot checks in retail shops and by conducting interviews with people involved in business. This information provided a crude picture of the actual cross border flows of goods which are packed in reusable packaging. The main aspects can be narrowed down to the following statements:

- Reuse packaging is used for export only when reuse systems are used by the filler anyway for domestic distribution.
- Export is mainly done in cooperation with foreign wholesalers who have a good functioning domestic distribution /redistribution system in the area of consumption
- Both international and national based Reuse packaging systems, are used for export. An exchange of packaging in European pool systems like VDF and P&G

for juices and EURO II and NRW-bottle for beer, is constitutes just a small share of the whole market.

- Some companies (Belgium, Dutch, French) use company-owned reuse systems (Type A) for export.
- The most important goods are water, juices, milk, and beer.
- The return of used wine bottles to foreign filling plants is still less common, but it is growing steadily. This is being caused by the extension of collection systems for empty wine bottles in Denmark and FRGermany.

Based on knowledge about the special export relations of certain companies and information about consumer patterns in some of the biggest importing countries, a rough estimation of the actual product streams which have been filled in reuse packaging has been calculated (see Table 4.4).

**Table 4.4: Estimation of actual product flows in reuse packaging**

Importing country	Exporting country	in million litres
Austria	Italy	5
Belgium	FRGermany	20
	The Netherlands	3,5
Denmark	Sweden	3,0
	United Kingdom	3,3
FRGermany	Italy	50
	France	33
	Austria	4,8
	Netherlands	0,6
	Denmark	1,5
	Belgium	2,7
	Sweden	0,1
The Netherlands	Belgium	6
	FRGermany	1,5
<b>Total</b>		<b>133</b>

#### 4.4 Potential for the use of reuse packaging in export

The employment of reuse packaging is restricted primarily by the acceptance of this type of packaging within the retailer organisations of the importing country and by the existence of a functioning redistribution system. Both of these components are very limited in some of the big member states like France, Italy, Greece, Spain, and U.K. In all of the other

countries where reuse packaging systems still exist, the export of beverages in reuse packaging is possible. There have not been any real restrictions in the form of barriers to entry into the national reuse systems in those member states.

In some countries, redistribution systems / collection systems for open loop systems exist (Denmark and to a certain extent, France and FRGermany).

Another possible restriction is the distribution distance, which ideally should not be more than an average of 300 km for economically reasons.

Based on the following conditions:

- The retake / redistribution systems are in place and
- The distribution distance on the average is not greater than 300 km

an approximately estimate for the two products which account for the biggest share of beverage exports in intra-EU trade (beer and water) has been made. Accordingly, there was a distinction made between the actual situation (only those importing countries where retake/redistribution still works), and a hypothetical situation where all of the importing countries have re-installed retake/redistribution systems.

**Table 4.5: Potential for reuse packaging in intra EU trade on beer and mineral water**

exporting country	actually possible in million tons	hypothetically possible in million tons
<b>Beer:</b>		
Belgium	100	170
Denmark	80	90
France	0	120
FRGermany	90	100
The Netherlands	60	130
United Kingdom	40	60
Subtotal Beer	370	670
<b>Mineral Water:</b>		
Belgium	150	300
France	450	700
FRGermany	20	20
Italy	100	130
Ireland	25	25
The Netherlands	15	15
Subtotal Mineral water	760	1190
<b>Total</b>	<b>1.130</b>	<b>1.860</b>

Another provision for the estimation was that because of uncertainties in the case of special distribution channels, market coverage of reuse systems was calculated at 85%. the remaining 15% of the exports take place in one-way packaging; though, even there, well functioning reuse systems exist.

In the case of wine, is, that about 90% of the bottles used for export belong to a set of standard bottle shapes where there may be small deviations or additional individualised punt marks or decorative details. When excluding these alternatives about 70% of all glass bottles in the market can be reused. Collecting and reconditioning systems for these bottles only exist in Denmark, FRGermany and in France.

Compared to the actual (1997) volume of wine exported in intra-EU-trade, about 1,3 billion litres could be filled in reuse bottles if retake and redistribution systems were available. If the dominating bottle shapes were standardised, it would be possible to export about 1,6 billion litres in reuse bottles.

Overhangs of export bottles (see Table 4.6 in Annex) can be compensated for by:

- domestic wine production in FR-Germany, France or
- bulk imports of non producing countries (Benelux, Scandinavia and United Kingdom) and / or
- for bottled imports which are filled in an acceptable distance from consumption area like in

Alsace, Champagne, Jura (France)

North Italy

Austria

where empty bottles (overhang) can be transported to from Benelux, United Kingdom (South) and FRGermany (South).

**Sources:**

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- (4.2) EUROSTAT COMEX data bank for EU-internal and external trade, Luxembourg, 1998
- (4.3) EUROSTAT PRODCOM data bank for production and import/export statistics in the EU, Luxembourg, 1998
- (4.4) Milchindustrie Verband (MIV): Einblick - Geschäftsbericht 1996/97, Teil 2: Zahlen, Daten, Fakten, Tab. 6.1.17, page 66, Bonn, 1998.
- (4.5) Milchindustrie Verband (MIV): Einblick - Geschäftsbericht 1996/97, Teil 2: Zahlen, Daten, Fakten, Tab. 6.2.13 , 6.2.14, page 75, Bonn, 1998.
- (4.6) UNESDA-CISDA; Paris, <http://www.unesda-cisda.org/de/stat3.html>
- (4.7) Dynamik im Handel, 8-97 page 51, Köln, 1997.
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- (4.10) Gesellschaft für Verpackungsmarktforschung (GVM): Füllgutbericht Wein, Bericht Nr. 65, Wiesbaden 1993

## 5. Costs and Constraints

### 5.1 Retail systems in the European Union

When focusing our attention on retail systems for food, the situation in the EU-15 member reveals differences across a wide range. Whereas in some countries, the old-fashioned type of sales structure with its small neighbourhood stores still exists, side-by-side with some of the modern big-sized retail stores (consumer stores and hyper markets); in other countries, the small neighbourhood stores have disappeared. Even the number of supermarkets with less than 500 m<sup>2</sup> ground floor are declining very fast. In the second case, discounters are emerging as the most prosperous sales system with sales reaching 15 to 30% of total food sales.

Food distribution is also changing rapidly, but the process of change has reached different proportions in each of the 15 member states. The basic trends can be described as follows:

- There has been concentration of just a few big retailer organisations which dominate the food market. In most countries, the three largest companies control 50% of the total sales while sales of the top ten cover around 70% of the market. The process of concentration has increased in the last years.
- The concentration has also taken place in the size and in the number of outlets. Small neighbourhood stores lose their importance while business grows at the hypermarkets located outside the cities and outside the residential areas. The discounter's market share is increasing up to 30% (FRGermany)
- Sales per square meter and per employee has grown steadily with a maximum having been reached with the discounters.
- Retailer owned brands (no name products) which are exclusively produced and packed for retailer organisations win market shares.
- Profit margin has come down to around 2% on the average.

These trends in respect to the retailer's side have coincided with social changes and changes in the consumer's preferences as indicated by the following:

- The portion of money spent on food and beverages as part of total private expenditures has been declining. Expenditures for luxury goods and cars are getting more and more important.
- The total of the net. private income has been sinking.
- The cooking and consumption patterns has been changing from homemade meals an even greater reliance on ready-to-eat foods (instant products) which are preserved and



packed. Eating now lets people stuff their faces while they are going about other activities.

- An ever increasing amount of private transport for individuals (cars) has become available. In some countries, on the average every single adult has a private car available at all times.

### **5.1.1 Declining prices for food supply**

For a long time, food sales were mainly been promoted by price. Prices for basic foods like milk, oil, meat, flour, eggs and juices did not rise for more than twenty years or in some instances even declined. In the same time, costs for industrial goods and the work force became more and more expensive. This ever increasing pressure on the producers and retailers lead to some strategies which can be described as follows:

In the field of selling, highly rationalised systems achieved an advantage and there was:

- A minimisation of the handling of goods - and a reduction in the number of employees to a lesser extent
- Much worse payment and working conditions for employees.
- A reduction in of service in the foreground and in the background of the POS.

In the field of logistics / distribution:

- Transport of scale (one truck to one outlet)
- A minimisation of stock keeping in outlets
- No commissioning of small quantities of sales units to be brought to the retail shop (pallet is smallest transport unit)
- Highly rationalised logistics for waste transport
- Highly centralised stock-taking and automatic ordering

In the field of listed goods:

- Maximum preservation / long lasting goods (good best before dates)
- Unification and selections of listed food
- Good which were getting poorer in quality

For the implementation of reuse packaging, these changes are counterproductive, because reuse systems in comparison to one-way packaging need:

- more service for retake in/at the outlet and in the redistribution logistics,
- more storage capacities for full packaging
- additional storage capacities for empties
- responsible handling of refunds for deposits and
- reuse packaging is profitable in regional distribution systems and therefore has more problems with refill of empties in the European scale distribution.

The clear consequence of this development is that reuse packaging is definitely excluded from listing of discounters and is under hard pressure within sales systems like hyper markets and super stores.



### 5.1.2 The role of discounters in - total competition by price

The situation described above is mainly propelled by the emergence and fast growth of discounters. This sales system was developed in FRGermany in the early sixties and developed to a war horse in food selling. The pioneer of that system, the German company ALDI, which was later followed by another German company LIDL, actually mix up large parts of European retail systems in a tremendous speed. In FRGermany, discounters realise a market share of about 30% of food sales in respect to price, which increases up to 35-40% of food distribution when going by weight.

#### The principle characteristics of the hard discounters are:

- \* The consistently cheapest prices in town
- \* Restricted number (500) of goods for sale
- \* Without exception no reuse packaging listed
- \* Minimum staff employed
- \* Bad contracts for employees
- \* No shelves with single product presentation - Goods offered directly out of boxes / from the pallets
- \* No price stickers on the packaging - pricing only at the POS
- \* No or minimised storage capacities in the outlet (storage at POS).
- \* No or very restricted assortment of fresh products (only bread)
- \* Minimum trust in loyalty of employees / Maximum control of employees
- \* Very short sequence of delivery - daily or twice per day delivery.
- \* Restriction of transport packaging to one material (cardboard)

In countries where discounters were not very common until the beginning of the 90's, while at the same time the market share in FRGermany had still crossed the 20% margin, discounters (namely ALDI and LIDL) did have an important signal function for the revolution of retail systems. The consequences for these countries are:

- selling which is more price aggressive commensurate with the situation described above,
- these basic changes occurring in a very short time and
- greater pressure being exerted on service oriented sales system

The reaction of commonly industry- and trade-oriented governments like those in France and in Italy against this practice is somewhat hindering competition. In both countries, this foreign invasion was countered by incorporating official restrictions which put restraints against the free establishment of new businesses (which has been done without any success).

In countries where legal frames for reuse packaging do not exist, these changes may cause the end of existing reuse systems because there is a loss in the distribution and sales basis in the retail system. Reuse systems would then only have a niche in the HoReCa.

### 5.1.3 The role of HoReCa in beverage supply and reuse packaging

Restaurants and pubs clearly have a special position in the distribution of beverages. Aside from the shares of consumption occurring outside the home in pubs and restaurants, these

„points of sale“ work under totally different conditions than retailer shops. The HoReCa, with the exception of the fast food industry, is dominated by service and atmosphere where eating and drinking has the status of culture and community. Even in countries where little reuse packaging is left, drinks wouldn't be served in one-way packaging.

In this instance, local and regional drinks and food are served preferably.

Prices are much higher than in retailer shops. Profit margins are higher as well because service demands a much higher number of employees.

In many countries, restaurants and pubs are owned by breweries or are under long term contract to them. This guarantees a profitable, regional, and controlled distribution for the breweries. The selling of beverages is outside of the actual competition by price, because delivery contracts are based on long term conditions.

For this reason reuse packaging, being the cheapest packaging, is ideal.

## 5.2 Standards for reuse packaging

Reuse packaging is used in a wide packaging chain, beginning with the filler, it goes through trade via the retail's outlet right down to the consumer of the packed good and back again in the same way to the filler. To guarantee a functioning of that circle and the easy functioning of the packaging in highly rationalised filling lines, this system somehow has to be unique. Every time different types of packaging get mixed up within that circle, technical problems and economic costs arise.

This uniformity of packaging is even more difficult to realise when different companies, which are competitors in the market, use the same pool of packaging. To guarantee the functioning of this huge and sensitive system standardised packaging is a must.

### 5.2.1 The difference between public and private standards

All standards by definition are trusts of specific interests. For technical standards, the interest is laid down in technical specifications. These technical specifications have to be clear understandable and checkable, and the user of the standard has to be able to prove the conformity to the standard.

As trusts are contrary to the idea of a free market, trusts are put under a certain public control. Social and community standards are worked out and decided in a legal process in a parliament. Technical standards come under special accepted regulations.

Within the technical standards, two different procedures for public / legal acceptance exist:

1. Standards of national standardisation bodies
2. Private standards of legalised trusts of public interest

National standardisation bodies have to follow internal procedures which are accepted as being democratic by the legal bodies of the state. Their basic rules are:

- openness for all interested groups
- decisions are made in consensus
- the execution of and the decisions are following a fixed procedure
- public hearings guarantee public access and acceptance
- the standards are open for use for everybody.

Right now this is not the place to discuss if these rules are being kept in reality or whether or not the procedure can be proven to be democratic, but it must be emphasised, that the standards can be used for every interest in the market.

Private standards, on the contrary, are:

- worked out behind closed doors by (closed shop) a group of companies / juridical bodies.
- Access to the standard is limited to the group of counterplayers.
- The standard is primarily part of a private property (patent, registered pattern, registered design or registered trade mark).

As trusts normally are illegal, these trusts have to be legalised by governmental trust keeping authorities, who have to guarantee, that the standard/trust is not hindering competition and that access to the trust/standard is open for any contractor.

### **5.2.2 The need for trusts for reuse packaging pools**

The easiest way to organise a reuse packaging system is to set up company owned packaging, which is protected by private registered rights. These systems do not have to co-operate with competitors but they may not use advantages of this co-operation which apply to the systems:

- Seasonal variations can not be balanced, so the stock of packaging has to be orientated to the maximum demand.
- Initial investments for design and manufacturing equipment have to be financed by the company itself - effects of economy-by-scale can not be used by small and medium-sized companies.
- The same thing applies to reinvestments for small quantities of substitute investments for lost/broken packaging.
- If sales are done via retailer organisations, individual reuse systems become an obstacle for listings. Since the number of different reuse packaging systems is growing, small competitors have to pay for the sorting costs or find themselves getting kicked off of retailer's listings.

The result is, if small and medium-sized companies want to run reuse systems, they have to co-operate in pool organisations. To co-operate with competitors in the market, a binding contract with clearly defined rules is a must. Without such a contract, reuse systems can not exist.

### **5.2.3 Reuse packaging pools - a dynamic organisation for internal and external conflicts**

Reuse packaging pools are very sensitive organisations. They have to recognise and handle internal conflicts between contractors, in addition to external conflicts between the pool and competitors outside the pool contract and co-operating partners in the distribution / redistribution chain.

To guarantee a specified quality of the reuse packaging in the pool, quality standards have to be kept and controlled by a neutral pool organisation. This starts with the control of quality standards for new packaging which is brought into the pool, the handling of packaging within the filling lines and in stock, and last but not least, the selection of damaged packaging and reinvestigation of new packaging so that a certain quantity remains for use by each contractor.

External conflicts may result from services (sorting, refunding of deposits, transport) which have to be done by wholesalers or retailer organisations. Conflicts can result as well from illegal use of bottles by non contractors or from the introduction of similar types of packaging onto the market which can disturb the functioning of the pool.

All of these conflicts can only be solved if there is a clear ownership of registered rights to the standardised packaging of the pool organisation. This can not be realised by national standards open to access for everybody.

As history shows, reuse packaging systems based on open standards have not been able to solve conflicts as described above. All of them have disappeared or have been changed to company systems with little market share and declining importance on the market.

Reuse packaging systems based on open-to-access standards (such with transport cases for car part delivery to a car manufacturer) do have very stable buying and selling conditions and also have trust-like organisations on the one hand which makes it possible to force the users of the open pool to use the reuse system.

## **5.2.4 Status quo of packaging standards for reusable primary packaging**

### **5.2.4.1 Public standards**

Standardisation of reuse packaging is very old. One of the oldest standards of Swedish standardisation body SIS is a 0,33 litre bottle for carbonated drinks and beer, SS 84220, first published in 1886. Most of the standards which once existed for reuse bottles and the assigned crates have been withdrawn in the last decade. Only very few still exist in France, FRGermany Austria, Spain, Denmark and Sweden (see Table 5.2.1 in Annex).

Standardisation in national standardisation bodies is actually focused on the harmonisation of technical details of glass packaging (closures, finishes, verticality etc.) (see Table 5.2.1 - italic in Annex).

For wine bottles and glass jars for fruit and vegetables a small number of standards exist but are not titled as reuse packaging standards by name, even though the packaging is technically reusable. The number of these standards is also declining, but packaging which is based on these standards is still available from the glass factories.

The harmonisation of reuse packaging standards to minimise barriers to intra-EU trade is of very little relevance for closed loop systems as they exist for beer, soft drinks, and mineral water (see therefore chapter 5.2.2). Only very few standards exist in these market sectors (see Table 5.2.2.5 - 5.2.2.10 in Annex).

- The EURO II beer bottle (Table 5.2.2.5 in Annex) is the only ISO-standard on reuse bottles at all. It was widely used in Central Europe (A, CZ, CH, GDR, PL, D) for many years. It's importance declined when the quality standards were not able to be controlled, and most German breweries changed to the private NRW-Standard.

The EURO bottle is now only used in Greece (modified standard) , and to a small extent in south FRGermany and Poland. For exports in intra-EU trade, it does not have anymore relevance.

- Some standards for Cone Type soft drink bottles (1/ 0,7 l) and Vichy / Apollinaris (0,33/0,25 l) and Ale 0,25 l still make up existing standards. Most of them have been used for national pool organisations mainly in Denmark, Sweden,

FRGermany and Austria. Most of these standard bottles are actually used as individual reuse packaging without a real pool exchange (namely in HoReCa), or are included in closed loop systems of only very few breweries like in Denmark or Sweden. The importance is declining rapidly. For intra-EU trade, this standard packaging never really had any relevance.

- The reuse of wine bottles in domestic markets is restricted to table wine and country wine. The dominant primary packaging therefore was the 6 Star 1 l -glass bottle (see Table 5.2.2.2 in Annex). It is standardised in France and Spain, and is also used in Portugal, Italy, and Greece. It's relevance for export is minimal. For these open loop reuse systems (Type D), an additional plastic crate is available in France (CFP). This former pool-system was closed down in 1986, but is still on the market. In all other countries, each of the wine fillers uses the same standard crates individualised by their own colours/prints.

Coinciding with the decline of public standards for reuse packaging, private standards of packaging pools and franchise companies have prospered with much success.

All of the contract pools in Europe have managed to develop new technically up-to-date and modern designed reuse packaging. The prosperity of the pools depends on the size (number of conterplayers and quantity of packaging in the pool) and the organisation's structure. Since highly centralised franchise companies (Coca Cola, Pepsi etc.) can do so faster than co-operative branch organisations which keep about a some hundred fillers under contract. The slower changes in the system are the reason for keeping mistakes in decisions small.

The actual status of the private standards for packaging pools are described in the country reports in the annexes.

### **5.2.5 Standards for wine bottles**

In comparison to the beer and soft drink bottles, wine bottles are very important in intra-EU trade (see chapter 4). More than 1,7 billion bottles filled with wine are exported from one end of the EU to the other. Most of these wine bottles end up in bottle banks and landfills even if they are technically fit for reuse. Collection and reconditioning of these bottles is useful (see country report Denmark), but means struggles with many hurdles.

Not to say that there aren't any common bottle types on the market - the typical problems result from well-aimed modifications the glass producers use to bind fillers to their production. There are then small differences in the measurements relevant to the filling machines:

- diameter of bottle finish,
- max. diameter of bottle,
- max. height of bottle and
- type and height of bottom caving of the bottle,

are the most commonly tools to hinder the fillers from buying bottles from other producers. Even if a modification of the filling machine is necessary, the benefit derived from obtaining a better offer of a competing glass producer is more than compensated for.



Standardisation has and still is used to support this strategy (see Tables 5.2.2.1 - 5.2.2.5 in Annex). Common standards for wine bottle shapes are not even on the agenda of the European Standardisation organisation's CEN TC 261.

The only thing which is dealt with there are quality related standards where glass producers can easily agree. A struggle which has been going on for the last 6 years and has the goal of obtaining the harmonisation of cork mouth finishes for wine bottles is now in the internal enquiry stage. The "agreement" in the highly producer-dominated SC 2 is to keep of the different diameters within the standard. In actuality, that clearly means there will be NO HARMONISATION, which basically makes the standard useless!

In the case of the reconditioners, this defeat of the technical harmonisation at the CEN has two great disadvantages:

- The variety of bottles will increase, which will lower the number of bottles which can be separated from the waste stream.
- The quality requirements (uniformity) for reused wine bottles, so as not to cause a loss in the filling line, will be even harder to meet in the future.

This undermining of the reconditioning is directly for the benefit of the glass producers. It guarantees, in the long run, that there will be an economic breakdown of the irksome competitors from the reconditioning branch.

The reason for the failure of CEN is that technical standardisation in the situation where huge technical facilities and machinery is needed (modification of moulds), would end up causing huge additional investments. The corresponding related economic advantages and disadvantages on the two sides of the table can not be dealt with on CEN level.

### **5.3 Deposit instruments - an instrument with high performance**

A deposit is the fixed amount of money which is given in exchange for a lent good; for example, packaging which shall bear the guarantee that the lent packaging is given back to the owner (primary owner/Eigentümer) and is treated properly way without damaging it. According to German law, unlike Anglo-Saxon law, the person who borrows a good does not get all of the rights to sell or change the fundamental structure of a good. He only becomes a secondary owner (Besitzer), while the primary owner still keeps all of the fundamental rights to the lent good. The secondary owner is only allowed to use the lent good in the frame of a bilateral contract with the primary owner.

In running a packaging pool system, such a contract can not be dealt out with each sale of a product which is filled in a reuse packaging. It must be part of the pool contract, which takes each sale into account which occurs from the filler to the wholesaler to the retailer to the customer and the same way back.

#### **5.3.1 Who charges a deposit**

Deposits can be charged on different levels of trade. In typical reuse pool systems, the filler has the leading role of deciding which packaging is used. He buys the packaging from the producer and charges the deposit to his customers. Each of the customers then charges the deposit to the next customer in the distribution line. The deposit is the same on each level.

Sometimes, full and empty packaging are only being changed one by one and balanced once a year.

In some cases, the filled packaging is traded without a deposit between fillers, wholesalers, and traders. Deposits are changed only on the last distribution level between the retailer and the private customer. In that case, deposits do have the intention of encouraging customers to bring back the packaging. The retake of empties by the filler is based on a bilateral contract between the filler and the retailer/wholesaler.

### **5.3.1 The fixing of deposits**

Within pool systems (Type B-C), the fixing of the deposit is very sensitive. It is part of the pool contract and can not be changed (or only with great difficulty) as long as the packaging runs in the system, which can sometimes last for more than 20 years. At the same time, the price of new packaging may vary to an unknown extent.

Since a deposit is part of the motor for the exchange of packaging in the logistic chain, the fixing of deposits must be supported by some other settings in a pool contract which in turn can be set into force by the counterplayers society.

#### **Deposits can be fixed lower or can be fixed higher than the buying price of the new packaging.**

In the first case, the filler carries the risk for the loss of packaging which means the difference between the buying price and the deposit. In addition, he bears the financing costs (interest) for that amount of money for each of the packaging. On the one hand, it is in the interest of each filler to get back as much of the used packaging as possible from the market by paying back a deposit. The overhang of empties at the retailers will be as small as possible. On the other hand, there is not as much interest in buying new packaging to compensate for the loss of the pool. The pool will run very economically, but will acquire a low, average quality level (with scraped, bad-looking packaging). To minimise that problem, the pool contract must call for a minimum input of new packaging by each filler dependent on the number of fillings. Additional contracts and regulations in respect to the groups of retailers, hauliers, or wholesalers are not necessary.

In the second case, where the deposit is higher than the price of the new packaging, it is in the economic interest of the filler to buy as much of the new packaging as he can in order to realise a profit from the difference between the deposit and the buying price. This trends to lead to an overhang of empties which causes big problems with the wholesalers, retailers, and haulage contractors. Those types of deposits are not accepted well by trade and cause a great deal of pressure (out listings) if there aren't any regulations to lend support in solving these problems. Especially in pools where a small group of fillers distributes in a huge market area, this deposit fixing can cause massive problems. In some cases, this can even lead to the death of a pool.

### **5.3.3 Taxation of savings for deposit refunds**

Deposits which are once taken have to be given back when the packaging comes back to the filler. At times, when input and output of full and empty packaging are balanced and the cash flow is minimal, most of the capital is circulating. In seasons, though, when there is only a small measure of business, most of the packaging is on the filler's stock pile. The deposit has to be paid back to the distribution chain. To have that cash available, each filler has to allocate a certain amount of money in his budget which is bound to the packaging

pool. The fiscal allocation and calculation of taxes for this purpose is a fundamental problem, and causes many difficulties with the tax departments. In comparison to one-way packaging which is bought and sold as a trading good, the difficult taxation of deposit refunds ends up being an organisational disadvantage.

#### **5.3.4 Compulsory deposits fixed by legal settings**

In some EU Member States, compulsory deposits for reuse packaging are fixed or are threatened if targets are failed. These compulsory deposits are fixed on a level much higher than the market price of new reusable packaging. They do not take into account the sensitive system/contract of the pool's system. The leading objective is to establish a financial interest for reusable packaging in the market. It does not realise that the deposit does only influence the sales price the private consumer has to pay and does not influence the price of the retailer, who is the main decision maker in the business. In difference to taxes, deposits keep the chance for additional profits for the retailers in the case when empties are not given back by the customer.

(Further discussion of legal instruments see chapter 6)

## 5.4 Costs - Comparison of reuse versus one-way packaging

"Reuse packaging is expensive and unacceptable on account of the costs for the market". "Redistribution (retake and transport) is too high a burden for the market..." These and similar arguments are pronounced when the packaging chain has the political floor. What parts of these arguments are reasonable ? Who pays and who gets the profits?

To compare the costs of reuse packaging versus one-way packaging, some basic aspects have to be kept into mind:

1. Reuse packaging systems are evaluated within three economic areas of the different market players:

Fillers

Wholesalers / Distributors - Re-distributors and

Retailers

2. Most packaging producers produce reuse, as well as one-way packaging.

### 5.4.1 Account analysis for beverage packaging systems

The comparison analysis and cost assessment for reuse packaging versus one-way packaging is based on a multi-cost factor calculation. An overall analysis and calculation on a company level is impossible since the production, distribution, and retail are not covered by one company, but occur among at least two of the different economic players with different background conditions and competing interests. Even in big companies which cover the production and distribution to a large extent, the calculation factors are numerous and conflict with one another.

To get a complete system related cost analysis, models which cover all steps of the packaging/distribution chain until the final disposal have to be defined as the basis for the calculation. Such overall model cost analyses for beverage packaging have been done in several studies (5.4.1 - 5.4.4). By referring to a detailed process analysis, the relating costs and cost structures were analysed in these studies.

On the basis of these studies, recent developments and corrections have been integrated. Costs have been adjusted to the 1998 price level.

Table 5.4.1 in Annex shows the typical types of costs for 1-litre beverage containers of hot-fill products like juices (Beverage carton / One-way glass / Reuse glass). The calculation is based on Roland Berger & Partner figures from 1989. The actual costs of the recycling and disposal as it relates to the current EU legislation have been added.

The chart shows very clearly, that:

- Reuse glass bottles can compete with the cheapest one-way packaging system (beverage carton) very well. One-way glass in that comparison is the most expensive, while one-way plastic bottles and cans, which are not shown in the chart, are even more expensive than one-way glass.
- The cost for reuse glass systems is based approximately 50% on human work power, and only up to about 20% on the costs of the packaging material. Most of the packaging costs

in reuse packaging systems are caused by one-way closures and labels.  
More than 50% of one-way packaging costs are caused by packaging material costs.

- The costs for recycling and environmentally acceptable disposal do have a certain share, but are still not that relevant in respect to the overall costs.

According to that analysis, it is clear that packaging producers do not have any interest in reuse packaging. Even if they could influence decisions for or against reuse packaging by pricing one-way packaging to the absolute minimum, they are not the decision makers in that market.

#### **5.4.2 Who pays and who profits in reuse packaging systems**

When analysing the allotment of the burden it becomes clear that the decision lies with the retailers and the fillers. As Chart 5.4.2 shows, fillers, on the one hand, enjoy the biggest profit when running reuse packaging systems. One-way packaging at least doubles their costs per unit. Retailers, on the other hand, can minimise their costs when selling one-way packaging.

Distributors costs do not vary that much. Their interest is to at least remain independent in-between and not be taken over by one of the other players. Therefore, doing reuse related services in the distribution and redistribution chain is one of their most evident strategies.

#### **5.4.3 Cost structure at the filler**

Even if reuse packaging systems are the most profitable packaging system for fillers, they cause, at the same time, a far bigger economic risk than one-way packaging. Chart 5.4.3 shows the investment necessary to run different packaging systems for carbonated soft drinks. Investments for reuse packaging systems are not only necessary for the filling lines at the production plant but there are also huge investments needed for the millions of bottles and crates in circulation out in the market.

Overall investments for reuse packaging systems are 1.5 to 5 times greater than for one-way packaging systems. What is even more risky, is that the investments do not depreciate in normal terms such as with the depreciation of machines. A change then to reuse packaging in the market would cause a much higher loss since its depreciation term is much longer.

Instable legal frames therefore support one-way packaging.

Finally, decision for one-way packaging is not determined by the costs in all situations. All packaging which is not sold directly to the customer or within own/controlled retail channels (HoReCa) has to be traded via retailer organisations. Retailers are the second biggest decision maker. Many of them have decided not to sell reuse anymore. As the situation in the United Kingdom and in France as well in all other EU-member states shows, retailers are the most powerful decision makers who can sell or ban reuse packaging from the market.

#### **5.4.4 Cost structure at the retailer**

Chart 5.4.4 shows the typical costs for the retailers caused by different packaging systems (beverage carton / reuse glass bottle) and different retail systems. The far greater costs are related to small supermarkets with their individual packaging, handling, and high personal work force demand. The cheapest overall costs are related to big scale retail outlets (hypermarkets and discounter). In the latter, the relative difference between one-way and reuse packaging is the biggest.

One half of the costs is related to retake, the other to the bigger volume / storage space demand for full and empty reuse packaging.

Retailer organisations have followed a purely price-oriented competition for more than three decades in most member states (probably with a delay in time in the southern member states) which has put them in a even worse profit situation. All of the retail organisations have therefore reduced costs by eliminating reuse packaging to a wide extent, for instance, in the discount channels and hyper-markets (see therefore in detail chapter 5.1).

At the same time, those fillers who were still running reuse systems with high profits in many countries were not able to build up redistribution systems for reuse packaging outside the retail channel simultaneously.

In some countries, such as in the Scandinavian states, fillers have negotiated monetary solutions with the retailers, paying for retake and redistribution services in general contracts. This is easier in situations where only a few big fillers have to deal with the big retailer organisations. In countries where numerous companies are participating in reuse pools, retailers use their position to extort dumping prices from the fillers or get them to deliver one-way packed goods simultaneously.

#### **5.4.5 Buying price of packaging**

The prices for packaging are highly influenced by energy costs and by the world market situation. The energy prices directly influence prices for aluminium and glass. The world market situation for the different types of plastic varied very greatly within the last three years and are actually far below production costs because of a big market surplus in the Far East. After some big changes in the packaging mix for soft drinks and mineral water, glass packaging producers in Europe also have large surpluses. Therefore, one-way glass is basically dumped out onto the market.

Currently, corresponding with the sinking raw material prices, as well as, energy prices, the price for one-way packaging is at very low level.

**Table 5.4 Actual prices for 0,5 litre carbonated soft drinks packaging**

Type of packaging	Price per packaging in ECU (5.4.5)
One-way glass (Standard VI)	0,047
Aluminium can incl. top	0,103
PET-One-way bottle	0,069
Glass Reuse bottles	0,103
PET-Reuse bottle	0,133

#### **5.4.6 The work force demand of one-way and reuse packaging**

An economic analysis of the costs and profits of reuse packaging is necessary for decision making on the company level. In regards to the political decisions for or against reuse packaging, employment constitutes a premier aspect for evaluation. The social costs of unemployment are only a minor aspect in the company's economic calculations, since they have to face rising social costs on wages. For the government, it is a double loss, because unemployment reduces income tax value on the one hand, and makes a mess of payments for unemployment benefits on the other hand.

The employment effects of packaging are a matter of dispute whenever restrictions against one-way packaging have been taken into consideration. The packaging producers mobilise their workers to fight against the close-down of their companies; as Solvay did in Brussels, when the Belgian parliament discussed taxes on one-way packaging.

But is it true that one-way packaging keeps jobs safe and reduces unemployment? Other than for economic and ecological effects of packaging, the question of the employment effects has not been discussed to that wide an extent. An analysis often is limited to single companies or branches, and therefore can not be used as a basis for political decisions.

A study done by the author which was published in the year 1993 (5.4.6) analysed the overall employment effects of one-way and reuse beverage packaging. The evaluation was based on a reanalysis from the Longuet/Wietbrauk study (5.4.2) and was supplied with their own research of the retake and redistribution process and an evaluation of employment data in the beverage packaging producers industry.

The study concluded, that reuse packaging creates many more jobs than one-way packaging does. Support for reuse packaging will cause a certain number of jobs to be lost in the packaging producing industry. Since the rationalisation is extremely high in these industries, the jobs which would be lost in the packaging producing industry would be more than compensated for by new jobs in the filling plants and within the distribution/redistribution chain of the reuse system.

Based on the situation in FRGermany in 1998 the study determined that from 161,000 jobs which were directly connected to the production, filling, distribution, and retailing of beverage packaging's the market share of reuse packaging was about 73%. If all of the

reuse packaging systems were closed down and one-way packaging would prevail, then 53,000 jobs would be lost. On the other hand, if all of the one-way packaging activities were stopped, this would bring a plus of 27,000 new jobs.

The result of this analysis is clear - Reuse is not a job killer, but a clear strategy to put people to work.

### Sources:

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- (5.4.6) Golding, Andreas: Schaffung und Erhalt von Arbeitsplätzen durch Mehrweg, in Neue Wege ohne Abfall - Tendenzen, Fakten, Strategien, Iför, Berlin, 1993.



## 6. Practical suggestions to encourage the use of reusable packaging

### 6.1 Stock taking of legal instruments concerning reuse packaging

Several legal instruments to try to support or hinder reuse have been tested within the last 20 years in Europe. Different political cultures and different basic policy strategies have been the basis for that in the past and will be so in the future. Actually there is very little national legislation which supports reuse packaging directly. The reasons for this is emphasised by the fact that in those countries, where industry and trade took reuse packaging systems from market in the last two decades, so that there is actually nothing left to protect. In the same time EU Packaging Directive 94/62/EC focus on recycling and incineration and not on reuse.

Furthermore, there are actually seven different instruments which are established in the EU-member states to support reuse packaging systems. In the following section, these instruments will be first described, then they will be analysed and discussed. Finally, a theoretical discussion of additional political instruments which have not actually been realised will provide the basis for a proposal for a common EU-policy to support economically and ecological advantageous reuse packaging systems.

**Table 6.1: Legal Instruments supporting reuse packaging in EU-member states legislation**

	A	B	Dk	Fin	F	D	Gr	Ire	I	L	Nl	P	S	E	UK
<b>economic instruments</b>															
Taxes on new packaging		X	X	X											
Compulsory deposits				X		X									
High recycling targets > 50%						X									
Taxes on landfill															X
<b>command and control</b>															
Ban of one way packaging for CO2 containing beverages			X												
Compulsory offer/retake of reuse packaging by retailers												X			
Permission for reuse systems quality control			X	X											

While the policy on reuse is kept very vague in the EU Packaging Directive (see chapter 6.3) the EU-Commission, namely the DG III, set pressure on the national governments to hinder them establishing effective legal instruments supporting reuse. In most cases the DG III tried, in some cases with success, to combat taxes, bans or compulsory deposits as a barrier to free trade.

- \* The Danish ban on one way packaging for carbonised drinks, was brought to EU-Court by the EU-Commission in 1999 against the competent position of the Legal Service of the EU-Commission. The EU-Packaging Directive even does not line out own instruments and an own policy for the support of reuse packaging, as it was requested by the European Court in 1986. In its decision 302/86 the EU-Court stated the Danish ban not as an unacceptable barrier to trade as long as the EU does not lay down own measurements.
- \* In the case against Germany the EU-Commission mainly sets focus on the live cycle assessment for each product range, packaging material and distribution distance (see letter SG (98)D/11547 of the 11.12.1998). Demanding a case by case analyse and justification will lead to a totally unacceptable scientific and bureaucratic burden which will make any legal law impossible. In the same time a justification of that extent for one-way packaging to proof conformity with the basic requirements of the Packaging Directive, is out of sight.
- \* The Finish tax on one way beverage containers was a further target. DG XXI started a written request (MVB/cr - IN/P/95/4696/rp2 of 10.1.1996) to the Finish government to justify the lower tax exemption for reuse packaging, while reuse packaging get a full exemption. The hierarchy of different processes is challenged. The request was launched at the same time the Finish industry and the ministry of industry hardly lobbied against the tax in Finland.
- \* The EFTA Surveillance Authority started a case (reasoned opinion) against Norway (Ref. No. GOO 844.400.001) because of the tax on one-way packaging. It also was started in a time when the national law was under discussion in Norway and industry needed support. The EFTA Surveillance Authority argued, that the exemption of reuse systems from the tax are a hinderance to trade as it gives a disadvantage to foreign companies to distribute in reuse packaging. After four years of quarrel, the EFTA Surveillance Authority closed down the case with letter from 7.6.1999.
- \* Two further interventions have been given to notice of the author by interview partners within the research, but written sources have not been given for publication.

In the first case, the EU Commission set pressure on the Portuguese government to withdraw the ban of one way beverage packaging for the HoReCa channel - with success. In the revised Portuguese law Portaria N° 29-B/98 of January 15<sup>th</sup> 1998, the ban is no more included.

When the Luxembourg government proposed in 1996 to introduce a packaging tax, EU Commission DG III sent a letter saying that the packaging taxes is a distortion to EU law. Following that letter, the packaging tax in Luxembourg was taken off the political agenda.

## 6.2 Legal instruments in EU member states policies - Description

Political instruments in the field of packaging can be addressed to three categories of economic players:

- producers
- filler / bottlers
- trade / retailers.

All of them are decision makers in a direct or indirect way as partners within the distribution chain.

- The packaging material producers and packaging producers primarily in the relevant beverage packaging market are highly concentrated in a very few big multinationals. They influence the reuse systems by fixing the price of packaging. Within that pricing, they can subsidise one-way packaging from the profits out of the sale of reuse packaging. This means selling one-way packed beverages for very low prices. They as well can hinder/destroy reuse packaging systems by hindering standardisation on several levels (see chapter 5.2). A third strategy is to lower the quality of potentially reusable packaging to the extent that this packaging causes damage in reuse systems (i.e. wine, preserve jars see report Germany and the Netherlands). Packaging producers do have the greater economic interest in producing one-way packaging since this guarantees a much higher production quantity.
- The fillers are a very heterogeneous group of companies ranging from very small to very big multinationals. The mix of the companies' sizes and consequently their distribution range is very different in the EU-member states. The bigger the companies are and the more centralised their production is, the greater too is their interest in one-way packaging. Running redistribution on long distances causes additional costs. A second reason is that only big highly rationalised fillers can get contracts with discounters.
- The trade and retailer's organisation structure is also very heterogeneous. Even so, decision making within the big retailers' organisations is highly centralised. In most of the EU-member states, more than 70% of retail sales are controlled by the top ten companies. Their main interest is to sell at the lowest cost which actually means using as little man power as possible. This means that the biggest interest for retailers is to prefer one-way packaging.

Many different aspects need to be considered if one is trying to steer that very complex interrelationship of market competitors so that they expand reuse packaging systems. Several economic and command and control instruments have been tested in the past. Many have succeeded, while others have not.

Actually there are in place:

### Economic instruments

- Direct taxation of one-way packaging and/or packaging material
- Reduced taxes on reuse beverage containers
- Compulsory deposit regulations on one-way packaging

- Setting ambitious recycling targets for one-way packaging
- Direct taxes on landfill

#### Command and control instruments

- Ban on certain or all one-way packaging for a certain group of products
- Making offers/listings of reuse packaging compulsory for retailers

In the following section, all charges, taxes, or other financial payments to the state are referred to as "taxes".

The success or failure of the instruments is often determined not by the instrument itself but by the detail of the regulations, the correct fixing of a punishment or excise level in comparison to the benefit which can be realised when not following the law. Another problem is the way in which an instrument is handled by public authorities in reality.

### 6.2.1 Economic instruments

One of the instruments referred to by name in the EU Packaging Directive to support reuse packaging are economic instruments see Article 15 (6.1). Two possibilities are presented: to raise prices for one-way packaging or to lower prices for reuse packaging. Both have the same effect, but lend reuse packaging systems an economic incentive in their competition with one-way packaging.

#### 6.2.1.1 Tax on packaging material by material and weight in Denmark.

In 1998 Denmark began with direct taxation of all packaging material (6.2). The basic idea is to tax packaging material in relation to its ecological influence and by quantity of packaging material brought into the market. The fixing of the tax level is based on LCA outcomes. The tax has to be paid by the filler of the packaging.

The new tax law is a follow up on the packaging tax on beverage containers (6.3) which is in force since 1978 (see Report Denmark).

The motive is to steer decision makers to use less packaging material for the same purpose and to change to packaging material with a better eco ballance outcome. The tax is actually the motor for many activities for reusing beverage containers. Whether or not it will have the same influence on other packaging markets, in which there are actually none or very little reuse packaging systems on the Danish market, can not be evaluated at this time.

#### 6.2.1.2 Reduced taxes on reuse beverage containers in Finland and Norway

There is an additional surplus tax for beverage containers which is based on high alcohol taxes in Finland and Norway. This tax is reduced for reuse packaging. In order to get that reduction, in Finland a set of requirements has to be fulfilled. These requirements are a prerequisite for permission by the government; in other words, it is a condition for the tax reduction.

In Norway, the tax is split into two parts. A basic tax on all new beverage packaging was brought onto the market which is fixed. Exemptions from this tax for reusable packaging

are bound to requirements (deposit system, minimum return rate etc.) which have to be met similar to these in Finland and Denmark. A second tax for all packaging reuse or one-way, is reduced corresponding to the quantity of retake (one-way and reuse) for recycling or reuse. When a level of 95% retake is reached, this tax is taken away.

#### **6.2.1.3 Compulsory deposit regulations on one-way packaging combined with a minimum quota on reuse packaging in FRGermany.**

The German packaging law set a minimum reuse quota of 72% for all primary packaging for all kind of beverages (6.4) except milk, for which it is 20%. This quota has to be fulfilled by „the fillers“ and is not assigned to one single filler or retailer. The quota is based on 1990 market figures.

As a punishment, in the case when the minimum quota not been achieved, all one-way beverage packaging has to be sold with a compulsory deposit of at least 0,24 ECU. The deposit has to be paid back to the customer when they bring back the emptied packaging. Retailers are free to use contract service companies to run the retake. For one-way packaging within the compulsory deposit scheme, the same recycling targets as were actually set in the German packaging ordinance for non beverage primary packagings (6.4) have to be met (50-75%).

#### **6.2.1.4 Indirect influences by setting ambitious recycling targets for one-way packaging (aluminium cans in Sweden) (high recycling targets in FRGermany).**

Since reuse packaging stands in direct competition to one-way packaging, the setting of high recycling targets within the scheme of a producer's responsibility supports reuse packaging`s position in the market.

As the first country in Europe, Sweden has established a law making retake deposit and recycling of one-way aluminium beverage cans compulsory (6.5). The level of retake/recycling was based on LCA and was added to a packaging tax, which was then withdrawn after Sweden joined the EU.

The 1991 German packaging ordinance (6.14) called, starting from 1995 for a 80% collection rate for all primary packaging and a retake of all transport packaging. 90% of the collected glass and metal packaging and 80% of the collected paper and plastic packaging had to be recycled. Therefor recycling target rate for primary packaging varied from 72 to 64% of the market input.

Both legislations were interested in making companies, bringing the packaging to the market, responsible to pay the costs for recycling of one-way packaging to a great extend. In Sweden the responsibility for reaching the targets is given to a small group of breweries. In FRGermany, it is given to each company (revision 1998) which can hire a service contractor to do the job for them.

#### **6.2.1.5 Taxes on landfill in U.K.**

Landfill prices are the basic external costs comparative to all advanced waste treatment activities. Even so, they are a minor comparable value to reuse packaging systems.

The U.K. has one of the cheapest landfill prices in Europe making recovery and especially reuse not profitable. The U.K. government in 1993 started to tax landfilling (2,5-12,3 ECU per ton in 1999). In comparison to the real costs for recycling and reuse, this basic tax may be a step in the right direction, but is far away from a real internalisation of the environmental costs of the packaging.

#### **6.2.1.6 Tax reductions on recycling in France**

French government reduced the VAT for recycling activities of municipalities to 5,5% (6.15). To support recycling activities along the targetlines of the EU-Packaging Directive, one strategy is to lower the taxes for services like collection and sorting of packaging waste.

This reduction of taxes stands in clear contradiction to the internalisation of external costs as it is a subsidy financed by the states budget. In the same time taxes for other waste treatments as well as for reuse systems is placed as a disadvantage compared to one-way packaging which ends up in municipalities recycling schemes. It is a reasonable hinderance to reuse packaging systems as these systems have to bear all costs of the services within the redistribution chain and reconditioning paying full VAT rates.

### **6.2.2 Command and control instruments**

Although not very popular in economic discussions, but very common in politics, command and control instruments try to set controllable frames for society and especially for industry and trade. In the field of packaging, command and control instruments are not many in number in the EU-member states.

#### **6.2.2.1 Ban on one-way packaging for carbonated beverages in Denmark**

Denmark started to ban one-way packaging for carbonated soft drinks from market in 1977 (6.3). Starting from that year on, only reuse packaging can be used for carbonated beverages. All other beverages can be sold in Denmark in one-way packaging; which is also done to a very wide extent.

The ban on one-way packaging just for carbonated beverages was argued for by comparing the greater environmental burden of cans and one-way glass bottles to reuse bottles. A certain exemption is accepted for imports. Reuse packaging systems which are granted permission by the government are open to foreign producers who want to export to Denmark under the same conditions as Danish pool members.

#### **6.2.2.2 Compulsory additive offers/listing of beverages in reuse packaging in Portugal**

In the Portuguese law Portaria No 29-B/98 (4.7), retailer organisations are obliged to offer beverages in reuse packaging whenever they sell one-way packed beverages of the same type. Retailers in that case have to run retake facilities with easy access for the customers. Information about the location of the retake facility of the shop have to be given at the shelf.

The idea of that law is to regulate the most important decision makers in the distribution chain, the retailers, and to give the private customers the chance to create market pressure.

### **6.2.2.3 Voluntary Agreements**

Agreements between industry and trade and the national governments are not taken into consideration in that study, when there are no legal actions or direct punishment that is fixed within the agreement or in an additional law.

## **6.3 Analysis and Discussion of legal instruments**

### **6.3.1 Instruments actually in use in EU-member states**

Reuse packaging systems have internalised all costs for the treatment of packaging after use. They are collected (retaken) in reality by the retailers to more than 95%, transported back to the filler who reconditions (cleans, repairs) the used packaging and brings them back into the market. Most of the environmental costs of all these activities are included in the price of the packed good / beverage sold in reuse packaging.

As opposed to that, the prices for one-way packaging only include the costs of packaging production and handling costs within the retail chain. All costs, which result out of the waste treatment of the used packaging are externalised and have to be paid by „the public“ via community fees on waste or taxes for cleaning up the environment.

There are two ways to internalise these actually external costs of waste treatment of one-way packaging: the direct or the indirect way.

The direct way is to fix taxes on one-way packaging which are then used by the public authorities to deal with the packaging waste problem. In that case, the waste treatment has to follow a high level of environmental protection corresponding to the known eco balances showing the amount of emissions and energy savings coming from the different waste treatment activities. The public interest of a sound environment than has to lead to the best available technology for waste treatment. These activities are under public control by democratic bodies.

The indirect way is to give the responsibility for solving the waste treatment of one-way packaging to „industry and trade“, who then would have to pay the costs for the activities (collection/retake, transport and waste treatment). Since the costs for waste treatment are very different compared to the environmental burden (reduction of enthalpy), the problem of this indirect way of internalising costs is to fix the technical targets which have to be met by industry and trade and to control if they are met.

#### **6.3.1.1 Taxes on packaging material or packaging**

Taxes on beverage packaging have been common in the Scandinavian states for many years. Their experiences are numerous because three different tax systems were realised, and the market has had up to 20 years to react on them.

In Finland taxes on packaging for carbonated soft drinks and alcohol beverages are fixed but differ within three categories:

- reuse packaging which does not have to pay the tax
- one-way packaging which is part of a recycling scheme
- one-way packaging which does not relate to a recycling scheme

In order to fulfil the first two conditions, fillers have to get the state's permission for reuse systems (see report Finland chapter 3), or have to join a nation-wide common recycling scheme. The demand for control and permission is not very large especially since there are not too many small and medium sized companies acting in that field in Finland. In relation to central European conditions, it would mean a higher demand in the work force for administrative work because there are a greater number of companies.

The Danish tax on beverage packaging is not restricted to carbonated beverages, it covers all beverage packaging, but differing by packaging material. The level of taxation in Denmark is about the same as the price of new packaging for glass and metal packaging. This doubling of the prices for beverage packaging has not only stabilised reuse systems which have been on the market since 1977 (alcoholic beverages, beer and soft drinks), but has also introduced an open loop reuse system for wine bottles. Even those retailers (discounters) who follow a very radical one-way packaging strategy in all of the other countries run reuse systems in Denmark just because of the price advantages.

In all of the other cases where reuse systems are gone (milk, juices) and the competing packaging (beverage cartons) has been taxed on a very low level, a restoration of the reuse systems has not been reached.

In Norway the taxation is split into two parts, a basic tax on one-way beverage packaging excluding milk packaging (which is about 100% beverage carton) and a second performance related tax. The second tax is reduced in relation to the performance of collection/retake rate, not differentiated whether the collected packaging is recycled or reused.

This second part of the tax gives incentives to optimise retake schemes and therefore to optimise the ecological balance of the packaging.

The performance based tax needs to be calculated annually and confirmed by the government. This demands a much more detailed control of business documents like it is necessary for recycling targets without a tax reduction benefit. Because there are only very few players in the beverage market in Norway, this is not a limiting burden to the tax system there. In other countries where there are some hundred companies to be taxed this is a much bigger job to do.

In conclusion, based on the experiences made in Scandinavia, the following statements can be made:

- Taxes can influence the decision on which packaging is used if they are on a reasonable level, which should not be less than the price for a new packaging of the same type. As a threshold value 0,2 ECU per litre packaging volume is the minimum (see as well Ewringmann (6.6 and 6.8)).
- Taxation should be as easy as possible so as not to cause too much administrative work in companies and governmental offices. Therefore taxation of packaging material/packaging at the state of the packaging producers should be preferred



instead of taxation on the level of filled packaging. Tax rates should be calculated on basis of very few factors like packaging volume or packaging weight and packaging material. Tax reductions shall be restricted on only one parameters like the recycling rate.

### **6.3.1.2 Compulsory deposit on one-way packaging**

The German law on compulsory deposits is formulated like a threat in the case that the reuse quotas remain under a fixed level. As this has been occurred for the first time in 1998, and there is a two year period of notice until the deposit regulation comes into force, it is really a theoretical estimation of what will happen. Some predictions are:

- Retailers then will have to decide if they want to run two separate retake/refund systems; reuse and one-way/recycling. For economical reasons it will be one of the two but not both simultaneously. The retake of one-way packaging can be externalised much more easily from retail business and logistics than retake and redistribution of reuse packaging can be. Packaging producers have offered very cheap general contracts to run retake and recycling systems for one way cans and PET-bottles since they will gain a huge new market. So the decision of the retailers will be of course for one-way packaging.
- The compulsory deposit will give the fillers a very large additional cash flow. Since packaging law calls for only 72% recycling, the intention of the retake companies will not be to exceed this level to a great extent. This means that retake facilities won't be organised that well so they do not get back too many of the beverage packagings especially from the convenience market like kiosks, petrol stations etc.
- The sales prices for beverages in one-way packaging will rise by 0,24 ECU which includes the deposit. Since the sales prices, particularly in the convenience market, are on the average 1 ECU per unit (0,33 or 0,5 litre can or glass bottle), the additional costs caused by the deposit will not hinder people to buy one-way packaging even if there is no alternative offer for reuse packaging in these places .

This reverse effect was stated by Ewringmann (6.6) in 1986 in a study for the German federal government. Even so, this instrument has been established in the German packaging ordinance.

- Deposits on packaging have to be paid for by the customer and therefore are not an economic incentive for decision makers in the filling companies or retailer companies.
- As long as the benefits coming from deposits which are not paid back (of packaging which have not been brought back to the retailer) lie with the retailer or a third contracted service companies, they have an antithetical effect not to take back empties for these decision makers. Based on a 80% retake rate and a deposit of 0,24 ECU per unite this causes a subsidy of 0,048 ECU. Plenty enough to finance the retake costs. To solve that problem, additional regulations are necessary such as they have been established in Swedish law by fixing minimum quotas for retake and recycling. These quotas then should be in a minimum of 90% to 95% relative to the type of packaging / packaging material involved.

#### **6.3.1.4 Internalising costs through recycling duties**

Using economic instruments means to influence decision makers in industry and trade who must follow the logic of costs minimisation. The process of internalising external costs can not be done only directly by taxes, but also indirectly by delegating costly duties to these decision makers. The apparent allure of an indirect internalisation of external costs is that:

- private businesses follow a lean cost principle which is stricter than public businesses,
- decision-making in industry and trade organisations reaches a higher acceptance within industry and trade and
- competence in industry makes recycling easier.

Experiences from self-organised dual systems which were actually run show some contrasting outcomes and additional problems caused by the non governmental status of the dual systems as they can not binding rules as a legal body can:

- The decision making in dual systems is not accepted by many companies. This is caused by the absence of a democratic composition of the dual systems, the lack of the right to control and the sanctioning of companies who do not cooperate. Both of these together leads to a large number of freeloaders and many different ways of using loop holes to avoid the rules set by the private body of industry and trade. There are no instruments of legal power for these organisations to get control of these internal problems.
- Dual systems are a result of companies who stand in open competition in the market. It is not the interest of all of them to do services like collection and recycling to minimise costs.
- Since the big packaging producers control the biggest share of primary raw material growth (i.e. forests), and raw material refining and production, they are hardly interested in recycling activities. They do have a very long-run interest in keeping primary raw material as feed stock.

Therefore, the indirect internalisation of the costs, through responsibility for the recovery of one-way packaging waste, needs two basic settings made by the government.

- The first is to set the level of environmental protection which is defined as the modal split (reuse, recycling, composting, incineration with energy recovery) for the environmentally most beneficial recovery activities at a reasonable cost.
- The second is to set alternative taxes which cover the costs for the waste treatment or additional recovery activities by the public for the rest of one-way packaging waste which is not recovered by the dual systems. If this second step is not done, it will only be a partial internalisation; which will still distort the competition between reuse and one-way packaging.

It is last the question of whether or not reuse systems recover 100% of their market input and therefore have to be made responsible for that deficiency in the same way like one-way packaging is.

The fixing of the modal split for the recovery duties (first part) is one of the most heavily battled problems within the packaging waste discussions. Three questions have to be resolved:

1. What is the environmental benefit of each of the different recovery methods and reuse?
2. What are the costs which can be seen as reasonable?
3. What is the state of the techniques available in each main recovery process?

All three of these questions have been mixed-up in the political discussion by the many different sides who were following their one individual interests. From a scientific point of view, all three of the questions have been dealt with in many studies in the last few years and reasonable strategies to solve these problems have been developed.

#### **6.3.1.4.1 What is the environmental benefit of each of the different recovery methods and reuse?**

The environmental benefit (reduction of emissions, reduction of energy use and material losses) of different recovery methods has been the focus of several studies. Various recovery techniques and systems therefore have been analysed and compared to each other.

One of the leading parameters for comparing the evaluations is the entropy caused by the different recovery processes. Entropy means the final use of the energy and the raw materials which is lost; in other words, which can not be used again in a physical way.

Starting with a used packaging, it is then the question how much energy is recovered (made available) in the recovery process for further use in the production of new goods. The energy contained in a used packaging is the sum of all of the energy contained in the packaging material which can partially be recovered when burning the packaging waste plus the energy which has been expended during all of the steps of the production of the packaging from the raw material to the ready-to-use packaging in industry.

The chief interest of all of the recovery processes (recycling, composting and incineration with energy recovery) is to optimise the recovery of energy and raw materials in order to minimise entropy. In other words, recovery is considered as advantageous as it can possibly be when it manages to bring back goods, materials, or energy to the production process at a very late stage of the production process to the biggest share possible.

The better the purity of a secondary raw material the easier/cheaper the production of new products out of it. I.E. brown corrugated card board paper when it is sorted as craft quality can be remanufactured to new corrugates paper of high quality. If the same paper is mixed up with low grade waste paper it can be used only for low grade grey board and when it is going to be wet in the recycling scheme and gets mouldy it can only be burned and gets lost as secondary raw material totally while all production energy used to produce craft fibres from wood (about 50% of overall energy consumption of that paper quality) is finally lost.

Then only the energy content of the paper fibres, (about 20%) of overall energy content can be recovered.

As a basic outcome of that comparison when, differentiating among the best available technologies for each type of recovery process, the following statements can be made (see as well chart in annex 6.1):

- The burning of packaging wastes all of the processed energy which was expended in the production process (with the exception of aluminium), derives only the lowest benefit with a calorific value in the form of heat, and causes the loss of raw materials.
- The reuse of packaging without any basic damage to the packaging itself brings the most beneficial outcome. The biggest share of high quality energy (process energy) is kept and can be used for further lifetimes of the packaging, in addition to the calorific value and the biggest share of materials.
- Recycling is positioned between these types of recovery processes. It's benefit varies to a wide extent depending on the type of material and it's grade of specification. Inert mono-material packaging like steel or aluminium cans are much easier to recycle than multi-material packaging containing different types of organic material.

#### **6.3.1.4.2 Which costs can be considered reasonable?**

When discussing the fixing of recovery targets in political discussions, a rough mix of high prices resulting from ambitious environmental waste treatment and alternative costs of cheapest dump sites are compared. If following the idea of an internalisation of costs, this does not make any sense.

Reasonable costs can only be evaluated from the processing costs which have to be realised in the processing of primary raw materials to that state when the secondary raw materials are brought in as an alternative ingot.

These costs can not be discerned from the actual pricing of the secondary raw materials since they are overlaid by several subsidies and shifted calculations. The prices for semi-finalised products, which are based on the primary raw material, are much more truthful. Even if the prices for primary raw materials are set at zero, the costs for obtaining and processing them have to be paid.

Depending on the current technique and the quality of the secondary raw materials, the following reasonable prices / costs can be calculated:

**Table 6.2: Comparing prices for primary material replaced by secondary raw material from discarded packaging**

Quality of secondary material	Primary material subsidised	price range in ECU/ton
<b>Glass</b> cullets from glass packaging	ingot mixture for glass melters	80-90
<b>Paper and board</b> mixed paper sorted paper de-inked sorted paper	wood pulp unbleached pulp (kraft) bleached pulp	110 250 350
<b>Aluminium</b> selective collected cans mixed alu foils	high tensile quality cast quality	2.500 - 3.000 800 - 1.000
<b>Steel / tin plate</b> residue free barrels shredded cans	rolling quality (warm band) cast quality	120-140 130 - 190
<b>Plastics</b> mixed plastics sorted plastics	wood / concrete moulding quality (PE/PP)	75 (volume based *) 180 - 300 (double demand **)

\* Mixed plastics do have a different specific weight than the subsidised concrete or wood have.

\*\* moulding qualities derived from sorted plastic waste do not have the same technical quality and therefor need a higher material demand for the same use.

#### 6.3.1.4.3 What is the current technique available for recovery?

All packaging recovery is contained in the steps retake/collection, sorting, and refining/reprocessing. The current technique for retake/collection is:

- retake by retake machines or personal retake at a counter. It brings high quality material which needs very little sorting afterwards. It is used for metals and plastics, where specifications of material vary very much and would downgrade rapidly by any kind of mixing. For these materials, the sorting after a mixed collection is not adequate.
- collection at the curbside collection or in containers (bottle banks). The quality can only be influenced to a lesser extent by technical means. The sorting of the collected material is needed in any case; but the possibility also exists for the separation of high quality grade material out of the „mix“. This is mainly being done to mass material like paper and board, or glass and steel packaging.
- in some cases, mixed packaging is collected at the curbside. The mix of packaging is limited to high grade material (plastics, aluminium, multi layer materials like beverage cartons) which can be separated afterwards by hand and to a certain extent by technical means.

The current technique for the sorting of separately collected packaging is to treat it before a secondary raw material goes into the highly specialised reprocessing. The outcome of the sorting comply with the trading lists used in each branch.

The current technique for the sorting of separately collected packaging is:

- Separation done by hand in the form of positive picking, where packaging qualities are picked out of the collected material and which is accepted in a typical trade quality. In some cases, hand picking is also done by using a negative picking of non-acceptable items out of the widely homogenous mass streams, which could not be detected otherwise by machines (paper, glass).
- A variety of technical picking/sorting machines which go by the physical characteristics of the packaging materials, such as:
  - gravity in water solutions (different types of plastic)
  - electrostatic features (different types of plastic)
  - magnetism (ferro-metals and Aluminium)

All of these technical separation facilities can only be used for materials which have been preconditioned (cleaned, washed, shredded, sized) and hence, they must go through a complex sorting plant. Most of these plants are used for plastics. Their target is to „produce“ qualities which are more upgraded. Secondary raw material trading lists are under rapid development in that material range in contrast to the „old“ secondary raw material's such as paper, glass, wood and metals.

The reprocessing of secondary raw materials are modified processes, often very similar to the processing of primary raw materials. In the case where pre-sorting has been done sufficiently (trade list qualities), the processing of secondary raw materials does not have any disadvantage in relation to primary raw materials.

In the case of highly modified/specified materials like plastics, the separation and reprocessing is much more difficult and just at the beginning of it's technical development.

The reprocessing of plastics is not a technical problem as long as separation and purification reaches a level of high quality. This is only the case with big-size plastic packaging (crates, shrink films, buckets and casks) of well known quality.

All of the qualities which are separated out of a mixture of unknown plastic packaging can still cause certain technical problems which then result in a massive downgrading of the material.

This means that recycling targets have to be set to the level where the costs for the collection and the sorting of the secondary raw materials reaches the break-even point of the costs of an ingot derived from primary raw materials (see Table 6.2 in Annex).

Glass collection and separating which is worth 80-90 ECU/ton in central Europe can reach a density of bottle banks (contains per 1000 /inhabitants) well enough to collect 60-70% of glass packaging waste (6.9).

The collection and separation of tertiary packaging (unbleached paper from corrugated boxes) at a cost of 250 ECU/ton can gain a recycling share of 70-80% of the corrugated packaging market input.

For small scale bleached paper and grey board packaging (mixed waste paper), the related cost of 110 ECU/ton would pay a collection/separation share of 20-40% of the market input.

Unique aluminium alloys of high tensile quality which are worth 2.500-3.000 ECU can be collected and separated at an extent of 95% of market input (see Sweden).

Mixed aluminium films, which are primarily a part of paper and plastic packaging, can be collected and separated only to a very small extent, even at a price of 800 ECU, the rate would not be more than 10-15%.

Steel packaging, mainly in the form of tertiary packaging, can be collected and separated for 120 ECU to a share of 80-90%.

Small scale tin cans, worth around 150 ECU per ton, can be collected to a share of 60-80%.

Mixed plastics are the most expensive of the collection schemes and at the same time, the material which is worth the least. If mixed plastics packaging is collected along with all of the plastic waste coming from private households and small businesses, the collection rate is around 40-50% (6.11) and pays 75 ECU. If small packaging and flexible food packaging is left out of the collection, the upgrading by sorting will achieve available benefits of about 150 - 200 ECU per ton.

Big volume tertiary packaging from retailers (unpacking professions) can be collected separately, and separated for 180 - 300 ECU per ton to the extent of about 50-60 % of the market input.

As the conditions which were described show, the indirect internalisation of external costs through the setting of recovery duties to industry and trade is a complex act including different evaluations. The whole product/waste stream has to be observed and controlled at many stages starting from collection to the final use of the secondary raw material in the production. Consequently, there are a lot of loopholes which could cause laws to be avoided. Not only is the fixing of the targets difficult and expensive in handling but the control of fulfilment is as well. In addition to these technical/legislative aspects, it should be kept in mind that it will always be only a partial instrument, because 100% of the external costs can never be internalised. Even if there is a decision to control a share of 90-

95% of the costs as it is done in reuse packaging systems, there will still be a gap between the instruments approach and that quota. Even in that case, an additional direct internalisation instrument (tax) has to be used to get adequate conditions without impeding the market impediment for reuse packaging.

#### **6.3.1.5 Internalising costs via taxes on waste treatment**

Using an indirect internalisation of the external costs on one-way packaging by pushing up the standards for municipal waste treatment is a very common practice in Europe. It has reached a certain effect in many of the countries where recycling activities can be evened out to a large extent by using the savings from the waste treatment fees. In countries where these standards do not exist in a legal framework or are not made evident in real life, this internalisation does not exist. One reaction to that situation was that the United Kingdom started to introduce a tax on land filling in 1992.

This tax does have the advantage that it is a very fast instrument which doesn't need a lengthy preliminary time like standards do. Usually, standards need many years to build up costly technical facilities before they can even generate any economic effect.

As a land fill tax does not cover other types of waste treatment like incineration or dumping into the sea, it is only a partial instrument; leading in the worst case scenario to a transfer to other waste treatment, but not to a true internalisation of the external costs.

Another problem is how the level of the tax should be fixed in order to get a fair internalisation. This should be followed according to the same aspects discussed under chapter 6.3.1.4. The actual land fill tax in the United Kingdom is far-removed from that.

#### **6.3.1.6 Bans on environmentally disadvantageous one-way packaging**

As a command and control instrument, bans are usual in the field of politics where actual danger to human life and/or environment has been stated. A ban is a very strict intervention into the principles of the free market, and therefore can cause compensation when it is not justified. The justification for bans is a good basis for scientists to earn money and normally leads to a big struggle with the controlling owners of the market shares.

Even so, it is an instrument which is accepted by the European Court of Justice, as long as an evaluation of the grounds for the ban has been done.

The disadvantages of this instrument are:

- it is rarely accepted by the regulated industries/trade and therefore under permanent debate
- it can only be used for parts of the regulation field where the justification is clear
- it has a very low level of flexibility (in regards to exemptions). Actual technical developments can only be integrated by changing the list of exemptions.

The advantages of bans are:

- a minimum of bureaucracy for control and handling
- a very fast transition
- high efficiency of the legal instrument, because avoidance can be controlled and punished very easily.

In a state where alternatives in the market still exist, the costs for industry and trade to change to the not banned packaging system which is not banned is small; in comparison to



the losses caused by parallel systems, each of which may have been struggling with inefficiencies for a long time.

### **6.3.1.7 Compulsory offers of reuse packaging**

A second command and control instrument is to set positive commands. One of the instruments discussed the most is to enforce retailers to offer beverages in reuse packaging as an alternative to one-way packed beverages. Retailers are the most powerful and determined players in the distribution chain. They are the ones who put pressure on reuse packaging and push producers to deliver one-way packed beverages.

There has been only one country which has used that instrument in its national law up until now and that has been which is Portugal. The experiences of that law show that:

- Retailers, especially discounters, counteract the law by merely following it symbolically and systematically distorting it by:
  - setting deterrent prices (up to 4 times higher than one-way packed beverages of the same quality and size).
  - making deterrent offerings using (dirty packaging and placing them at very unfavourable places)
  - offering only big volume packaging which hinders the convenience market
  - offering only a symbolic range of products (one type of juices while more than 10 types are in one-way packaging)
  - organising of retake as inconvenient as possible for the customer
- The cost for the control of the ban and the punishment at any offenders is very high and is therefore done only seldom.
- The penalty are not high enough to cause an internalisation of the costs in relation to the benefits the retailers have by not selling with reuse packaging. In that situation then, the penalties are out of any economic relevance for the retailer companies.
- Retailers, in some cases, misconstrue the environmental interest / idea of the reuse system by offering European brands in reuse packaging; for example, the discounter Lidl sells German beer from Dortmund in individual crates and bottles in Lisbon which then have to go back the same way for a distance of more than 3.000 km.

If a ruling, is to have a real influence on the market, it must solve the various loopholes and uncertainties outlined above. Therefore, it needs voluminous regulations and a much bigger control system behind it. This is in most cases impossible.

The result is that this kind of instrument will never be a single instrument which stands by itself. It can only be an additional instrument which when added to other economic instruments can guarantee the existence of an infrastructure which gives the customers the choice to change their behaviour. This is actually no longer given in the ever growing discounter branch.

### **6.3.1.8 Compulsory labelling of one-way and reuse packaging**

The marking of one-way packaging and reuse packaging is guided by the idea of creating a consumer decision (to buy or not to buy) and represents a pressure instrument for retailers

and fillers. Labelling as a means of separating packaging within the redistribution chain in order to sort reusable from non-reusable packaging is very restricted, because sorting goes by visual control of the bottles shapes or by electronic codes like EAN-codes not readable for customers.

The decision to buy a competitive product by a customer is normally done as a spontaneous act right in front of the retailer's shelf. Marking has to fulfil certain requirements if it is to have any influence in that decision-making process. The labelling must be:

- easy to understand (symbolic quality),
- must be well-known to be detected as such (public relations in The background) and
- big enough in relation to other information on the packaging to be visible for the customer.

In addition to these requirements, customers must have an adequate choice which depends greatly on the behaviour of the retailers (see chapter 6.3.1.7).

The Belgium law concerning eco taxes on beverage packaging includes a compulsory marking which is a requirement for access onto the market for some beverage packagings. The symbolic quality of the symbol is easy to understand and clear contrary to the one-way symbol. The publicity for it is limited so that is hardly known/recognised in Belgium. An additional weakness of the law is that a minimum size for the symbol in relation to the other printed information on the packaging has not been guaranteed. Some of the markings can barely be discerned without using a magnifying glass.

If there is a real economic interest for producers/retailers to run reuse systems, then unified markings are a big help when running public relations; especially in open loop reuse systems where packaging is sold over long distances and ends up in foreign markets which can not be reached by the public relations of the producer to an adequate extent (i.e. wine bottles).

## **6.4 Other legal instruments actually not used in EU-member states` packaging laws**

### **6.4.1 Permits**

Permits are instruments which in the past have been used especially in the field of air emissions by big scale power plants in Japan and the USA. Permits are specific kinds of taxes for the environmental damage which is caused by industrial action. The most frequently discussed charm of that kind of tax is the market dynamic which may be initiated by lowering the total quantity of permits rising the prices for environmental damage and give a price advantage for costly but environmentally beneficial alternatives.

The basic conditions for using that instrument are:

1. the total quantity of the permits has to be fixed, based on political decisions resulting from the idea of environmental protection. This fixing has to be:
  - in relation to the overall industrial production / consumption and
  - in relation to a certain area

2. the correct use of the permits has to be controlled by the government.

3. the primary emission of the permits has to be done in a controlled and balanced way. The trading of permits at the stock exchanges has to be regulated.

Ad 1.:

The fixing of the maximum quantity of permits and their re-fixing under altered economic conditions (market growth) is the same process as is necessary when fixing the recovery targets of indirect economic instruments (see chapter 6.3.1.4).

One additional problem for the consumption-based fixing of recycling targets over a wide range of products and types of packaging is that the permission has to be fixed for single products of a certain closed area.

Ad 2.:

Products produced under permits have to be controlled from the production plant over the various steps of trade and distribution all the way up to the retailer store where it is sold to the customer.

In any case, the permit is not a tradable good which is controllable on the market, but a license to produce goods. Nobody can recognise by the product itself in the market if it is belonging to a permission or not. The connection between the permits and the product is only possible by a detailed control of the bookkeeping. For low price, mass products like beverages, this is absolutely impossible because imports from other member states are not under governmental control.

This is the most obvious difference in comparison to the big power plants, where control is fixed to a small number of locations and can be done by technical means relatively easily.

Ad 3.:

When introducing permits into an existent market, every kind of emission of the permits can cause big problems. In economics, different models are discussed (6.10). The main questions are who gets the chance to buy the permits first and at which price. Those who are still harming the environment with their industrial actions (i.e. selling one-way packaging) or those as well who actually are not (i.e. those who run reuse packaging systems). If the emission of permits is done by auctions, which is probably the fairest procedure, the permits will be bought to a large extent by the producers of one-way packaging to hedge their own production. The whole instrument then will lose its dynamics because they will never sell those permits to non-users. The instrument then would be reduced to a packaging tax on a minimum level steered by the power of the packaging multi nationals.

Even if permits were issued differently, such as through the „grandfathering“ (giving permissions to the actual polluters), or fix price emissions or by some other means, the same type of problems would materialise.

In conclusion, it can be stated:

- The need for additional bureaucracy (emission, price fixing, exemptions) is immense.
- The control of industry and trade is needed, but this clearly contradicts the EU-policy, because the products produced under permits are low price, mass products which circulate freely in EU-market.

- The fixing of the permit's quantity does not replace the political decision making which is the same for direct or indirect economic instruments.
- The effects of the instrument (stock exchange) can be reduced by multi nationals very easily.

#### **6.4.2 Standardisation of reusable packaging**

Reusable packaging has to go back from the customer to the filler to be refilled. The redistribution of reuse packaging has to be minimised for environmental and economic reasons. A second factor contributing to the costs is the separation and stock keeping of different reuse packaging in the redistribution chain.

The only solution to minimise these costs for redistribution is standardisation. Using the same common type of packaging is the key to every good working reuse system. Standardisation can be done through different processes with different restrictions and duties for the user of the standard (see chapter 5.2.1). Public standards, which can be pushed forward directly by the New Approach procedure, can be considered one such political tool. Another one is the legal support for private standards; such as with the pool organisations which are contracted on the basis of private standards (see chapter 5.2.2).

Standards for open loop systems Type D and Type F (see chapter 2.1.4 and 2.1.6) have an even bigger influence. The reuse of technically reusable packaging, which actually is used as one-way packaging, can be supported by standardisation to a very big extent. Such standardisation can hardly be agreed upon within the group of fillers, since they are just too numerous and not in direct connection with wholesalers and retailers. Contracts are very difficult to assemble in this situation. CEN, „the“ European standards organisation should normally have the obligation to do that standardisation.

In the case of reusable primary packaging it has failed totally. No such CEN standards are available (see chapter 5.2.4).

### **6.5 Political instruments used in EU-Packaging Directive 94/62/EC concerning reuse packaging**

The EU-Packaging Directive EC 94/62 was worked out during four years of difficult political struggle. Direct political instruments are indeed few in number, because the differences between several EU-member states concerning packaging policies are immense. Additionally this directive is one of the EU-directives which was lobbied the most. Lobbying groups spent huge amounts to get the weakest directive and one with an indefinite legal basis.

Concerning reuse packaging, the following conditions can be found in the directive:

Article 1 (2) - reuse listed as one principle following waste prevention

Article 3 (5) - a vague definition of what reuse is

Article 4(1) - „preventive measures“ are promoted

Article 5 - the possibility to encourage reuse systems

These very vague recommendations are missing any direct political instrument to support reuse packaging. Targets for reuse, similar to those for recycling and incineration with energy recovery, were discussed in those four years, but failed.

The only direct instrument to promote reuse, the establishment of a common reuse labelling, has been taken off as well.

Only one indirect political instrument concerning reuse has been implemented in the form of recycling targets as described in chapter 6.3.1.4. The minimum targets set for recycling and incineration „with energy recovery“, cover under the best circumstances, 65% of the waste stream, which results from one-way packaging. The recycling targets are 25 to 45% all total, and cover all types of packaging (primary, secondary and tertiary) and all packaging materials. It can be lowered to 15% for certain packaging materials.

These targets are smaller than the average status quo of packaging recycling within the EU. For this reason, they can only be seen as a first step to harmonise the regulations on recycling in the EU, but not as an attempt to use recycling targets as an indirect instrument to internalise the external costs of one-way packaging. For more, the discussion in chapter 6.1.3.4.

The internalisation effect is lowered on the one hand by the spans for recycling quota and the long time schedules in the EU-directive and on the other hand the very slow transition into national law using the minimum level for recycling in some countries. Furthermore, the less precise definitions of recycling create loopholes („recycling“ of plastics in steel ovens or burning of aluminium in steel melters) and lower the internalisation effect, too. The CEN standards for recycling processes which are requested for through the New Approach mandate 200, should strengthen this weakness in the definition (6.13).

The only step forward, if not blocked again, is the CEN Standard EN 13429 on reuse packaging systems. It will bring a certain clarification to the definition of reuse packaging. Quantitative settings, especially the minimum number of trips that a reuse packaging system has to have completed, is not included in the standard.

The EU-Packaging Directive 94/62/EC is not a way to stabilise or support reuse packaging. Even reuse packaging (at it's most effective state) fulfils the fundamental objectives of the „producers responsibility“ and „sustainability“.

## **6.6 Practical suggestions**

Based on the non regulation of reuse packaging in the EU-Packaging Directive, any suggestion which is made must answer the question, if there is any interest in supporting reuse or not.

As the report shows, in more than 50% of the beverage markets in Europe, reuse packaging is in place, functioning well and bringing a high economic and environmental benefit. In those countries where reuse packaging systems only have a remaining function for a few beverages or distribution channels, a rebuild of the reuse packaging systems will need to be defended by a long term policy. In any case, support for existing and future reuse packaging systems must be the objective of EU policy as, like all analyses show, well

organised reuse packaging systems bring the highest environmentally and economic benefit for society.

The second question to be answered is the decision in regards to economic and/or command and control instruments. The answer is absolutely clear - both are necessary. As long as a full internalisation of the external costs is not reached, additional command and control instruments have to be used additionally so that there is not an unfair distortion of competition and an unsustainable shift of the burden to the environment.

The third question is: how much self control and self regulation is possible in industry and trade? Are industry and trade organisation's structures able to make decisions to the extent as requested in the mandate (to make standards) in the EU-Packaging Directive, or are there limits of efficiency and self control?

This basic fundamental question will only be looked at from two aspects; the standardisation of reuse packaging and the setting of minimum restrictions in reuse packaging systems.

The EU-Packaging Directive 94/62/EC can be seen as one first step to change from command and control instruments to economic instruments in the EU-packaging policy. The indirect internalisation by setting recycling targets is the beginning of the transition of that strategy. In Article 15 the legislator even agreed on the future improvement of that policy with the intention to develop and adopt further economic instruments on community level. This did not happen until now, but will be the duty of the revision of the Directive 94/62/EC.

The discussion can not step back to the question of command and control versus economic instruments but has to develop a mix of political instruments making that policy change possible. The focus has to be set on all three parts of the instrument mix equally:

- \* indirect internalisation via recycling duties,
- \* direct internalisation and
- \* command and control instruments for a interim time where the internalisation has not been transposed or danger to health and environment has to be ward off.

The following practical suggestions therefor will not be restricted to the direct instruments related to reuse packaging but to the indirect instruments for internalisation via recycling. Four steps of analysis and proposal will be necessary.

In a first step, the status quo of technically possible and economically acceptable recycling systems has to be described and analysed and maximum target quotas have to be derived.

In a second step the necessary modifications (increase or reduction) of the legal recycling targets will be proposed.

In a third step the gap between indirect internalisation and full internalisation will be ascertained and a proposal for direct internalisation for that open gap will be proposed.

Last not least assisting command and control measures are proposed which may support the instruments of indirect internalisation where community interest can not be dealt within the framework of industry and trades self regulation.

#### 6.6.1.1 Indirect internalisation via recycling targets

Following the example of indirect internalisation, there are many deficits which have to be optimised to proceed as a first step to the real internalisation of waste related costs.

Therefore, three main aspects have to be integrated :

1. Recycling targets have to be fixed separately for primary and tertiary packaging.
2. Recycling targets have to be fixed for different packaging material related to the technical ability and cost (see chapter 6.3.1.4).
3. The definition of recycling has to be clarified in such a way so that the burning of plastics and aluminium is unacceptable as a form of recycling.

The following recycling targets can possibly be reached with the actual state of technique and therefore should be implemented in the EU-Packaging Directive:

**Table 6.3: Proposed recycling targets for the revision on EU-Packaging Directive**

<b>Primary packaging including sec. packaging</b>	<b>5 years</b>	<b>10 years</b>
Glass	60%	70%
Paper and board	20%	40%
Aluminium cans	70%	90%
Aluminium films	10%	20%
Steel	60%	80%
Plastics rigid	10%	20%
Plastic flexible	5%	10%
<b>Tertiary packaging</b>	<b>5 years</b>	<b>10 years</b>
Paper and board	70%	80%
Steel	80%	90%
Plastics	40%	50%
Wood	50%	90%

Tertiary packaging which ends up in private households shall no longer become primary packaging (they are upgraded by sorting).

The proposed recycling targets are not a problem for reaching the current state of technique and collection systems tested in Europe.

The idea to set mixed, overall recycling targets and to leave the split of the costs be decided by the self-organised dual systems failed in most cases. In fact, on the contrary, either the

recycling was focused more or less on the tertiary packaging and left primary packaging out of the internalisation, or when targets had been set especially for primary packaging, the differentiation on „recyclable“ and „non recyclable“ packaging was unable to be decided. Therefore, it would be very expensive and not environmentally beneficial; meaning collection and sorting has been installed which ends up in industrial co-incineration.

The wide variety of recycling targets leaves a very different amount and composition of one-way packaging waste left over to the duty/budget of the public authorities. To get a real and balanced internalisation and therefore fair conditions for all market participants, the rest of the costs have to be internalised directly via taxes. At any rate, the indirect instrument will never be able to do a full internalisation, since many one-way packagings can not be recycled at all after use.

#### **6.6.1.2 Taxes on new packaging**

The actual situation which has developed within the last 20 years shows two aspects concerning reuse packaging.

One-way packaging has been supported by accepting an externalisation of costs to a big extent. These conditions have been used by retailers to build up and to stabilise a distribution and sales system strictly based on one-way packaging (see chapter 5.3). These retail systems, aside from any responsibility for packaging waste handling, are a clear barrier to trade for all producers using reuse packaging. This infringement against free trade can not be changed only by the internalisation of external costs. Market power, especially the discounters, is a big major initial hurdle which needs to have additional incentives for reuse systems.

To get a full internalisation and an initial boost to rebalance the chances of reuse systems in retailers' structures, two types of taxes are proposed:

1. A basic tax (internalisation) in addition/relation to the recycling targets
2. A balancing tax on all one-way packaging (beverages) where reuse packaging are available



### 6.6.1.2.1 Basic tax

The basic tax shall be charged on the producer's/importer's level. It shall be charged for all packaging groups differentiated like the recycling targets (see Table 6.4). The tax shall be reduced related to the recycling outcome.

**Table 6.4: Proposed tax rates for the revision on EU-Packaging Directive**

<b>Primary packaging including sec. packaging</b>	<b>full tax in ECU</b>	<b>tax rate based on recycling targets/outcome in ECU</b>
Glass	0,40	0,16
Paper and board	1,60	1,28
Aluminium cans	6,00	1,80
Aluminium films	6,00	5,40
Steel	1,40	0,56
Plastics rigid	2,00	1,80
Plastic flexible	2,80	2,66
<b>Tertiary packaging</b>		
Paper and board	1,20	0,36
Steel	1,40	0,28
Plastics	2,00	1,20
Wood	0,60	0,30

### 6.6.1.2.2 Balancing tax on all one-way packaging

For all one-way beverage packaging, an additional tax to the basic tax should be charged. The tax should be charged by the retailers.

The tax rate should be 0,2 ECU per litre packaging volume.

The tax rate is related to the costs for retake (see chapter 5.4)

## 6.6.2 Keeping command and control

Full internalisation (90%) of external costs for one-way packaging will take more than 10 years in the best case scenario. As reuse packaging systems are under massive pressure by retailers and packaging producers, economic instruments will arrive too late.

To rebuild once destroyed reuse systems which were once destroyed, there has to be enormous starting investments. Therefore the most important economic interests are to keep existing reuse systems and to modernise them.

To speed up the effect of economic instruments, it is also necessary to keep command and control instruments at the same time. As internalisation moves ahead, the command and control instruments can be reduced step-by-step.

Compulsory offers in respect to retailer's duties or rules to use reuse packaging are therefore to be accepted (see as well decision of European Court of Justice of August 1988). By implementing such command and control instruments, the discussed problems (see chapter 6.2.2.1 and 6.2.2.2) shall be taken into account.

### **6.6.3 Support by technical means**

Reuse packaging systems are slow in their progress because they, on the one hand, use packaging over many years, and on the other hand, are coupled to complex organisation structures which have to follow democratic structures.

It is the question, if and how national governments and the EU-Commission can support reuse systems by technical means. Three aspects can be useful in supporting reuse packaging:

1. The qualification of „reuse“
2. Standardisation of reuse primary packaging in the field of wine bottles
3. The establishment of a common voluntary marking system exclusively for reuse

#### **6.6.3.1 Qualification of reuse**

Following Mandate 200, the EU Commission initialised a CEN-standard setting basic requirements for reuse packaging systems. This standard in its actual version (public enquiry) does not include a minimum number of rotations (average number of fillings per packaging lifetime). CEN was not able to fix such figures because of conflicting interests within the industries concerned.

The current situation is that some Scandinavian member states do have such regulations through a licensing procedure for reuse systems.

When using economic instruments and/or command and control instruments concerning reuse packaging, it is necessary to clarify this aspect. It should be possible to do that in Art. 21 committee procedure.

#### **6.6.3.2 Supporting Standardisation**

In the field of wine packaging, which is traded over long distances, the standardisation of a set of reusable glass bottles is a big help for collection and reconditioning. The standardisation in that extremely scattered market can not be done by an organised pool of fillers as it is done in other industries.

A harmonisation of existing national standards with an outcome of about 10 EU-Standard bottles should be the goal.

These bottles do not have to be constructed completely from scratch. Based on existing standards, three aspects have to be harmonised:

- the basic measures / tolerances
- the finishes
- the colours of the glass

The long lasting quarrels in TC 261 SC2 show that the chances to get such standards from CEN have been neglected (see chapter 5.2.5). On account of the fact that this organisation is highly dominated by the packaging producers, there is really no chance for progress in that procedure.

One solution out of this blockade of the decision on standards, which does not require so much a technical development, but needs a political decision should be done in Article 21 Committee Procedure on the proposal of a technical advisory board.

### 6.6.3.2 Marking

Marking of reuse packaging is organised in most closed loop systems sufficiently. For open loop systems it is weakness, which in some cases causes problems at retake and separation of the reusable packaging. Marking should be voluntary.

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- (6.15) French annual tax law 1999, Article 31 of March 4<sup>th</sup>, 1999

<b>Special terms</b>
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**discounter** Certain type of retail system with the following characteristics:

- restricted number of goods listed (500-600)
- distribution only by retailer, direct buying at producers
- Very poor furniture in outlets - no/little cooling equipment, selling out of transport packaging, off pallets
- No price labels on the good itself
- No reuse packaging listed
- No/very few full time employees (restricted jobs)
- Very price-aggressive selling

**convenience market** All kinds of consumption of food and drink; not at home, but just consumed on the way/fast food.

**listing** The process of taking a product into the order list / assortment of a retailer organisation by contracting (conditions, prices etc.) with the producer. Other goods than those listed, can not be sold by the shopkeepers.

**local / regional / national / European**

Within the description and discussion of distribution areas and transport ranges for goods, expressions like local / regional / national / European and International are used. As there is no common definition for these expressions, each party within the discussion should define his or her own understanding. For example, multi national companies like Coca Cola define their regional distribution in terms such as Europe and Middle East, while economic geography defines region as an area which stays in a daily logistical exchange of goods and people; for example, the area from which people drive back and forth to work each day.

To describe and discuss the distribution of packed goods in the interrelationship between reuse and one-way packaging, it is necessary to clarify those expressions for common understanding.

For use in this study; an average transport distance in km from a production/filling plant to a retailer outlet is defined as follows:

local distribution	up to 50 km
regional distribution	50 to 100 km
national distribution	100 to 500 km
European distribution	> 500 km

**pool** organisation of different companies or legal bodies using a range of standardised packaging based on a contract keeping special rights within the pool society.

**Twist off** closure for wide mouth finishes with throat sizes 25. to 100. mm

<b>Exchange rates for national currencies to ECU</b>
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Belgie	BEF	39,30
Denmark	DKR	7,36
BR Germany	DM	1,91
Spain	PTA	160,75
France	FF	6,49
Greece	DRA	305,55
Ireland	IRL	0,79
Italy	LIT	1958,96
Luxembourg	BLF	39,30
Nederland	HFL	2,14
Austria	ÖS	13,43
Portugal	ESC	195,76
Finland	FMK	5,83
Sweden	SKR	8,51
United Kingdom	UKL	0,81

All prices in the study, as not remarked different, are based on information dated 1998. The conversion of ECU, the European Currency Unit, to/from national currencies has been done on basis of the ECU equivalency of 1998.

The actual EURO exchange rates, relevant since 1999, in some cases vary a little bit from the 1998 ECU rates. The ECU has been kept for the study for a full comparability, as not all EU-Member States have joined the EURO system.

<b>Abbreviations</b>
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A	Austria
AB	Swedish company structure
AC	Apellation Contrôlée, wine of destined origin, (French quality wine)
ADELFE	French Company running glass collection schemes
AFNOR	French standards organisation
ALDI	German retailer/discount company
ALKO	Finnish alcohol retailer company
AMG	Arbeitsgemeinschaft Moderne Getränkeverpackung, pool organisation of German soft drinks producers
ANIRSF	Portuguese association for recycling of packaging
AOC	Apellation Origine Contrôlée, wine of destined origin, (Italian quality wine)
A-Pullo	Finnish wine bottles reconditioning company
Article Committee	21 Committee based on Article 21 of the EU-Packaging directive 94/62/EEC, intergovernmental committee for packaging related issues
Ass.	Association
B	Belgium
BBM	Bond Beter Leefmilieu, Belgium environmental organisation
BEF	Belgium Francs, currency
BGBI.	Bundesgesetzblatt, Governments Official Bulletin
Billion	thousand Millions 1.000.000.000
BLF	Belgium and Luxembourg Francs, currency
BML	German ministry of Agriculture
BMZ	Austrian Ministry
BS	British standard
BSI	British standards institute
BVL	Bottle type (french)
CAGERE	Portuguese committee for packaging at the national ministry of environment
CBMC	European brewers Association
CC	Crown cork, one way cap for bottles
CEMA	Company name, German diary
CEN	European standards organisation
CFP	Caise France plastic, former French bottle crate pool
cl	centilitre, a hundredths part of one litre
Co.	Compagnion, Company structure
Co.Re.Ve	Italian association for recycling of glass
CO <sub>2</sub>	Carbon dioxide
COMEX	European data bank of external trade
D	Germany
D.E.T.R	Department of the Environment, Transport and the Regions, British ministry
DIN	German standards institute
DIY	British retailer company
Dk	Denmark
DKR	Danish Crowns, currency

dl	decilitre, one tenth of a litre
DM	German Marks
DRA	Greece drachmen, currency
DS	Danish standards organisation
DS	Danish standard and Danish standards institute standards institute
dww	German wine growers association
E	Spain
e.g.	
EAN-Code	code to identify goods, automatically readable
EC	European Community
eco	environmental
ECU	European currency
EEC	European Economic Community
EN	European standard
EPA	Environmental Protection Agency
ESC	Portuguese Escudos, currency
etc.	et cetera
EU	European Union
EU-15	the 15 member states of the European Union
EU-Court	European court of justice, Luxembourg
EURO beer bottle	ISO standard beer bottle
EUROSTAT	European Office of Statistics
EUWID	News letter on packaging issues
F	France
F.I.P.E	Federazione Italiana Pubblici Esercizi
FDB	Danish retailer organisation
FEDIS	Belgium branch organisation
FEVE	European glass manufacturers association
ff	the following pages (more than two)
FF	French Francs, currency
FIN	Finland
flat	not carbonised, not containing CO <sub>2</sub>
FMK	Finnish Mark, currency
FREYA	Companies name
FR-Germany	Federal Republic of Germany
GATT	World free trade contract
GDB	Genossenschaft Deutscher Brunnen, pool organisation of German mineral water producers
Gisem/Unesem	European mineral water producers association
GmbH	Company with restricted liability
GR	Greece
GVM	German statistical consultants
H.M.	Her Majesties
HACCP	Concept for production control on hygiene
HDPE	High Density Polyethylen, plastic material
HFL	Dutch Gulden, currency
hl	hecto litres, hundred litres



HoReCa	Hotel, Restaurants and Catering
http/www	internet address
I	Italy
i.A.	in Annex
IBC	Intermediate Bulk Container, small containers, packaging up to 5 m3 volume
INR	Instituto dos Residuos , Portuguese department of ministry
intra-EU	internal trade within the European Union
IPQ	Portuguese standards institute
IRE	Ireland
IRL	Irish Pounds, currency
ISO	International Standards Organisation
IVCIE	Inter regional organisation in Belgium
kg	kilogram, 1.000 gram
km	kilo metres, 1.000 metres
KN	Common Nomenclature of the European statistics
l	litre
LCA	Life Cycle Assessment, Scientific balancing and evaluation method
Lda.	Company with restricted liability
LIDL	German retailer/discounter company
LIT	Italian Lire, currency
Ltd.	Limited, Company with limited liability
LUX	Luxembourg
M&S	Marks and Spencers, British retailer company
MCA	Screw cap for bottles
Mio.	Million, 1.000.000
MIV	Milch Industrie Verband, German dairies association
ml	millilitres, one thousands part of a litre
MMP	pool organisation dairy products producers
MoEP	Member of European Parliament
MP	Member of Parliament
NF	French standard of AFNOR
NL	Netherlands
no	number
NO2	Nitrogendioxyde
NÖM	Niederösterreichische Molkereigenossenschaft, Austrian dairy company
NP	Portuguese standard
NRW	Name of German bottle type
O.I.V	International wine growers association, Paris.
ON	Austrian Standard of Austrian Standards Institute ÖNORM
org.	organisation
ÖS	Austrian Schilling, currency
P	Portugal
P&G	Procter and Gamble, US based company
PC	Polycarbonate, plastic material used for beverage bottles
PET	Polyethylentheraphtalat, plastic material for beverage bottles
PET-EW	One way PET-bottle
PMA	Dutch scientific consultants

POS	Point of sale, The place where goods are offered, retailers shelf
PPN	pool organisation for the green REF-PET-bottles in the Netherlands
PR	Public relations
prEN	draft European standard under process
Primalco-	Finnish alcohol wholesaler company
PRODCOM	European production statistics
PTA	Spanish Pesetas, currency
PVC	Polyvinylchloride, plastic material containing chlorine
REF-PET	Reuse PET-bottle
RENDAN	Danish consultants and governments information centre on waste
re-trays	reuse trays for reuse bottles
S	Sweden
S.I.	Governments Official Bulletin
SC	Subcommittee within the European standards organisation
SIS	Swedish standards institute
SMK	Swedish Crowns, currency
SPA	company structure
SS	Swedish standard
TC	Technical committee within the European standards organisation
ton	1.000 kilo gram
TV beer	beer brands which are promoted by TV-advertising spots
U.K.	United Kingdom
U.K.	United Kingdom
UBA	Umweltbundesamt, German environmental protection agency
UHT	Ultra High Temperature, conservation process for milk and other beverages
UKL	British Pounds, currency
UNE	Spanish standards organisation
UNE	Spanish standards institute and Spanish standard
UNESDA	Federation of European Soft drinks producers
UNI	Italian standards institute
UNICA	pool organisation for beer bottle crates
USA	United States of America
Valorlux	Packaging recycling association in Luxembourg
VAT	Value added tax
VDF	Verband Deutsche Fruchtsaftindustrie, pool organisation of German juice producers
VITO	Belgium scientificconsultancy
VO	Verordnung, Governments Ordinance
VoG Fost Plus	Belgium Organisation to run packaging recycling system
VROM	Netherlands ministry
WI 261...	Work Item of European standards organisation
WWF	World Fund of Nature, international environmental organisation
->	from / to
%	per cent, one of hundred
<	smaller than
<=	smaller or equal
>	bigger than

