

Plastics

A material of choice for
the packaging industry

**Insight into consumption
and recovery in
Western Europe**



ASSOCIATION OF PLASTICS
MANUFACTURERS IN EUROPE



sign of the times plastics packaging meets the challenges of the 21st century

Year by year, packaging transforms and reinvents itself, evolving to meet the changing demands of modern society. Faced with a new contemporary individualism focused on convenience and aesthetics, producers in industrialised markets are tackling the ever growing need for innovation. The developing world faces very different challenges, relying on packaging to preserve food and medication and to avoid waste. Plastics, with their unique and diverse combination of properties, are the ideal materials to meet these growing demands of innovation and performance, in a sustainable manner.

Plastics' diversity and inherent properties make them an invaluable packaging material for all sorts of commercial and industrial users around the world. Designed and engineered for very specific needs by exploiting their almost limitless adaptability, plastics packaging is essential to processing, storing, transporting, protecting and preserving products.

Versatile

Plastics' versatility enables an almost infinite variety of thick, thin, rigid or flexible packaging solutions, allowing for maximum protection of goods with minimum material.



Lightweight

Plastics packaging requires less fuel for its manufacture and transportation than other materials, in this way saving energy from beginning to end-of-life. Its inherent light weight also gives convenience in handling.

Cost effective

Plastics packaging is often more economic to produce in custom-made forms, cutting costs and increasing affordability for consumers. Throughout production and use, savings are created in labour, time, materials, energy and operating costs.

Preserving shelf life

Plastics packaging offers longer life protection for perishable products, reducing waste and use of preservatives.

Transparent

Transparent packaging allows people to look at food without having to touch it, cutting down on bruising and other damage.

Durable and shatter proof

Plastics packaging is practically unbreakable, making handling safer, reducing accidents and preventing waste from damage.

Hygienic and safe

Plastics packaging protects against contamination in foods and medicine and helps prevent the spread of germs during manufacture, distribution and display. Tamper-proof closures provide added protection and security.

Use less to do more

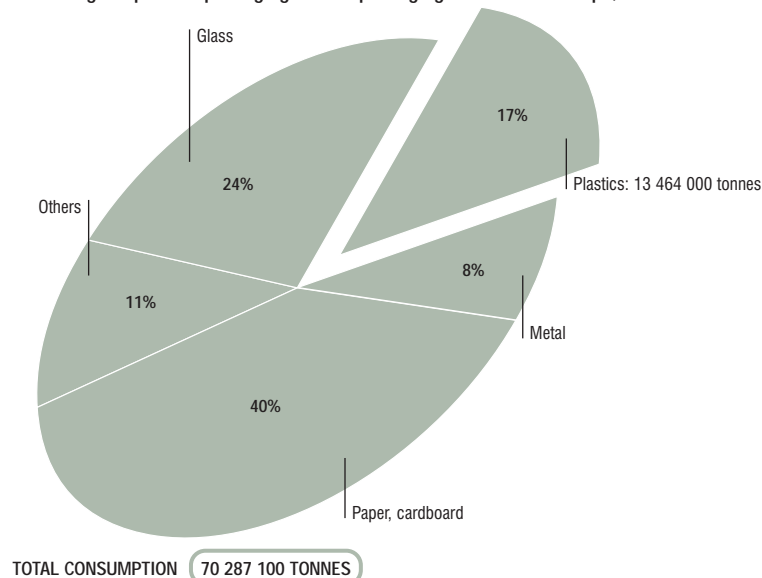
While plastics are the most popular choice of material in the packaging sector, they are also prevention champions, minimising total packaging required and saving resources.

As standards rise and new demographic trends emerge, different market demands are placed on packaging which plastics are well placed to satisfy.

It is therefore no surprise that there has been a consistently high growth in plastics consumption. Some 50 per cent of all Europe's goods are now packaged in plastics yet, by weight, these plastics account for only 17 per cent of all packaging. This is due to the significant efficiencies in plastics packaging that have been achieved, so that today the average weight of packaging for a given article has reduced by 28 per cent over the past 10 years. Moreover the amount of plastics packaging waste lost to landfill is not growing despite the production of more unit packs, thanks to innovation in production and recovery techniques that have improved prevention via source reduction and increased the level of recycling and recovery.

Energy consumption and potential environmental impacts are also reducing, thanks to constant innovation in production and optimisation throughout the supply chain due, for example, to lighter weight.

Percentage of plastics packaging in total packaging for Western Europe, 1999



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innovation in plastics packaging changing packages for changing lifestyles

In an increasingly fast pace, individualistic society, convenience has become a quest for many. Plastics packaging pervades every aspect of modern life, from marketing to health, security to quality assurance. In developing countries, it plays an important role longer-term in helping to raise standards of living and to provide more affordable goods to more people.

The trend towards convenience

People expect packaging to combine a number of convenience features. In addition to protecting its contents and keeping food fresh and free from contamination, they want packages with clear identification and labelling and which are easy to open and use.

Social changes have major implications for packaging. In particular, changing household size has a major impact on how goods are packaged – multi-pack or single, big or small?

Increasingly complex lifestyles mean more individuals eat alone and at times convenient to them. Round the clock working patterns and larger numbers of women in the workplace also mean fewer 'traditional' dinners and more fleeting visits to the supermarket.

'Ready to eat' packages and blister packs which supply individual and useable portions have been designed to meet these needs, thereby avoiding a great deal of food waste. People also need their shopping loads to be lighter

and easier to carry, making plastics packaging such as lightweight beverage containers ideal.

Standing out from the crowd

As production techniques develop and consumers are faced with a much wider choice of products on their supermarket shelves, they are also more aware of what differentiates one product from another, of the aesthetics of the packaging as well as the information printed on the package itself.

Packaging has become an integral marketing tool, determining a brand's individuality. Plastics' ability to be produced in almost any colour and shape means that packaging and the image it confers on the product are only limited by our imaginations.

What the doctor ordered

Modern health care would be impossible without many plastics medical products that we take for granted, products as diverse as disposable syringes, intravenous blood bags and heart valves. But their success relies completely on equipment being sterile. The challenge for packaging materials in this environment is one to which plastics are similarly suited, with their exceptional barrier properties, light weight, low cost, durability, transparency and compatibility with other materials.

Security is also a concern for industrial and developing countries alike – the faking

of pharmaceuticals is becoming a widespread concern. Plastics packaging can incorporate anti-counterfeiting measures such as 'invisible' package coding systems or tamper-proof closures to help counter this – as well as giving added safety in use.

The quest for food quality

Thanks to good packaging, food wastage in developed countries is low; only two to three per cent in Western Europe versus 50 per cent in developing countries. But consumers want shelf lives to be extended still further, with the taste and nutritional value of food maintained at a high level.

Plastics packaging is able to continue meeting these demands. Recent innovations include a plastics packaging solution which is only activated when the package is first filled, 'eating' oxygen and starving any bacteria that might be present. Another absorbs the ethylene given off by ripening fruit and is expected to be of special benefit in hotter areas of the world where refrigeration is not readily available. Similar additives are capable of absorbing unpleasant odours or can be used to prevent odour transfer between different foodstuffs in the same storage space.

Plastics often make an important contribution to maintaining the quality of the product by adding extra value to other

packaging materials. In packages designed for extremely long storage times, such as steel cans, the inside of the can was at one time coated with a thin layer of tin or chromium to preserve the can from corrosion. In recent years a thin plastic layer has been used instead in order to prevent a metallic taste in certain canned products.

Challenges for developing countries

At present, one of the most pressing needs in developing countries is for food supply security – a clear challenge for plastics packaging. According to the Food and Agriculture Organisation (FAO), every year, millions of tonnes of cereals, roots and tubers in developing countries never reach the consumer because of poor storage, damage by pests, and transport and marketing problems. Some 30 – 50 per cent of food in developing countries is lost between harvest and consumption because of inadequate packaging during storage and transit. Food losses are correlated with insufficient use of packaging.

Because of its inherent properties, plastics packaging can help improve quality of life through better storage, the provision of low cost, lightweight containers that enable safe drinking water to be made available, and preservation – especially important in humid climates.

It is certain that plastics will continue to bring exciting innovations to the market

place, in both industrial and developing countries. Some predict a future made of 'all-in-one intelligent packaging', which will replace the shopping basket, the fridge, the saucepan and the plate in one go. Others foresee a world where packaging provides the solution for transporting huge quantities of drinking water to countries experiencing severe drought. Whatever the future holds, new plastics and the increasingly sophisticated demands of manufacturers, retailers, distributors and consumers will certainly combine to make these innovations possible and offer extended markets for plastics packaging.

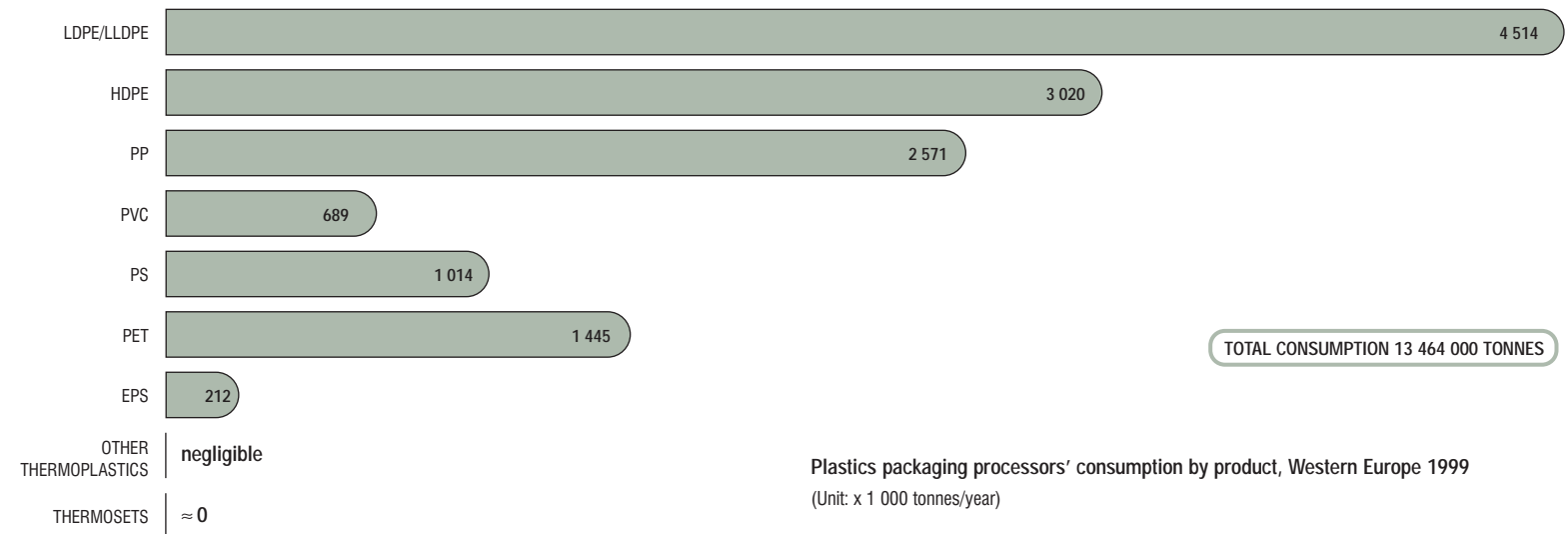
plastics packaging consumption

From transparent film around meat and cheese to bottles for soft drinks, detergents and toiletries, plastics packaging is visible everywhere on our supermarket shelves. But plastics packaging is not limited to primary packaging (sales packaging) – it is also an essential part of the entire supply chain.

Compared with other sectors, the packaging sector remains the largest consumer of plastics. In 1999, 13 464 000 tonnes of plastics, approximately 40 per cent of total plastics applications, was used for packaging. This includes primary (sales packaging), secondary (grouped packaging) and tertiary (transport packaging) applications. Primary packaging accounts for the large majority of all plastics packaging used by consumers and industry.

Polyethylene (PE) dominates the

Plastics packaging processors' consumption by polymer type, Western Europe 1999 (Unit: x 1 000 tonnes/year)

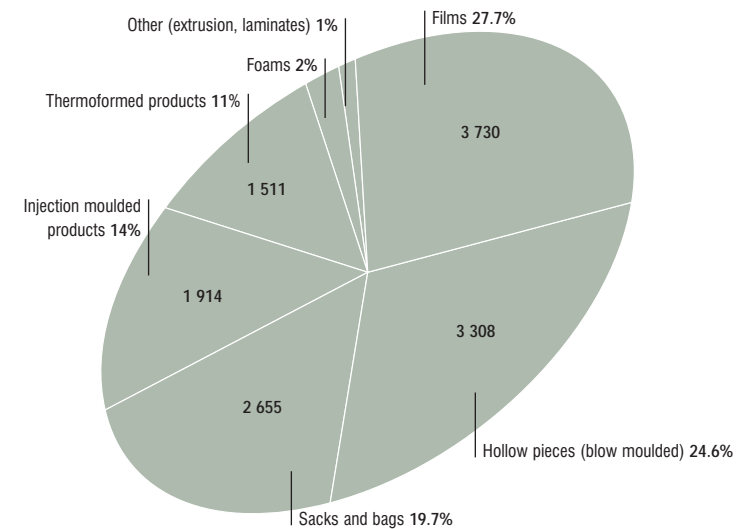


packaging market, accounting for 56 per cent by weight of all packaging produced by processors. Five other plastics – polypropylene (PP), polyethylene

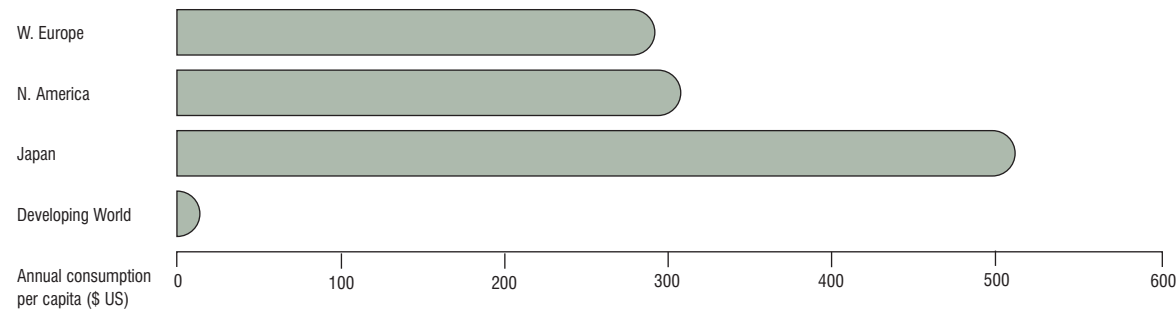
terephthalate (PET), polystyrene (PS), polyvinyl chloride (PVC) and expanded polystyrene (EPS) – cover most of the remaining 44 per cent.

Plastics packaging processors' consumption by product, Western Europe 1999

(Unit: x 1 000 tonnes/year)



Annual packaging consumption per capita



Source: Packforsk – Report no. 194, 2000

For certain plastics, packaging is the major market. For example, outside of the fibre market, over 90 per cent of PET is used for packaging and over 70 per cent is used for food contact packaging. About 65 per cent of all PE is used for packaging. At the other end of the scale, 27 per cent of all EPS and 13 per cent of PVC is used in packaging applications; the remainder is consumed in other sectors such as building and construction and electrical and electronic goods (E&E).

Used extensively for both domestic and industrial purposes, PE and PP films account for the largest proportion of all plastics packaging types (28 per cent for films, 48 per cent if bags and sacks are included), closely followed by blow-moulded products (25 per cent). Bottles, mainly PET and HDPE, represent 18 per cent.

In the five year period 1994-1999, despite the increase in the number of units consumed, and as the result of prevention at source and redesign of many packaging types, there has been an overall reduction in total packaging materials used from 75 million to 70 million tonnes. Plastics, due to their light weight, their versatility and their increased functionality, have significantly contributed to this result, including through the substitution of more traditional packaging materials.

Given the increasing demand for packaged goods from a growing and more complex population, it is clear to

Final consumption of plastics packaging, breakdown by country (1999)

COUNTRY	Processors' Consumption	In and out flows	In and out flows in %	Final consumption
Austria	206	-39	-19%	167
Belgium	649	-187	-29%	462
Denmark	196	-3	-2%	193
Finland	190	-13	-7%	177
France	2 033	157	8%	2 190
Germany	2 758	-392	-14%	2 366
Greece	180	87	48%	267
Ireland	72	38	53%	110
Italy	3 058	-630	-21%	2 428
Netherlands	597	28	5%	625
Portugal	220	21	10%	241
Spain	1 278	49	4%	1 327
Sweden	324	-40	-12%	284
United Kingdom	1 666	417	25%	2 083
European Union	13 085	-507	-4%	12 578
Norway	116	-20	-17%	96
Switzerland	263	-25	-10%	238
Western Europe	13 464	-552	-4%	12 912

see that plastics have made a significant contribution in terms of meeting the need, while capping the quantity of packaging created and, ultimately, the amount of packaging entering the waste stream.

The choice of packaging is influenced largely by national preferences, cultures and lifestyles, as illustrated by consumer consumption of plastics packaging across Western Europe.

Case study: Modified Atmospheric Packaging

Modified atmosphere packaging (MAP) is an increasingly popular food preservation technique whereby the composition of the atmosphere surrounding the food is different from the normal composition of air. This form of plastics packaging is mostly found as sealed bags to pack cut vegetables, fish and meat. MAP is all about food preservation without additives, and the key to it lies in the modified atmosphere itself – a carefully balanced combination of three gases: oxygen, carbon dioxide and nitrogen, all three natural components of the air we breath.

The combination of the gases vary according to the product they protect. For instance fresh red meat needs plenty of oxygen to maintain the colour of the meat and carbon dioxide is required to slow bacterial growth.

MAP has revolutionised fresh food packaging, enabling retailers to market fresh foods that are prepared and packed in central preparation units, rather than prepared back store. The technique has also extended shelf life and reduced risks of microbial attacks, for example salmonella and listeria. Without a barrier pack, products like fresh red meat would only have a shelf life of just three to four days as opposed to the seven days or more achieved with a MAP pack.

Other benefits include:

- reduced packaging and product waste, due to the efficient use of very thin but strong shrink films
- improved quality of taste, texture and appearance
- greater consumer choice through increased availability of more fresh food products on sale at any given time



prevention and saving resources

Source reduction – or prevention – is an important strategy for reducing the environmental impact of packaging, both through the preservation of natural resources and, ultimately, the minimisation of waste by ‘doing more with less’. Plastics packaging is central to the plastics industry’s contribution to source reduction, preserving more resources than it uses, and reducing overall waste.

Efficient use of plastics helps keep consumption of natural resources low. Plastics only consume a small fraction – four per cent – of the world’s oil, compared to 87 per cent for transport, heating and energy. Furthermore, it is estimated that the fraction used by plastics is used so effectively that the use of plastics as a whole actually saves more oil than needed for their manufacture, helping other users of oil (heating, transport etc) to become more energy efficient.

Plastics packaging has become about 50 per cent more efficient in the last twenty years – in the 1970s 1g of plastics packaging could deliver on average 23g of product. By the mid 1990s this figure had grown to 34g. These changes represent a saving of almost 2 million tonnes per year of plastics used for packaging. This has important implications, not only lowering manufacturing and transport costs, but also the amount of energy needed to

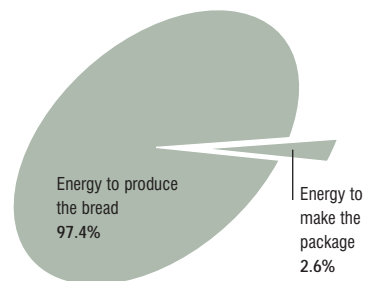
produce the plastics and the weight of waste produced at end-of-life.

Plastics packaging also has significant secondary implications for the preservation of resources:

- **Plastics protect products from loss during distribution**

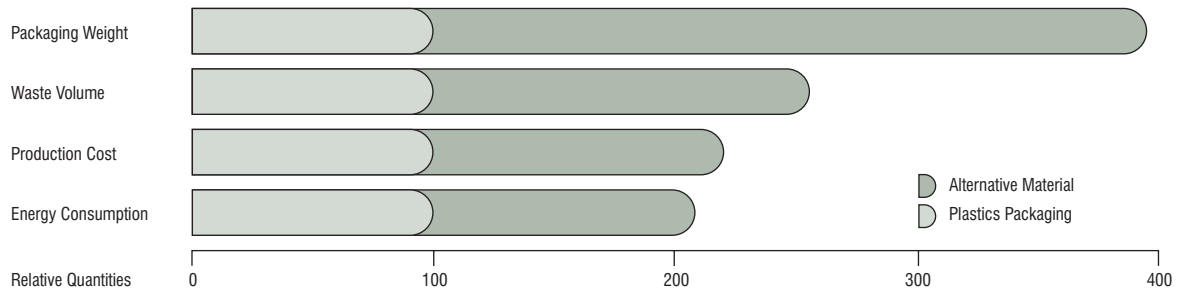
Plastics packaging protects against the wastage of both the packaged products and the energy used to create them in the first place. In fact, energy balance studies of the food energy chain show that using plastics for food packaging can lead to energy savings which total over twice the energy needed to produce, fill and transport the packaging in the first place. For example, data from the Swedish packaging research organisation, Packforsk, indicates that for a 700g loaf of bread, the energy required to make the

Energy used to make a package/
product system (700 g loaf)



Source: Packforsk

Impact of using alternative packaging materials



Source: Gesellschaft für Verpackungsmarktforschung, 1992

package (a polypropylene bag with a polystyrene clip) is a tiny proportion of the total potential energy loss which would occur with an inadequately packaged product.

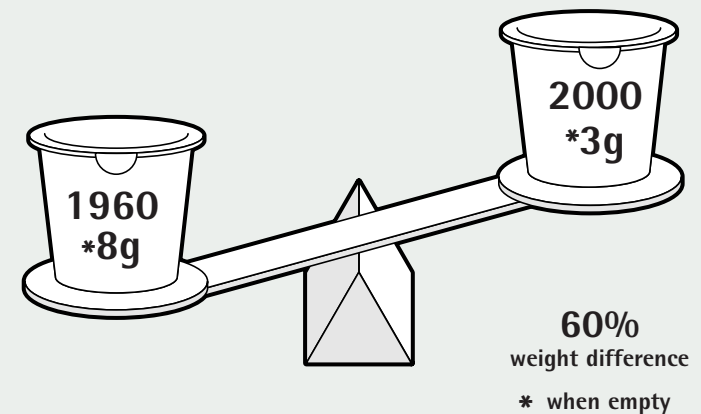
- **By replacing less efficient packaging types plastics help save materials and energy resources**

Innovations by the plastics industry have led to the advent of lighter, stronger plastics, allowing manufacturers to reduce the amount of plastics used to package individual items, creating significant savings in warehousing space, handling and transport costs.

A landmark study by Gesellschaft für Verpackungsmarktforschung (GVM) has demonstrated that if plastics packaging was substituted by other materials, packaging weight would increase almost four fold. Production costs and energy consumption would be doubled, and waste volume increased by 150 per cent.

Case study

Over a forty year period, through a combination of advances in raw materials and moulding techniques, the weight of a 125g yoghurt pot has been reduced by more than 60 per cent. With sales of almost 9 billion units per year in France alone, this equates to annual material savings of 44 000 tonnes.



waste & waste management

Fact: plastics waste represents less than one per cent by weight of all waste generated in Europe. Nonetheless, the European plastics industry is committed to recovery and minimising any of this waste being lost to landfill – through the optimisation of the mix of all recovery options available as part of an integrated waste management approach.

Re-use

Plastics packages are increasingly being designed in ways that make them re-useable; the number of reusable plastics crates and boxes used for the distribution of products to retailers is growing rapidly. For example, a major UK food retailer has replaced cardboard cartons with returnable plastics crates for deliveries

from suppliers to stores via depots. Together with the use of returnable trolleys for fresh milk and pot plants, the company has reduced its packaging waste by 28 000 tonnes per year.

Reuse is a convenient and important way of saving resources, often offering an energy-free alternative to recycling. However, sometimes reusing a package creates an unacceptable environmental burden. For example, bottles for beer brewed, distributed and consumed locally can be reused many times, with minimal environmental impact. But for a specialist beer produced on the other side of the continent, the environmental impact of transporting used bottles over long distances back to the bottling plant would far outweigh any savings.

Waste management decisions must therefore be made locally, taking into account all the relevant factors including technical, environmental, economic and local market issues.

Other recovery routes

For plastics packaging waste, several recovery methods are available. Optimum recovery is often achieved by using a combination of these. The availability of several recovery methods provides a flexibility of options which, combined with continuous improvements in waste collection methods and separation techniques, has meant that approximately 40 per cent of plastics packaging waste is being recovered in Western Europe.

There are three methods of recovery of waste plastics:



Mechanical recycling

Mechanical recycling, the material reprocessing of waste plastics by physical means into new plastics products, is the European plastics industry's preferred recovery technique, provided some important conditions are met.

In its report, *Assessing the potential for post-use plastics waste recycling – predicting recovery trends in 2001 and*

2006, it was established that the quantity of plastics waste mechanically recycled across Western Europe has the potential to more than double over the period 1995 – 2006.

Several factors exist which currently inhibit our ability to exceed the forecast rate:

- the imbalance between the waste collectable and the potential end-markets
- the presence of large quantities of mixed plastics waste, where the difficulties and energy consumed in separating and cleaning outweigh the environmental gain of mechanical recycling
- there is limited use of recycled plastics in food packaging applications (one of the major outlets for virgin plastics) due to food safety concerns and regulations

Nonetheless, mechanical recycling remains an excellent recovery method, given these caveats and the existence of a homogenous and constant waste stream.



Feedstock recycling

Feedstock recycling is a form of material recovery that is suited to the recovery of large volumes of mixed plastics, which

can be typical of the waste generated by the household packaging sector. These technologies break the plastics down into their basic chemical constituents for use in a wide range of new industrial, intermediate and consumer products, including new plastics.

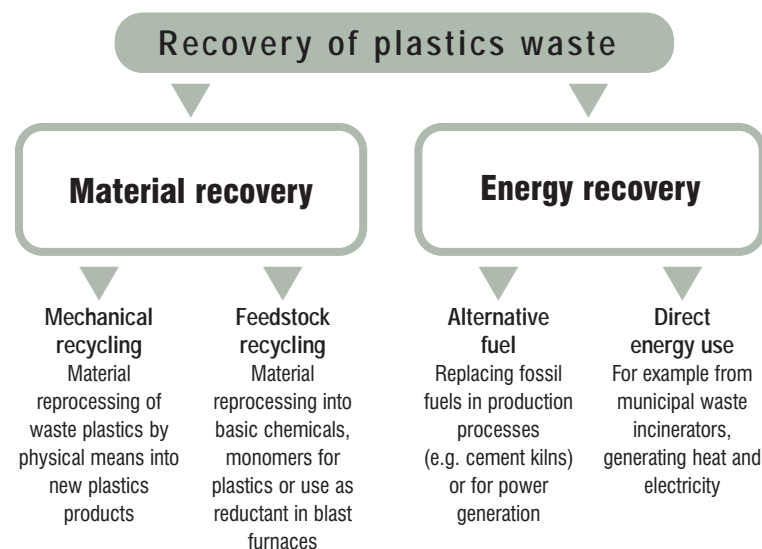
Recycling technologies also exist or are being developed to convert homogeneous streams, such as PET bottles, back to monomers to make new bottle grade plastics or to intermediates used for producing other plastics.



Energy recovery

Energy recovery is a key recovery option for plastics. Where waste streams are such that eco-efficient mechanical recycling is not achievable, or after certain items have been removed for mechanical recycling, the remainder of the high calorific value plastics waste can be recovered as energy. Mixed plastics waste can be safely and cleanly substituted for fossil fuels in mono- or co-combustion plants generating heat and/or power. It can also be used as an alternative fuel in energy-intensive processes, for example cement manufacture.

While in the past there has been much opposition – some of which was justified because of the concern around



Case study: Plastics in a spin

Lever Fabergé have introduced new Persil Capsules which contain a pre-measured amount of liqui-gel detergent, encased in a specially developed biodegradable cold water soluble polyvinyl alcohol film. The capsules are simply placed in the washing machine where the film coating fully dissolves on contact with water – offering consumers the ultimate in simplicity and convenience.



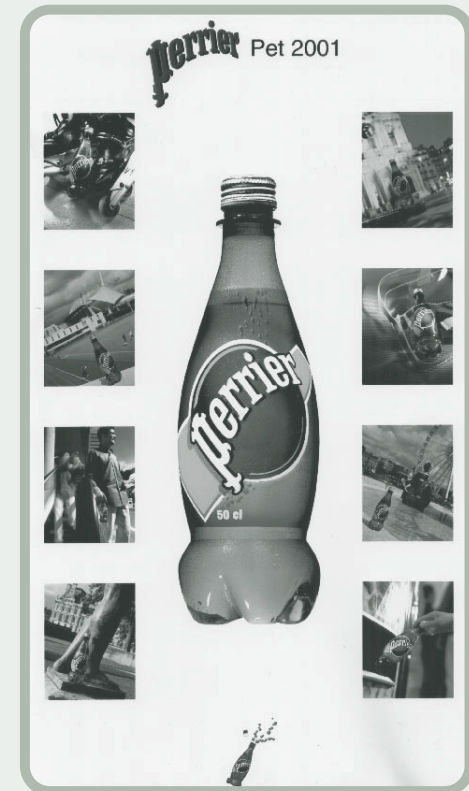
poor environmental performance and emissions from old incinerators – today energy recovery is endorsed as an environmentally sound option. Emission levels from incinerators have been significantly reduced to meet demanding legislative limits and waste combustion for the recovery of energy has been endorsed by the European Commission.

In Europe there are 275 Energy From Waste (EFW) plants which handle 47 million tonnes of waste per year and recover 43 000 gigaWatt hours of energy. In Amsterdam, for example, the tram system and other municipal facilities are powered by energy recovered from the city's solid waste. Similarly, in the city of Gothenberg in Sweden more than 70 per cent of the city's heating is now provided by incineration of general waste – thus saving conventional fuels.

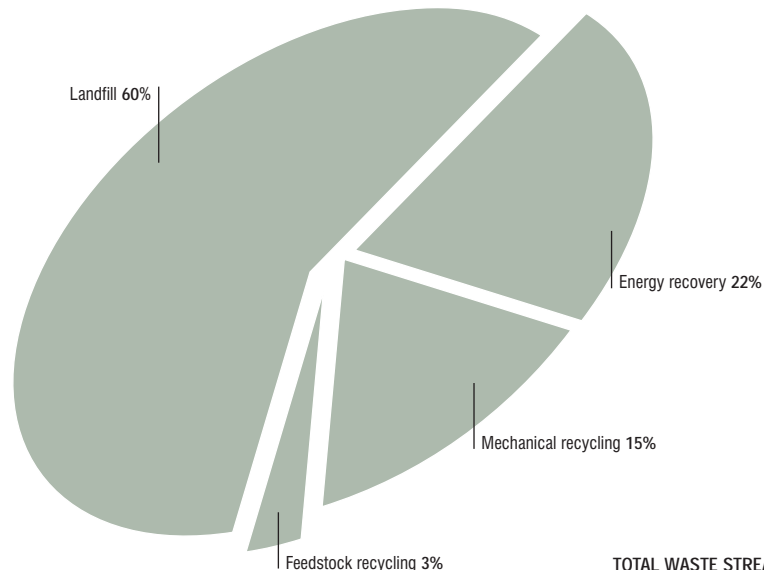
Case study: First plastics bottle for Perrier

Perrier, the world's best selling sparkling water brand, has introduced its first PET 50cl bottle, marking the end of an eleven-year search for a packaging material that would prevent Perrier's natural bubbles from escaping. Perrier will still be available in its traditional French green glass bottle but the PET bottle is aimed at younger drinkers who are always on the move and the growing impulse sector of the market. The new bottle fits comfortably into handbags, rucksacks, lunch boxes and pockets.

The plastics bottle is made from polyethylene terephthalate (PET) and uses two layers of plastics with a layer of nylon in between. The addition of nylon has ensured the taste of the water and its bubbles are kept intact. It resembles the traditional Perrier glass green bottle, but plastics have enabled a unique difference in its shape. It has a rounded base rather like a five petal flower.



Management of post-user plastics packaging waste



TOTAL WASTE STREAM (1999) 10 498 000 TONNES

eco-efficiency

The European plastics industry is committed to the diversion of plastics waste from landfill but is keen to emphasise that all waste management solutions should be primarily eco-efficient. Eco-efficient solutions provide the optimum balance of environmental impact and economic cost from raw

materials extraction through to disposal of final residue.

The APME study, *Assessing the eco-efficiency of plastics packaging waste recovery*, published in 2000 and now peer reviewed with the conclusions re-enforced, examines recovery options for

plastics packaging in such an environmental and economic context, with the aim of enabling sound decision-making and planning of future waste management strategies for plastics packaging.

The report concludes that too great an emphasis on recycling as a recovery option for plastics packaging waste could drive Europe to ever increasing waste management costs with limited environmental gain. The study illustrates that increasing recycling above approximately 15 per cent, in combination with municipal solid waste incineration, has no major impact in terms of eco-efficiency. By exploring a number of different waste management scenarios, the study demonstrates that there is a cut-off point above which increasing plastics packaging recycling does not provide further environmental gain. One important factor is the impact that increased recycling rates have on the total energy balance – the extra energy required to separate plastics packaging waste for recycling is not offset by the saving in resources from substitution of new materials.

In other words there is no hierarchy of recovery techniques that can be applied universally when making waste management decisions. Instead the focus for waste management should be on diverting plastics packaging from landfill via a range of recovery options, dependent on individual local conditions.

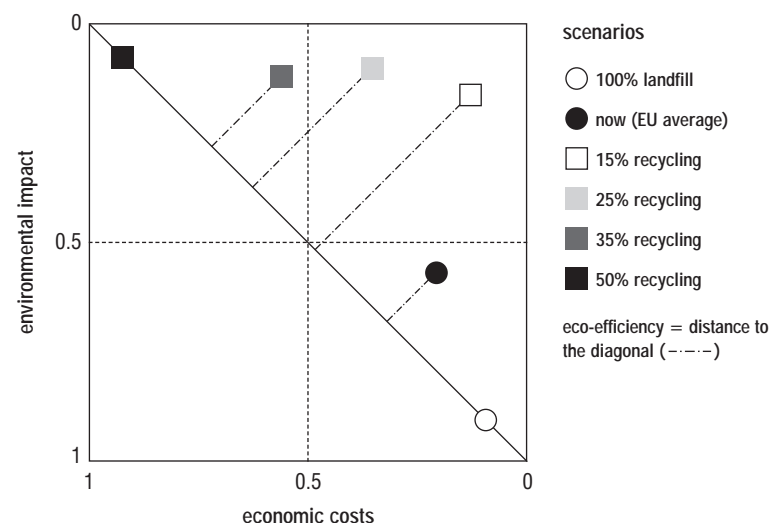
Percentage of plastics packaging waste recovery by country, Western Europe 1999

COUNTRY	Total %	Recycling %	Energy Recovery %
Denmark	85	9	76
Sweden	79	17	62
Netherlands	73	17	56
Germany [▲]	70	51	19
Austria	66	35	31
Belgium	55	21	34
France	49	12	37
Italy	22	12	10
Greece	21	2	19
Finland	19	11	8
United Kingdom	17	11	6
Spain	15	9	6
Portugal	14	4	10
Ireland	4	4	0
European Union	38	18	20
Switzerland	91	13	78
Norway	44	17	27
Western Europe	40	18	22

[▲] Recycling in Germany includes 346 000 tonnes via feedstock recycling

Eco-efficiency of plastics packaging waste recovery scenarios

Source separated household and industrial plastics packaging waste



This figure above shows the eco-efficiency of the six scenarios taking the illustrative base case for environmental criteria (even weighting of all factors except human and aquatic toxicity). Key insights from this are:

- 100 per cent landfill has the highest environmental impact, but currently represents the lowest cost option at the other extreme.
- 50 per cent recycling of plastics packaging waste has the lowest environmental impact but by far the highest cost burden.
- 15 per cent mechanical recycling combined with energy recovery offers the greatest reduction in environmental impact at a reduced cost compared with the current average situation.

sustainable development

Nowadays there is unprecedented awareness of the need to act more responsibly to protect our world for future generations. The true goal is sustainable development: 'meeting the needs of today without compromising the needs of future generations' (source: Brundtland Commission). This means acting in a way that does not limit the range of environmental, economic and social options available.

Plastics packaging is making a substantial contribution towards all three elements of sustainable development, helping to improve the overall standards of living of a growing world population in a cost-effective, resource-efficient manner.

Environmental protection

Plastics packaging helps keep the consumption of oil and other fossil fuels low. As feedstock for their manufacture, plastics consume only a tiny fraction – just four per cent – of the world's oil. This fraction is used so effectively that the use of plastics as a whole actually saves more oil than is needed for their manufacture.

Plastics use less to do more because they are lightweight and specially tailored to the demands of the application. As a result waste is minimised, resulting not only in a reduction in manufacturing and transport costs but also in the amount of energy needed to produce the plastics

and the volume of waste at end-of-life.

Plastics packaging also helps guard against the wastage of resources through the protection of both the packaged products and the energy used to create them in the first place.

- Reusable trays made from plastics are increasingly used in food distribution and the medical sector. In Europe 36 million plastics trays were reused in 1992. The figure increased to 84 million in 1998 and will reach 152 million by 2003: an increase of 80 per cent in only 5 years.
- By switching to using plastics stretch film to hold the contents of their distribution pallets securely in place, Riedel, the largest fruit juice producer in the Netherlands, has saved 80 000 kg per year of packaging material.
- For their super concentrated washing powders the international manufacturing company Henkel is using a 22 per cent lighter film. The benefits include a reduction of 45 000kg of plastics annually.
- Electricity from waste combustion, including plastics waste, will supply the 50 million kWh used annually by Amsterdam's Muziektheatre, the city hall and the streetlamps in the square where the two buildings are situated

- A study in Ontario, Canada showed that thanks to the use of plastics, between 1968 and 1995 the total amount of waste generated from milk packaging decreased by almost 20 per cent, despite an increase of 22 per cent in annual sales.

Economic development

The production of plastics, of which over 40 per cent is used for plastics packaging, makes a major contribution to society through the significant wealth and employment it creates. The wider plastics industry in Western Europe employs over one million people and plastics consumption consistently outpaces national GDP throughout the world

The low cost of plastics packaging, and its ability to minimise costs across the entire supply chain, enable businesses in industrialised countries to retain their competitive advantage.

At the same time, the plastics packaging industry is well placed to meet the demand from developing countries for industries to which the economic barriers to entry are low and which provide a rich diversity of manufacturing and related activities.

- Special multilayer plastics packaging keeps fish fresh for two days when stored in the normal self-service cooling systems of supermarkets – thereby preventing the loss of valuable stock. This brings economic

benefits that far outweigh the cost of the package. In 1998 for example, while the total weight of fish sales in French supermarkets decreased by 2.5 per cent, sales of pre-packed fish increased by 7 per cent in weight and by 21 per cent in value.

- Collapsible plastics crates and boxes for fruit and vegetables bring economic benefits because the containers are made in standardised sizes, are robust, capable of stacking, easy to move both by hand and with automated equipment. Thanks to their stackability, and the stability of a stacked pallet, there is no need to add palletisation film or product interlayers – this reduces costs and material consumption, and increases competitiveness.

Social progress

Plastics packaging offers a range of benefits to society, helping in its advancement and improving its standard of living:

- Plastics packaging plays a key role in enabling consumers to achieve their lifestyle and choice aspirations – as standards rise and demographic trends emerge, new market demands are placed on packaging which plastics are well placed to satisfy.
- In the developing world between 30 and 50 per cent of food is lost between harvest and consumption,

with important implications in terms of health and nutrition. Plastics packaging has important advantages that make it well suited to taking on the challenge of limiting food losses and thereby improving food security.

- In the developed world, where food losses amount to less than one to two per cent, different demands are made on packaging, including prevention against food poisoning, and increased assurance that products have not been tampered with.
- Modern healthcare relies heavily on products whose sterility is ensured by plastics packaging.
- Thanks to a special expanded polystyrene package, vaccines are being safely transported from Dakar in Senegal to Latin America. Thanks to the thermal insulation properties of expanded polystyrene, the required temperature inside the sealed package is maintained for 72 hours.
- There are special plastics films that can change their appearance depending on the temperatures they have experienced. The package can indicate whether its contents have remained continuously refrigerated. And it is possible to incorporate a detection device that can warn consumers of the presence of potentially dangerous bacteria.

litter

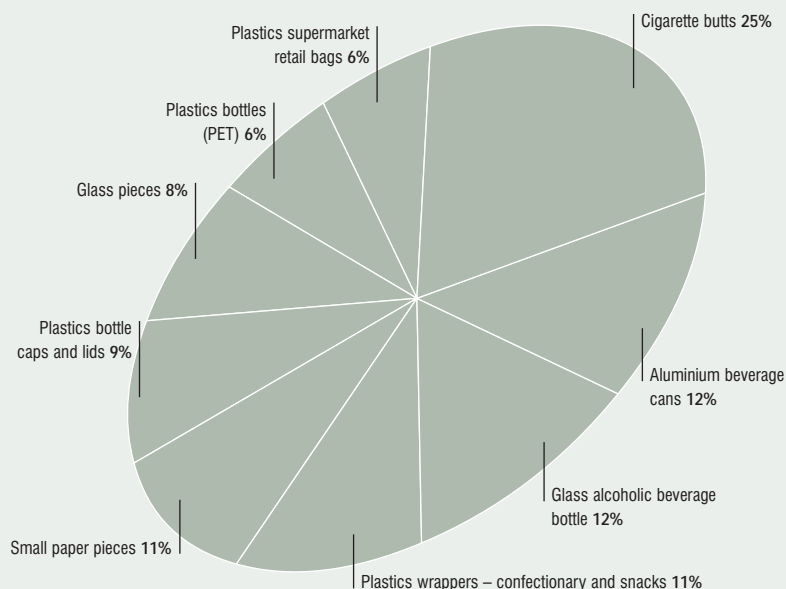
Eco-efficient recovery of plastics packaging is only possible if the waste enters a suitable waste management system. This is unfortunately not the case with litter, which is waste that has simply been dropped on the ground with no chance of entering a sensible waste recovery system without incurring significant costs in collection. The dropping of litter is not only a waste of resources but also has social, environmental and financial implications.

Although not the most common items of rubbish to be found on the streets, items made from plastics are a significant proportion of litter and can be highly visible. However, litter provides a valuable reminder that every member of society has an important role to play in the goal of sustainable development. It is important to recognise that litter is an issue concerning the behaviour of society. The plastics industry recognises its responsibility to ensure waste is suitably recovered, but

consumers must also accept their responsibility, both by directing their used packaging materials to the designated collection schemes, and also by avoiding littering. Throughout Europe education campaigns have been organised to raise awareness of the negative implications of litter and to encourage consumers to take responsibility for the problem. For example in Ireland, where some 80,000 tonnes of litter is collected in street cleaning each year at a cost of some £20million pounds,

the Anti-Litter unit of the Department of the Environment organises an annual 'National Spring Clean' campaign, as well as an annual 'Tidy Towns' competition. Meanwhile APME's education programme, which reaches over a million young people across Europe, includes an activity card and information on littering.

Typical make-up of litter for Australia (likely to reflect the situation in parts of Europe)



Source: Clean Up Australia Campaign – www.cleanup.com.au

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Note:

Those references marked (*) are available and downloadable from the APME Web site: www.apme.org

The Association of Plastics Manufacturers in Europe (APME) is the voice of the polymer producing industry at the European level. Its membership today includes more than 40 companies representing well over 90 per cent of Western Europe's polymer production, with a turnover of more than 29 billion euro. Combined with the European polymer converting industry and the machinery manufacturers, the plastics industry represents a major contributor to Europe's economic strength employing well over one million people and generating sales in excess of 135 billion euro.

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