Plastics Packaging
The Progressive Packaging Medium
Introduction

This Guide has been produced by the British Plastics Federation to help Government, Local Authorities, Consumer bodies and other Non-Governmental Organisations to understand the key benefits brought by plastics packaging.

The British Plastics Federation is certainly well qualified to present this information. Founded in 1933 it is the first established plastics federation in the world with the BPF’s Packaging Group representing the UK manufacturers of all types of plastic packaging including containers, bottles, drums, trays, boxes, cups and vending packaging, baby products and protection packaging.

The BPF is at the cutting edge in its understanding of how sustainability applies to plastic packaging materials as witnessed by its participation in the ground-breaking initiative, the Plastics 2020 Challenge. Our Guide illustrates how plastics products will help mitigate the effects of Climate Change.

The BPF is a member of both the Packaging Federation and a Trade Association member of INCPEN, a non-profit, research-based organization which draws together an influential group of companies who share a vision of the future in which all production, distribution, and consumption are sustainable.

The UK plastics packaging industry is a UK economic strength:

- It employs over 50,000 people
- Annualised sales revenue is estimated to approach £ 5 billion.

Over one-third of plastics is consumed by the packaging sector in the UK.

Historically the industry is rooted in the UK’s entrepôt trade which packaging facilitated.

The UK has boasted the great names of the global packaging sector and today is at the cutting edge of the international plastics packaging industry.

For more information about the BPF and its activities consult www.bpf.co.uk
The Genius behind Retailing

It would be difficult to imagine the efficient operation of modern supermarket retailing and distribution systems without the extensive deployment of plastics packaging. Indeed plastics packaging played a strong role in helping to create the relatively sophisticated retailing scene which we have in the UK today in particular facilitating the extraordinarily wide choice of products available and their delivery to and around stores.

The UK - Innovation in Plastics Packaging

With both a vibrant demand pull from retailers and brand owners together with a strong technology push from the plastics industry itself the UK plastics packaging industry has an unrivalled record of innovation. Polyethylene, used in both rigid and flexible packaging was discovered in the UK in 1933 and the UK was one of the first countries to exploit the potential of the PET (polyester) bottle.
A Pack for All Seasons

The nature of plastics technology with its wide variety of raw materials and processing techniques permits the manufacture of packaging in an infinite variety of shapes, colours and technical properties. Practically anything can be packed in plastics - liquids, powders, solids and semi-solids.

Some examples of plastics packaging include:

- **Bottles**
- **Bulk Containers**
- **Pots**
- **Pails**
- **Trays**
- **Returnable Transit Packaging**
The Raw Materials

The chemical building blocks from which plastics raw materials are made are based on oil or gas. They also are beginning to be derived from biological sources - ‘biomass’.

Some of the typical plastics raw materials from which packaging is made include:

- Polyethylene (PE)
- Polyethyleneterephthalate (PET)
- Polypropylene (PP)
- Polystyrene (PS)
- Polyvinylchloride (PVC)

Each raw material has different properties which make them suitable for different packaging applications in order to achieve, for example, flexibility, toughness and transparency.

Additives can be incorporated into a plastics material to modify its properties. These include colourants, opacifiers, microbials and anti-static agents.
Why Use Plastics Packaging?

It is crucial to recognise that plastics packaging, indeed packaging as a whole, does not enjoy an independent existence. Its sole purpose is to pack products and packaging is called into existence because of the demand from manufacturers and distributors who want it and specify it to protect their products. Packaging cannot be disassociated from the products it protects.

Above all, plastics are used because of the unique combination of benefits they offer:

**Durability**

The long polymer chains which constitute the plastics raw material make it extraordinarily difficult to break.

**Safety**

Plastics packaging is shatterproof and does not fragment into dangerous shards when dropped.

**Hygiene**

Plastics packaging is ideal for the packaging of foodstuffs, medicines and pharmaceuticals. It can be filled and sealed without human intervention.

The materials used, both plastics raw materials and additives, fulfill all food safety legislation at national and European Union levels. Plastics products are customarily used as medical devices in intimate contact with body tissue and conform to the highest standards of safety in their life-saving uses.
Security
Plastics packaging can be produced and used with tamper-evident and child resistant closures. The transparency of the pack enables users to examine the condition of the goods prior to purchase.

Light Weight
Plastics packaging items are low in weight but high in strength. Hence products packed in plastics are easy to lift and handle by consumers and by personnel in the distribution chain.

Design Freedom
The properties of the materials combined with the array of processing technologies employed in the industry, ranging from injection and blow moulding to thermoforming, enable the production of an infinite number of pack shapes and configurations. Additionally the extensive range of colouring possibilities and the ease of printing and decoration facilitate brand identification and information for the consumer.
Contribution to Sustainable Development

These properties have extremely important social, economic and environmental implications.

**Plastics packaging saves energy**

Because it is lightweight plastics packaging can save energy in the transport of packed goods. Less fuel is used, there are lower emissions and, additionally, there are cost savings for distributors, retailers and consumers.

A yogurt pot made from glass weighs about 85 grams, while one made from plastics only weighs 5.5 grams. In a lorry filled with a product packed in glass jars 36% of the load would be accounted for by the packaging. If packed in plastic pouches the packaging would amount to just 3.56%. To transport the same amount of yogurt three trucks are needed for glass pots, but only two for plastic pots.

**Plastics packaging is an optimal use of resources**

Because of the high strength / weight ratio of plastics packaging it is possible to pack a given volume of product with plastics rather than with traditional materials.

It has been shown that if there was no plastics packaging available to society and there was necessary recourse to other materials overall packaging consumption of packaging mass, energy and GHG emissions would increase.

Source: PlasticsEurope

(GHG – Greenhouse gas)
Plastics packaging prevents food waste

Almost 50% of the total amount of food thrown away in the UK comes from our homes. We throw away 7.2 million tonnes of food and drink from our homes every year in the UK, and more than half of this is food and drink we could have eaten. Wasting this food costs the average household £480 a year, rising to £680 for a family with children, the equivalent of around £50 a month.iii

The durability and sealability of plastics packaging protects goods from deterioration and increases shelf life. With modified atmosphere packaging made from plastics, shelf life can be increased from 5 to 10 days, allowing food loss in stores to be reduced from 16% to 4%.iv

Traditionally grapes were sold in loose bunches. Grapes are now sold in sealed trays so that the loose ones stay with the bunch. This has reduced waste in stores typically by over 20%.v

Plastics packaging: continuous improvements through innovation

There is a strong record of innovation in the UK’s plastics packaging industry.

Technical advances and design flair have reduced the quantity of plastics packaging needed to pack a given quantity of product over time without sacrificing the pack’s strength or durability. For example a 1 litre plastic detergent bottle which weighed 120gms in 1970 now just weighs 43gms, a 64% reduction.vi

Society’s consumption levels rose by 20% between 1999 and 2004. However the use of plastics packaging only rose by 4%.vii
Plastics Packaging Means Low Environmental Impacts

Oil and gas in context – carbon savings with plastics packaging
Plastics packaging is estimated to account for just 1.5% of oil and gas use, the BPF estimate. The chemical building blocks for plastics raw materials are derived from by-products of the refining process which originally would have had no other uses.

Whilst the vast majority of oil and gas is consumed in transport and heating, the usefulness of that used for plastics manufacture is extended by the recyclability of plastics and the potential for recovering its energy content at the end of its life in waste to energy plants.

A 2004 study in Canada showed that to replace plastic packaging with alternative materials involve the consumption of 582 million gigajoules more energy and would create 43 million tonnes of additional CO₂ emissions. The energy saved each year by using plastics packaging is equivalent to 101.3 million barrels of oil or the amount of CO₂ produced by 12.3 million passenger cars.

Re-usable plastics packaging
Many types of plastics packaging are long-life artifacts. Returnable crates, for example, have life spans of over 25 years or more and re-usable bags are playing a greater role in responsible retailing.

A strong recycling record
Plastics packaging is eminently recyclable and a growing range of plastics packaging incorporates recyclate. EU legislation now permits the use of plastics recyclate in new packaging intended for food stuffs.

In June 2011 the Government Advisory Committee on Packaging (ACP) announced that in 2010/11 24.1% of all plastics packaging was recycled in the UK and this achievement exceeded the target figure of 22.5% stated by the government. The UK plastics recycling industry is one of the most dynamic in the EU with some 40 companies constituting the BPF’s Recycling Group.

Recycling 1 tonne of plastic bottles saves 1.5 tonnes of carbon and one plastic bottle saves enough energy to run a 60 watt light bulb for 6 hours.
Energy from waste

Plastics packaging can be recycled six or more times before its properties are weakened. At the end of its life plastics packaging can be submitted to energy from waste schemes. Plastics have a high calorific value. A mixed basket of plastics products made from Polyethylene and Polypropylene, for example, would, at 45 MJ/kg, have a much greater net caloric value than coal at 25 MJ/kg.

Conclusion

Plastics packaging has demonstrated how it can respond to rapid changes in social and economic needs. The industry’s level of innovation will ensure that plastics will play a key role in the development of ‘smart’ or ‘intelligent’ packaging. Finally, the independent data which is increasingly available supports the benign environmental impact of many types of plastics packaging, particularly in the saving of energy and carbon emissions.

Sources


viii BPI, 2011, environmental Facts, p1

ix http://www.recycle-zone.co.uk – How Recycling Works – recycling facts and tips