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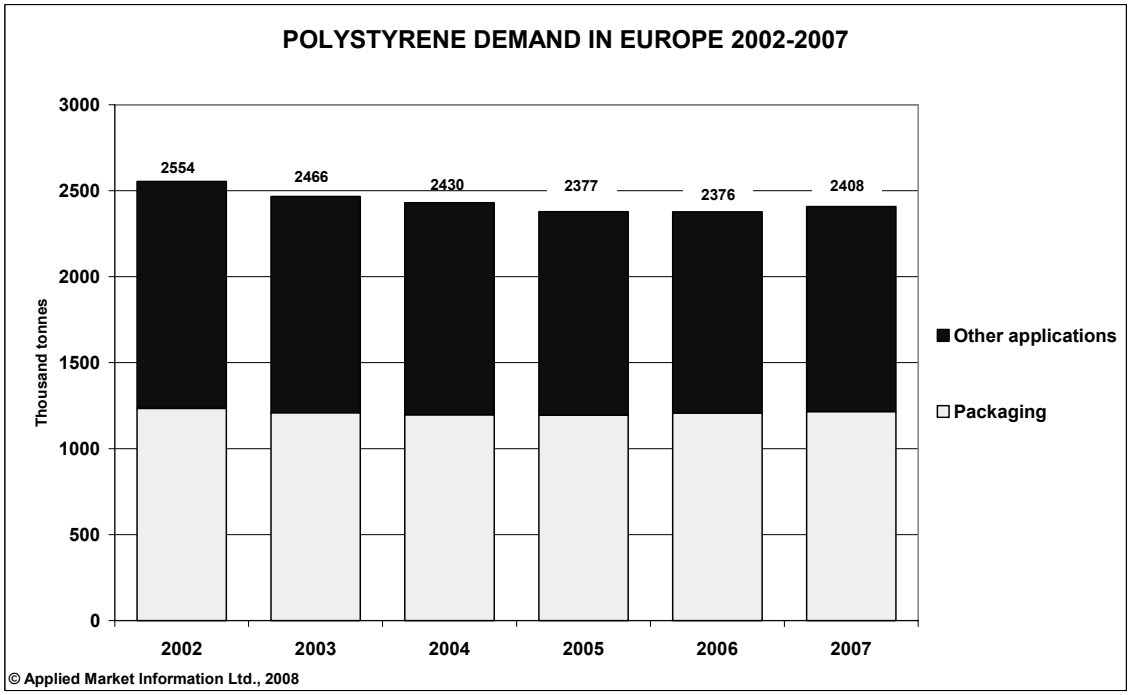
for mineral water bottles. Nowadays Germany and Italy are the leading consumers of PVC for packaging thanks to the large output by leading rigid film producers Klöckner (in Germany) and Ineos (in Italy). In 2006 Klöckner closed a plant in the Netherlands and transferred the PVC sheet operations to Germany.

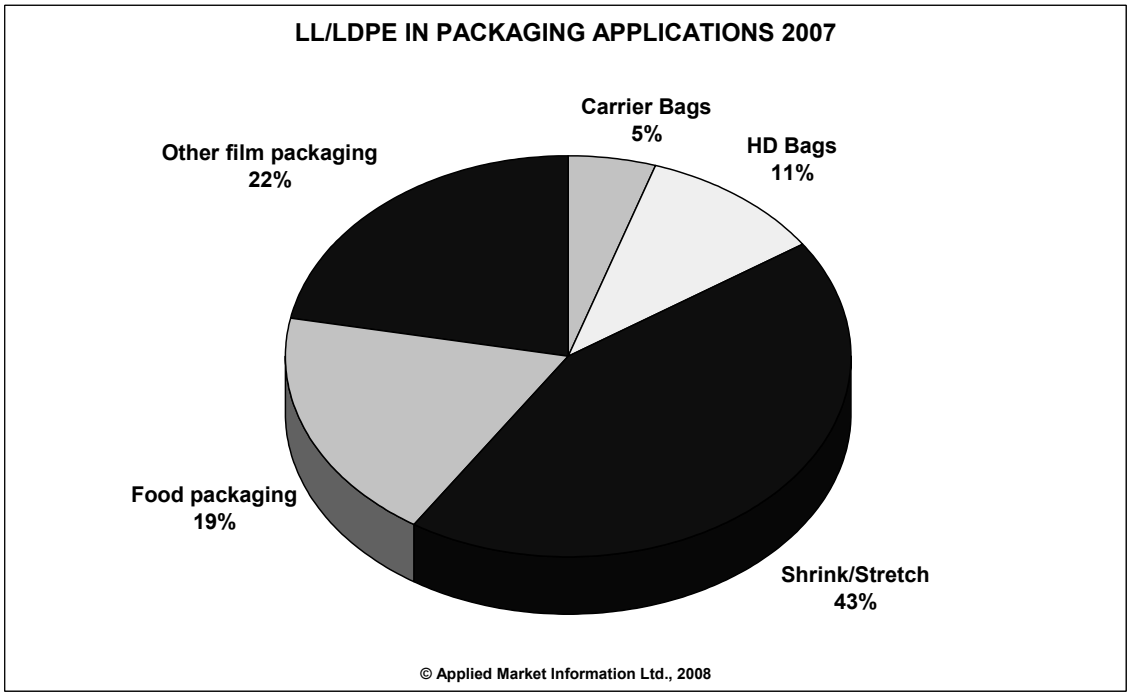
PVC has been the subject of much environmental opposition for many years, which has seen various attempts to ban or limit its use. The pressure resulted in a thorough review of PVC by the EU with the EU horizontal initiative on the environmental issues relating to PVC. To date there has been no findings to justify any restriction or ban of PVC in any applications. The industry is also being more proactive in the debate. In 2000 it established Vinyl 2010 to look at and implement voluntary initiatives to limit the environmental impact of PVC and introduce improved recycling schemes. For 2006 it announced a doubling in PVC recycling through its schemes amounting to 83,000 tonnes.

The underlying weak fundamentals of the European PVC market remain and demand for packaging applications is expected to decline by an average of 0.4%/year to 2012. Packaging markets will remain weak because of environmental opposition to their use and substitution pressures.

4.5 Polystyrene

Polystyrene is produced by polymerising molecules styrene via a chemical reaction initiated by free radical catalysts. Styrene can also be used to make a variety of thermoplastics and rubber. Unmodified polystyrene (also known as general purpose polystyrene) is very brittle, and is therefore often modified to produce general-purpose high-impact polystyrene (GP-HI polystyrene) by polymerising styrene in the presence of rubber. This gives the material a much higher impact strength, but with lower tensile strength and stiffness. The transparency of polystyrene was initially lost with the incorporation of rubber, but there are now high gloss high impact grades of GP-HI polystyrene available. Expanded polystyrene (EPS) is a cellular plastic material based on polystyrene. During the polymerization of polystyrene a physical blowing agent, such as pentane, is incorporated, which leads to the production of fine beads. When these beads are heated, in water or steam, the blowing agent becomes a gas, causing the polystyrene beads to expand. EPS has good thermal insulation and shock absorbing properties, high compressive strength, low weight and good resistance to moisture.





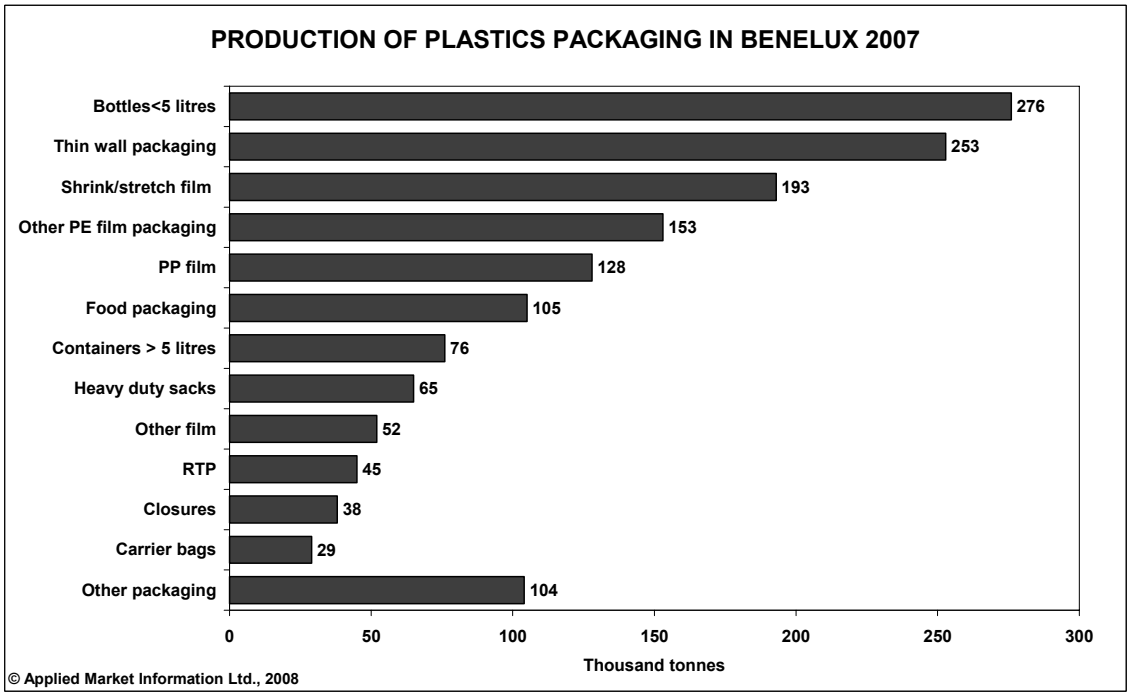
refuse sacks, heavy duty sacks, frozen food bags, produce bags, bread bags and a wide variety of other industrial and consumer packaging.

This sector has been experiencing varying fortunes as pressures continue from environmental groups with various attempts to introduce a tax on plastic carrier bags (only successfully implemented in Ireland at the time of writing), or impose charges for the use of bags (proposed in France, Germany, Italy and Spain). There have also been increasing imports of bags from South East Asia, which have negatively affected the carrier bag market, particularly in the UK but increasingly elsewhere in Europe, to the extent that the EU introduced anti-dumping duties on Chinese and Thai bag producers in September 2006.

Produce bags have tended to show growth because of a trend towards more pre-packed food, gradually eroding demand for self-fill produce bags, while heavy duty sacks have continued to penetrate the paper sack market. Metallocence grades of linear resin are increasingly popular within the heavy duty sack sector and their benefits are summarized in the following table:

Properties	Attributes	End use performance
High impact, puncture and tensile	Improved toughness Blanced properties	20% downgauging potential. Improved performance at some gauge Up to 30% PCR incorporation with acceptable tensile impact and tear. Equivalent edge fold and face impact.
Low extractables	Reduced blocking	Good convertibility, higher line speeds
Low melting point	Lower seal initiation temperature Higher hot tack	Higher line speed Improved seal integrity

Food packaging accounted for 19% of LL/LDPE volumes used in packaging in 2007. The key factor driving demand for LL/LDPE film for food packaging applications in Europe is consumer convenience.



5.5.1 Leading plastics packaging producers in the Benelux

Company Name	Locations	Main Activity
AEP	Ghlin (B)	Stretch film
Artenius PET Packaging	Brecht (B), Gent (B)	PET preform manufacturer
British Polythene Industires	Hardenberg (NL), Roeselare, (B), Zele (B)	PE film producer
Constar	Didam (NL)	Blow moulder of PET bottles
DW Plsatics	Bilzen (B)	Injection moulding for packaging
ExxonMobil Chemical Films	Kerkrade (NL), Virton (B)	BOPP film production
Innovia Films	Merelbeke (B)	BOPP film production
ITW Mima Films	Virton (B)	Stretch film
Kivo	Volendam (NL)	PE film producer for general packaging needs
Luxpet	Bascharage (L)	PET preform manufacturer
Procap	Hoboken (B), Wiltz (L)	Injection moulding of closures
Resilux	Wetteren (B)	PET preform manufacturers
RPC Group	Beuningen (NL), Deventer (NL), Goor (NL)	Sheet extruders for the packaging sector
RPC Group	Antwerp (B), Gent (B), Halfweg (NL), Kerkrade (NL)	Containers
Schoeller Arca Systems	Hardenberg (NL)	Injection moulding for packaging
Superfos	Wetteren (B)	Injection mould thin wall containers
Plasticum	Ede (NL), Tilbur (NL)	Injection moulding of closures
Velsen Flexoplast	Wieringerwerf (NL)	PE film producer for food packaging