The Compelling Facts About Plastics

An analysis of plastics production, demand and recovery for 2005 in Europe - Published Spring 2007

Plastics
The Material for the 21st Century

Contents

What has changed?

This brochure on production, demand and recovery in 2005 is the sixteenth annual publication by the manufacturers of plastics raw materials in Europe.

It aims to provide both an overview of the development of plastics in their wide variety of applications and the progress made to recover these plastics at their end-of-life phase.

Plastics*Europe*'s Market Research and Statistics Group provided the input on production and demand of the plastics raw materials.

Consultic GmbH collected and estimated waste generation and recovery data for EU25+N/CH*. For recovery data, official statistics have been used whenever these have been available from European or National authorities and waste management companies or organisations. Where required research or knowhow from consultants has been used to complete the picture. The section on end-of-life plastics and recovery was overviewed by Plastics*Europe*'s Technical Applications and Recovery Group (TARG).

The figures cannot always be directly compared to those published earlier by APME and Plastics*Europe* due to changes in the estimates of both market demand and the waste generated. However, the overall differences are small and a revision of earlier estimates has been made to enable the historical progress to be tracked of both the use and recovery of plastics across Europe during the last decade.

In addition, as many figures are the result of assessments applying the same definitions across EU25+N/CH they can deviate from corresponding numbers quoted by other sources as they may use different definitions or have made alternative assessments.

** EU25+N/CH include the 25 Member States of the European Union in 2005 plus Norway and Switzerland*

2005 at a glance

- Plastics continue to be a global success story with Europe (EU25+Norway and Switzerland) remaining a major manufacturing region for plastics, producing about 57,5 million tonnes in 2005, representing 25% of the total estimated worldwide production of 230 million tonnes.

- For the whole of the plastics industry - producers, processors and machinery manufacturers - the overall turnover in 2005 (EU25+N/CH) was in excess of 280 billion € and more than 1.6 million people were employed.

- The demand by converters for plastics in Europe (EU25+N/CH) increased to 47.5 million tonnes from 47 million tonnes in 2004.

- The recovery of end-of-life plastics continues to increase by about 10%/year in tonnage terms, with recycling and energy recovery demonstrating similar growth rates. The recovery rate of post-user end-of-life plastics now stands at 47% in EU25+N/CH – up 4% points on the previous year.

- There is continued decoupling in EU25+N/CH of the growth of collected, used plastics and the volume of used plastics sent to final disposal. End-of-life plastics going to disposal continue to fall by 2%/year to 11.6 million tonnes/year.

- There are wide variations in resource management practices for plastics across Europe. The upside in a number of Member States for integrated resource management solutions – including recycling and different forms of energy recovery – will contribute to a more sustainable society.

Plastics today – a global success story

The plastics industry plays a significant part in each of the environmental, societal and economic dimensions of sustainable development.

Our lifestyle would not be possible without plastics. Plastics meet the demands of society by enabling the affordable manufacture of numerous products from protective packaging, lightweight components in cars and aircraft, mobile phones, insulating materials in buildings, medical devices, toys, profiles and pipes to name just a few.

Plastics improve safety, protect the environment and save energy.

In cars, around 60% by weight of the plastics used enhance comfort and safety while 40% are used in applications contributing to weight reduction, resulting in considerable fuel savings and a reduction in CO_2 emissions.

In an Airbus 380, high performance plastic composites will reduce the passenger cost per seat through lower weight and consequently lower fuel consumption.

Homes and buildings are kept warm (or cool!) by plastics insulation. With about 40% of all energy consumed globally used in buildings, optimum insulation will be one of the top initiatives to reach the Kyoto climate change targets.

Innovative design uses plastics for the drums of washing machines reducing both water and energy consumption.

Plastic pipes are used for the safe and efficient transport of drinking water and for sewage systems.

Plastics on the Pitch

Plastics make our lives more enjoyable and activities more affordable in numerous areas. In today's football plastics shape the game more than ever. The 100% plastic ball is virtually water-proof, and thanks to new innovative designs enabled by plastics, rounder than ever before. Now players at all levels will experience more accuracy and power than ever before when they pass, dribble or shoot. The plastic shirt is lightweight, durable and water-repellent whilst transporting moisture from the body. The boots are mostly plastics, while the referee also benefits from his yellow and red cards being made of plastics.

In the medical area plastics are used for blood pouches and tubing, artificial limbs and joints, contact lenses and artificial corneas, stitches that dissolve and splints and screws that heal fractures and many other applications. It is estimated that half of all medical devices are now made of plastics.

Without plastics packaging, it has been estimated that the tonnage of alternative packaging materials would increase by a factor of four, emissions of greenhouse gases by a factor of 1.9, costs by a factor of 1.9, energy use by a factor of 1.5, and waste by a factor of 1.6 in volume.

The use of plastics in electrical and electronic appliances has contributed significantly to advances in communication technology, satellites, mobile phones, GPS, televisions and more. Flat screen LCD monitors and televisions are not only more aesthetic and space saving, they also consume a third of the energy of the traditional cathode ray tube-based technology.

And as the world faces the challenge of finding and developing new sources of energy, plastics can be expected to play an important role. From fuel cells to solar and wind energy generation installations, plastics are demonstrating their versatility in enabling the innovations for the future. On social progress, plastics bring access to better education and healthcare through more affordable computers, communication, internet and advances in medical technology. The coming 100$ laptop for developing countries will use plastics extensively.

Recently the plastic chip was progressed to commercialisation stage, with the potential to reduce costs by 90% compared to the silicon chip and create new opportunities.

Why are plastics so versatile?

The low density of most plastic materials means the end-products are lightweight. They also have excellent thermal and electrical insulation properties; some can even be made as conductors of electricity when required. They are corrosion-resistant to many substances which attack other materials, and some are transparent, making optical devices possible. They are also easy to mould into complex shapes and forms, allowing integration of different materials and functions. And in the event that the physical properties of a given plastic do not quite meet the specified requirements, the property balance can be readily modified with the addition of reinforcing fillers, colours, foaming agents, flame retardants, plasticisers etc. to meet the demands of the specific application.

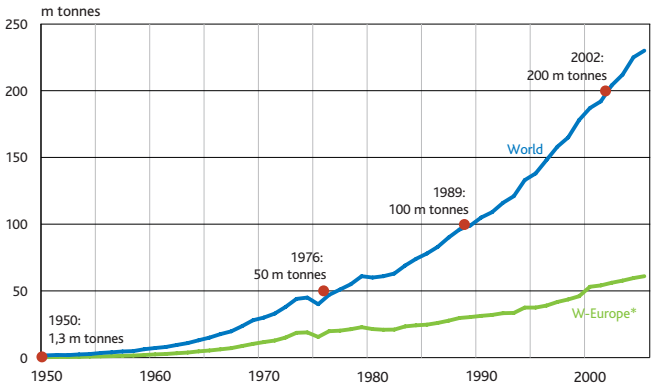
Production and market demand of plastics in a world context

Continuous innovation helps explain that since 1950, plastics production has increased by an average of almost 10% every year on a global basis. From around 1.3 million tonnes in 1950 the total global production of plastics has grown to 230 million tonnes in 2005.

An analysis of plastics consumption on a per capita basis shows that this has now grown to over 100kg/y in North America and Western Europe, with the potential to grow to up to 130 kg/y per capita by 2010. The highest potential for growth can be found in the rapidly developing parts of Asia, where currently the per capita consumption is only around 20kg/y.

In the European context, it is the new Member States which are expected to see the biggest increase as their economies develop. Their current per capita consumption of 55 kg/y is currently little more than half of the old Member States.

Figure 1: World plastics production 1950 - 2005



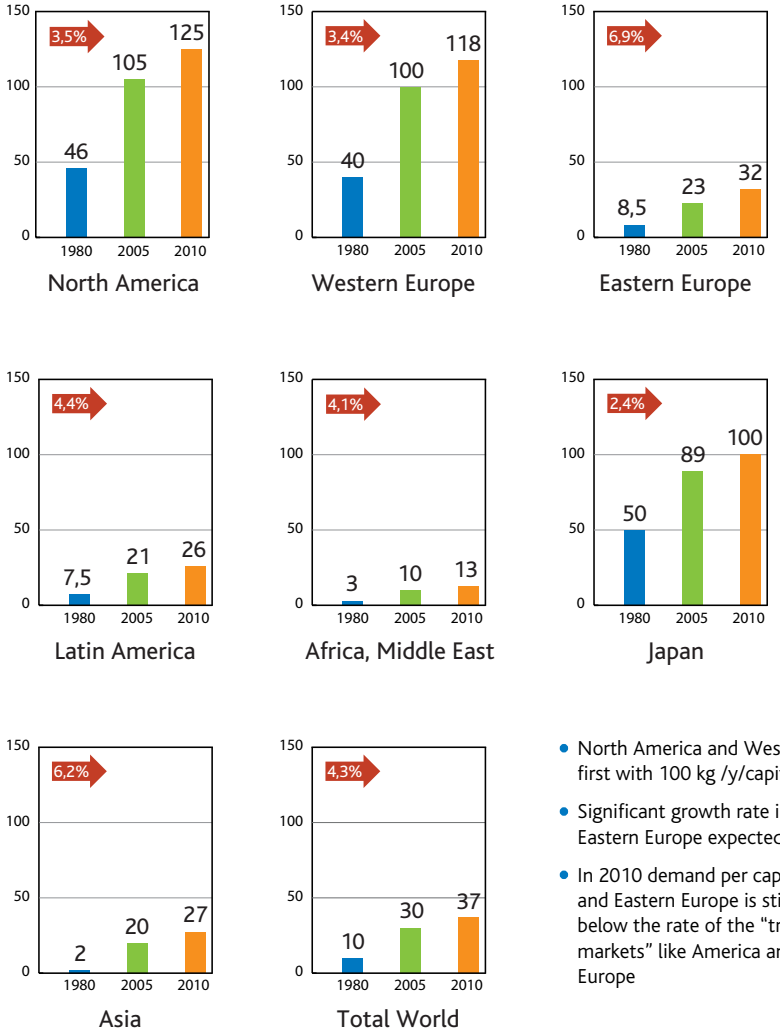
- 1949: Global production exceeded 1 m tonnes
- 1976: >50 m tonnes
- 1989: >100 m tonnes
- 2002: >200 m tonnes
- 2005: >230 m tonnes

*) EU 25+2 ex Year 2000

Note: Based on preliminary estimates by European Market Research & Statistics Working Group. Includes thermoplastics, thermosets, adhesives, coatings and dispersions. Fibers are not included.

Source: Plastics*Europe*, WG Market Research & Statistics

Figure 2: Per capita demand/y of plastic materials*
in kg/y per capita 1980 - 2010 and growth p.a.



- North America and Western Europe first with 100 kg /y/capita
- Significant growth rate in Asia and Eastern Europe expected
- In 2010 demand per capita in Asia and Eastern Europe is still much below the rate of the "traditional markets" like America and Western Europe

Note: *) localy converted volumes
Without adhesives, coatings, dispersions etc.

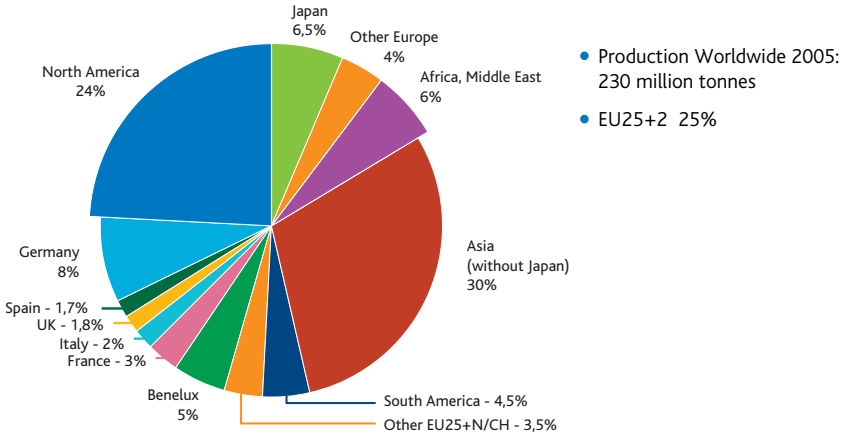
Source: Plastics*Europe*, WG Market Research & Statistics

Production and demand in EU25+N/CH

EU25+N/CH represent 25% of global production, at a similar level to that of North America, at 24%. Within Europe, the base polymer production facilities are well spread. Germany is the major producer, accounting for 8% of global production, followed by Benelux (5%), France (3%) and the UK, Italy and Spain (the 3 latter at 2%) (Figure 3).

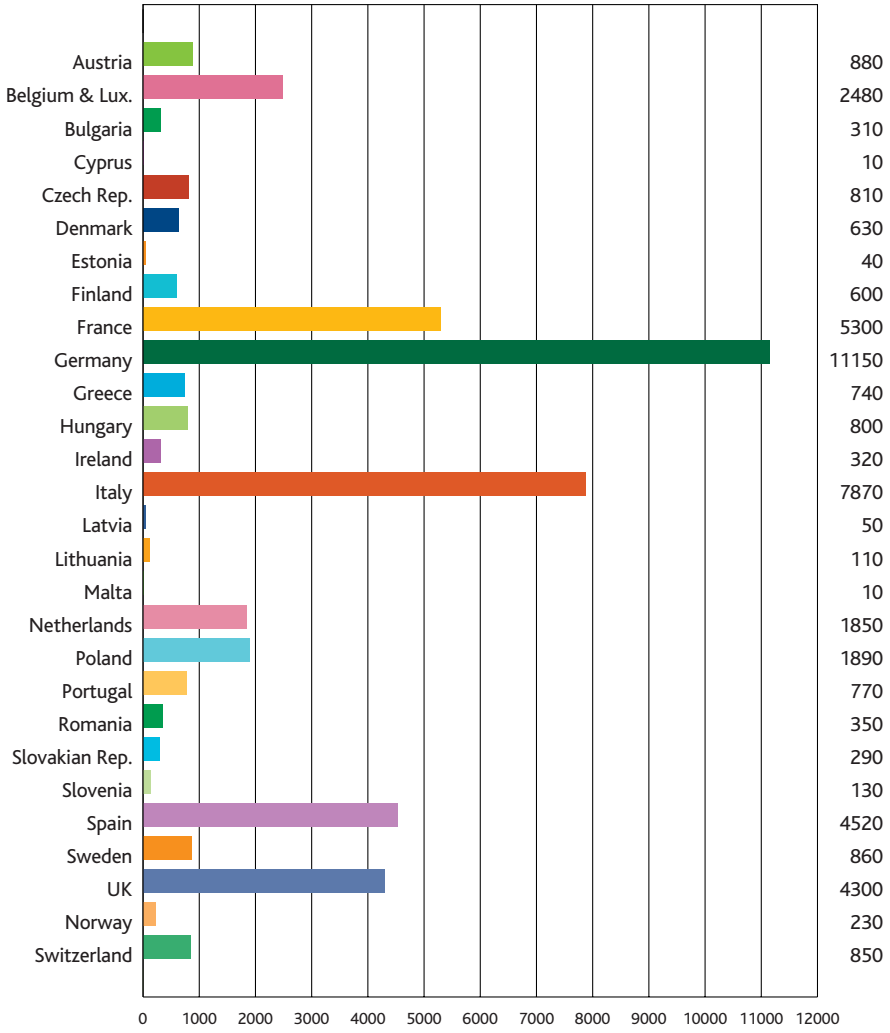
Plastics demand by converters in EU25 + Norway and Switzerland was 47.5 million tonnes in 2005. The demand expressed as tonnage of virgin resin processed by European converters by country is shown in Figure 4. The major countries are Germany and Italy, which together account for around 40% of all European conversion to plastics products. Of the new Member States, Poland has the highest plastic conversion, currently at about 1.9 m tonnes of the European total. The Czech Republic and Hungary are each about half this. It is expected that the converting industries in most of the new Member States will grow strongly in the coming years.

Figure 3: World plastics production per country / region breakdown by producer countries 2005



Source: Plastics*Europe*, WG Market Research & Statistics

Figure 4: Plastic demand by converters: breakdown by country in Europe (k tonnes/year)



Key figures

Around twenty distinct groups of plastics exist, each with numerous grades available to enable the optimum choice to be made for each specific application. There are five high volume families of plastics. These are polyethylene (including low density-LDPE, linear low density-LLDPE, high density-HDPE), polypropylene (PP), polyvinylchloride (PVC), polystyrene (solid-PS, expandable-EPS) and polyethylene terephthalate (PET). Together they account for around 74% of all plastics demand in Europe. Figures quoted were collated by the European Market Research and Statistics Working Group and represent well over 95% of the total production capacity in Europe for these plastics (figures cover EU25+Norway+Switzerland unless indicated otherwise). The graphs show the consolidated results for 2003, 2004 and the best industry estimates for 2005. The terms used are defined as follows.

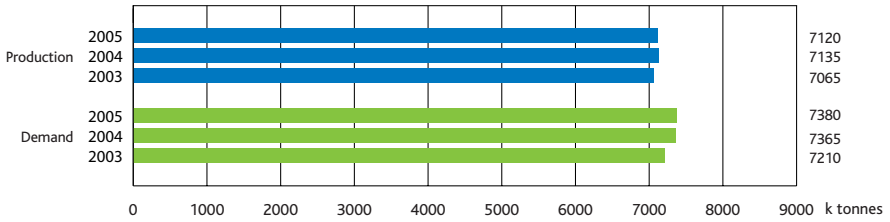
PRODUCTION

means polymers produced in Europe.

DEMAND

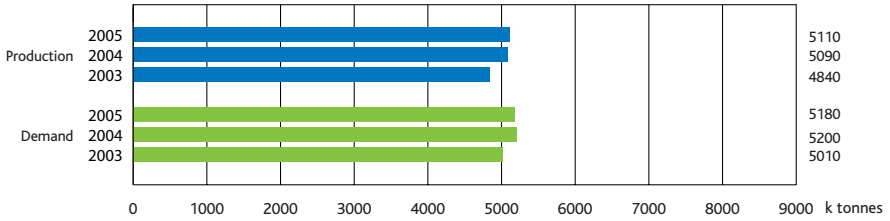
means all 'virgin' polymer used by converters in Europe including imports. Reported as "sales" in 2005.

LDPE + LLDPE

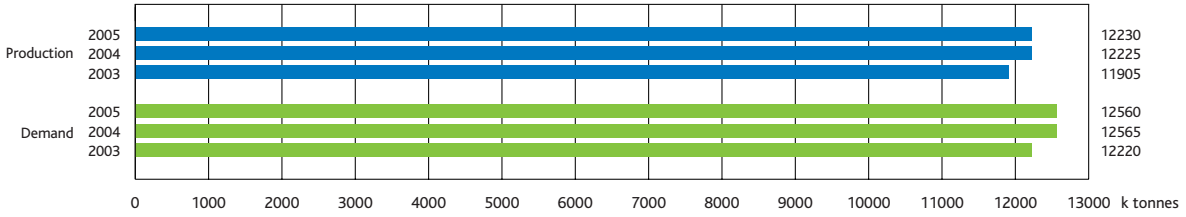


HDPE

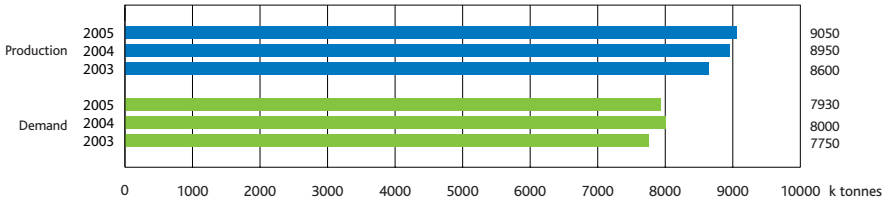
covers grades of polyethylene having densities in excess of 0.940.



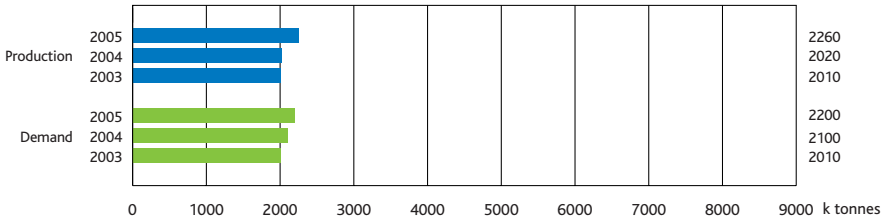
PE - Total



PP

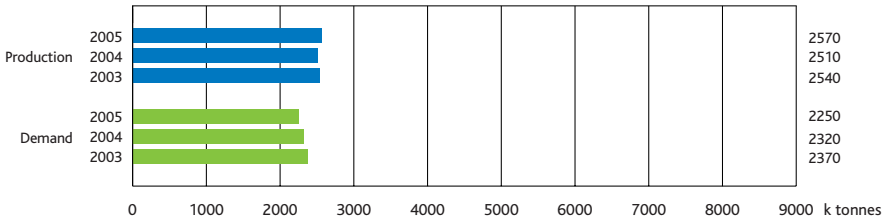


PET (bulk)[1]



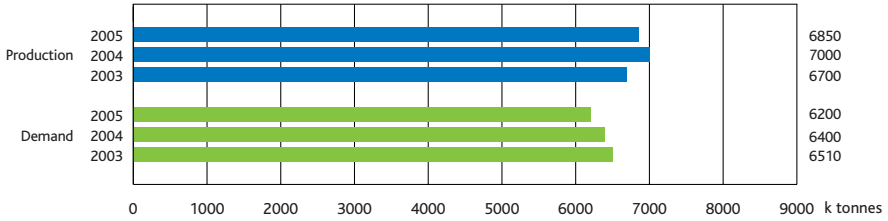
PS[2]

Does not include expandable or modified grades. Production and sales figures do not include the operations of non-participating companies which are estimated at about 150 k tonnes in Europe in 2005.



PVC[2]

Figures are relevant for the PVC-producing companies established in the EU25, excluding Greece and Slovakia. These figures also include Norway, Switzerland and Romania. The production and sales figures do not include the operations of non-participating companies, which are estimated to be about 180 k tonnes in EU25 in 2005.



[1] *EU-15 + Norway + Switzerland + Malta + Cyprus*
[2] *EU-25*

Plastics in a resource efficiency perspective

Plastics save energy and CO_2 emissions during their use phase. If we were to substitute all plastics in all applications with the prevailing mix of alternative materials, and look from a life cycle perspective, then 22.4 million additional tonnes of crude oil per year would be required. The corresponding, additional greenhouse gas emissions would be equivalent to 30% of the EU15 Kyoto reduction target for 2000-2012.

Plastics contribute to waste minimisation by more and more resource effective solutions, including less energy to produce plastics, less plastics material to do a particular job and less waste of the contained goods whether it is food or water or a computer.

Plastics are reused in a number of areas. Soft drink bottles of plastics are reused in deposit systems in a number of Member States, many of us reuse the carrier bag for a variety of needs, circulating trays of plastics used in supermarkets offer a clean, robust and costeffective way of moving vegetables, bread or fish from producer to customer.

The recycling of plastics is increasing year on year. In addition to the well known applications like bottles and industrial packaging film we are starting to see additional applications developing, like window frames. These important developments must continue, and we must continue to try to realise the full potential of existing applications, for example there is still much potential across EU25+N/CH to increase bottle recycling.

However even if we include these growing applications there will be residual applications which are not appropriate to recycle for a number of reasons:

- plastics mixed with other materials require more energy for cleaning than is contained within the product itself, e.g. food packaging
- mixed waste e.g. different materials from an automotive shredder is extremely costly to separate
- plastics are both diverse and very lightweight, making it hard to distinguish and source-separate each piece of plastics in e.g. the garbage bin. In most cases it is both energy-intensive and very expensive to collect separately.

Unlike several traditional materials, plastics offer an additional recovery option – energy recovery. As long as we use fossil fuels for energy production, plastics will offer an additional value to society for these hydrocarbon molecules on their journey from oilwell to energy source.

Landfill or disposal must be minimised as it wastes a valuable resource and contributes to greenhouse gas formation.

For these reasons plastics justify a wider waste management framework to capture the full potential of plastics in society.

Plastics*Europe* vision for forward-looking resource efficiency

- **Minimise disposal of plastics waste to landfill**
- **Use mix of recovery options for the best environmental and economic in every situation**
- **Treatment and recovery of waste under defined environmental standards**
- **Overall life cycle impact should be taken into account**

The plastics supply chain from cradle to grave

Figure 5 illustrates the flow of plastics from raw material to converters, consumption, post-consumer waste and finally the distribution amongst the end-of-life options. The data are valid for EU25+Norway and Switzerland. The converters used 47.5 million tonnes of plastics raw material in 2005. 22 million tonnes end up as post consumer waste each year.

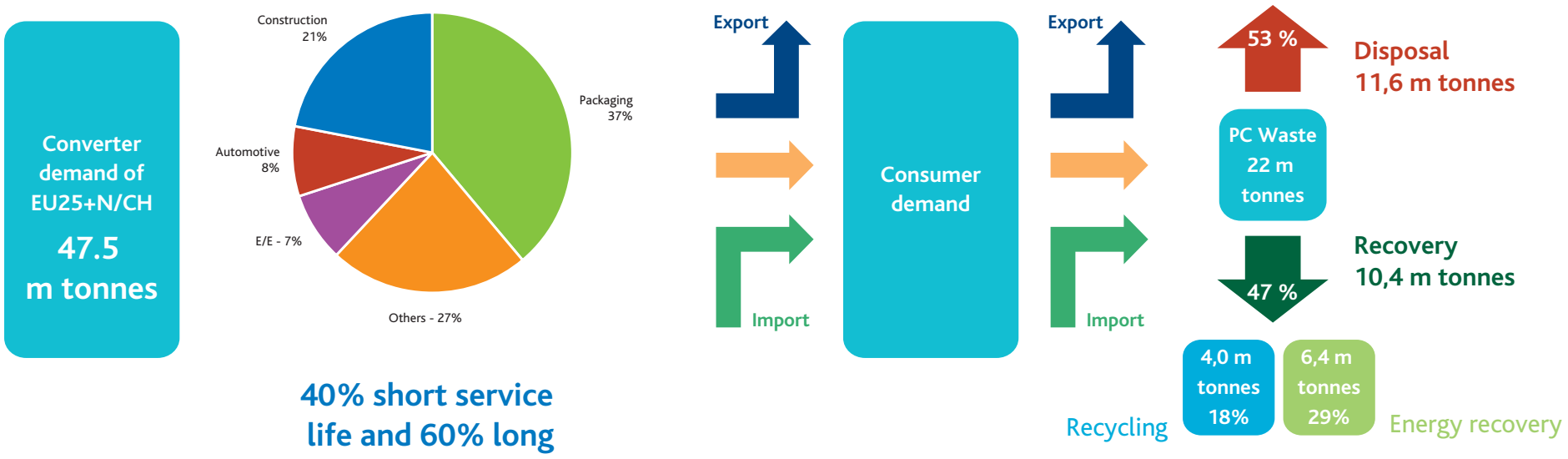
47% of the post consumer waste was recovered and 53% went to disposal. Of the 10.4 million tonnes recovered 4 million tonnes were recycled – through mechanical and feedstock recycling – and 6.4 million tonnes were recovered as energy.

The overall material recycling rate of post-consumer plastics in 2005 was 18%, with mechanical recycling at 16 % (up 1% point over 2004) and feedstock recycling at 2%.

The energy recovery rate was up by 3% points over 2004 to 29%, reflecting the stricter legislation on landfill in several Member States.

In 2005, 11.6 million tonnes of plastics were wasted in landfill. If recovered, the energy saved – either by avoiding producing more virgin plastics or replacing fossil fuel for energy production – would be sufficient to cover 50% of the energy demand for Denmark.

Figure 5: Plastics from cradle to grave
EU25+N/CH 2005



Source: Plastics*Europe*, Consultic 2005

Plastics continue to decouple growth in demand and material to landfill

Despite a 3%/year growth over the past decade for both plastics demand and post-consumer waste, the quantity going to landfill has continued to decline by about 2%/year. Figure 6 shows the history for EU15+N/CH up to 2005 and the figure for EU25+N/CH for 2005.

Figure 7 illustrates the growth of both mechanical recycling and energy recovery.

Over the last decade the average annual growth rate has been about 10%. Feedstock recycling has remained flat over the past 8-9 years.

To continue this trend considerable effort and investment need to go into both recycling and energy recovery to keep up with the expected future growth in plastics.

Flexible legal framework and support for innovation will be key to drive further progress.

Figure 6: Continued decoupling of growth in plastics waste and disposal on landfill

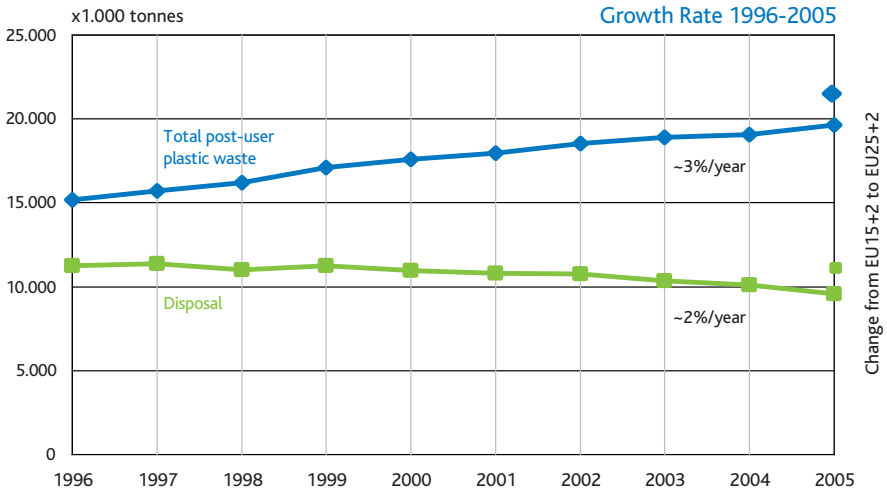
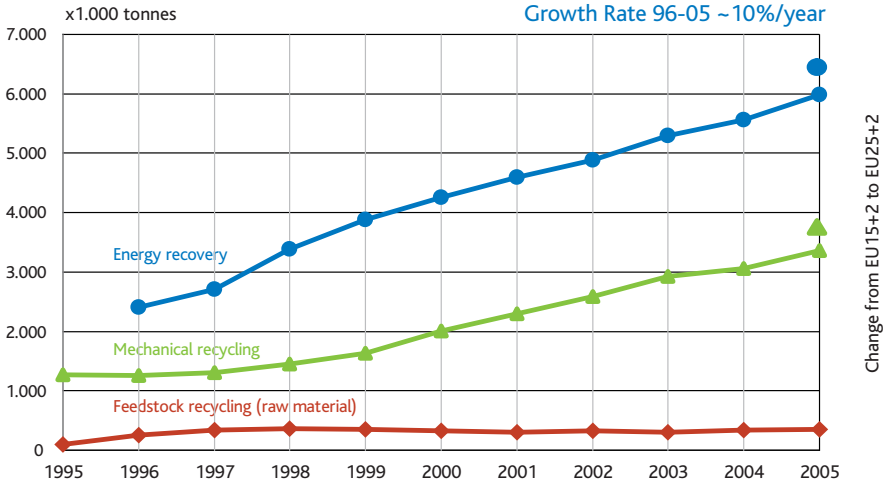


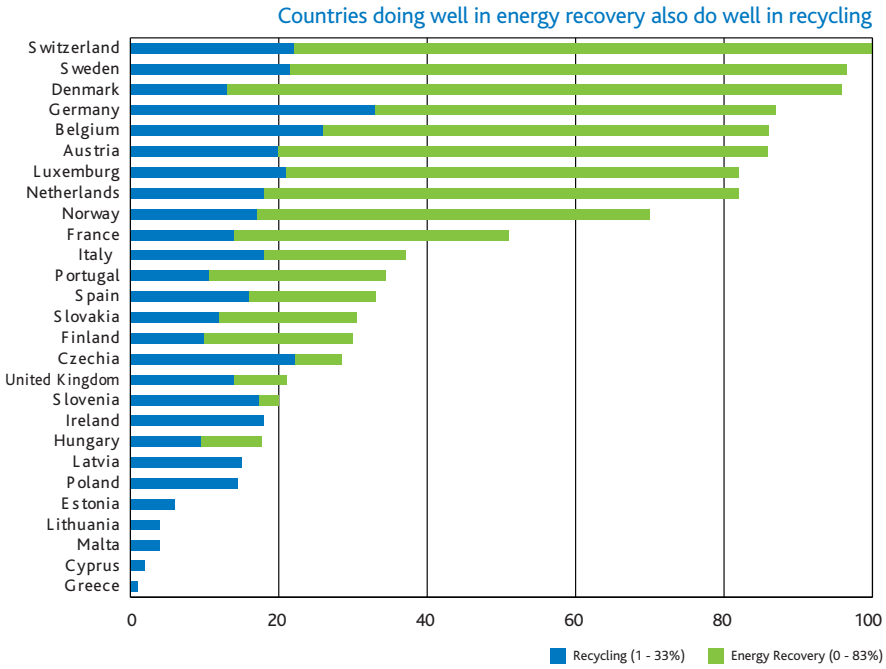
Figure 7: Strong continued growth of recycling and energy recovery



Resource management strategies vary across Europe

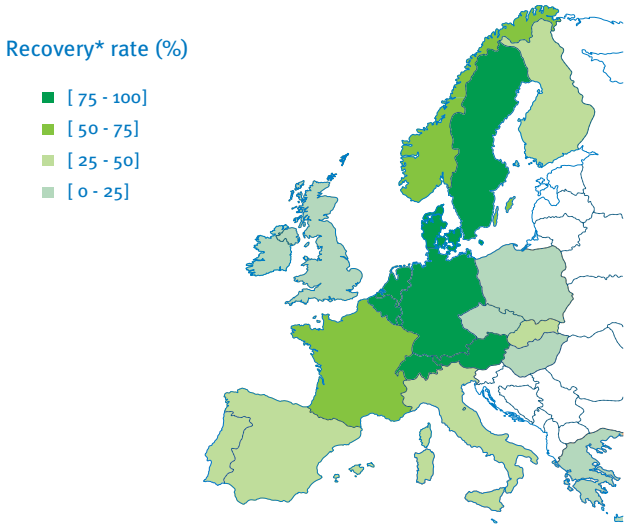
The material recycling and energy recovery of post-consumer plastics waste varies significantly by country.
In some countries like Switzerland, Sweden and Denmark there is virtually no landfill – these countries are very close to completing their diversion-from-landfill strategy. Also Germany, Belgium, Austria, Luxembourg and the Netherlands recover more than 80% of their post-consumer plastic waste. On the other end of the scale we have several of the new Member States but also the UK, Ireland and Greece who recover 20% or less.

Figure 8: Several countries are near diversion from landfill



One important observation from Figure 8 is that countries with high recovery do well on both recycling and energy recovery. We can therefore bury the myth that a strategy including energy recovery is contradictory to achieving good recycling results. It simply illustrates that a complete resource management strategy needs to address both, as no country has been able or is likely to be able to recycle all post-consumer waste!

Figure 9: Recovery rates of post-user plastics across Europe



Baltic States, Slovenia, Cyprus and Malta are not indicated because some recovery data is missing.
*Recovery include recycling - mechanical and feedstock - and energy recovery

The other observation that can be drawn is that recycling performance is fairly similar across most of the EU25+N/CH countries. If we exclude Germany, with a high green dot fee and contribution from feedstock recycling, and some of the new Member States we find the other 21 countries within a fairly narrow range.This level of recycling can be achieved by setting up systems for recycling of bottles and industrial packaging film. Some countries have recently introduced their system while others have operated their systems for a longer time. Even if there is still potential for growth in e.g. bottle recycling in a number of countries, the fact that countries with long experience have not achieved more suggests that increasing recycling rates will be increasingly difficult.

Trends in mechanical recycling

The reporting of recycling performance is done on a member state level, and reflects the amount of material collected for recycling, whether that be across borders within the EU or overseas to countries such as China or India.

In recent years European recyclers have been concerned that they cannot compete effectively, especially in those cases where industry standards and conditions are less stringent than in Europe.

Within Europe, there is much cross-border movement of material for recycling. For example the proportion of imported waste treated by recyclers in Switzerland, Belgium and the Netherlands is in the range of 35-45%.

Mechanical recycling is a well-established and growing business. The total recovery rate for post-consumer plastics waste by mechanical recycling increased by 1% over 2004 to 17% in 2005. This represents an increase up to a EU25+N/CH total of 3.7 million tonnes.

Most of the increase was achieved through the expansion of packaging streams such as PET bottles and PE transport packaging film.

Adapting systems as a result of experience and changed conditions is also underway. In Austria, for example, many municipalities have stopped the collection of mixed plastics and are focusing on bottles from households as input for mechanical recycling.

Plastic bottles are suitable for recycling

An application within packaging with good recycling track record is the bottle. Such bottles can be made of PET, PE, PP or PVC.

According to statistics from Petcore 35% of all PET bottles were recycled in 2005 – which is up by 3% over the previous year. In tonnage this amounts to 0.8 million tonnes/year.

The countries in EU25+N/CH demonstrate huge variations, from below 10% to around 60-65% in Belgium based on a no-deposit system. In countries with deposit systems recycling rates of 80-85% are being achieved.

The system in Austria is based on a combination of kerb-side collection and bring stations, for bottles only, depending on the demography. Bottles are collected separately and brought to sorting plants where the different kinds of materials are separated and sent to recyclers. A mixed fraction of sorting residuals is sent to energy recovery.

Technologies for cleaning processed bottle material, to allow bottle to bottle recycling, are in use in e.g. France and Switzerland and is expected to increase in the future.

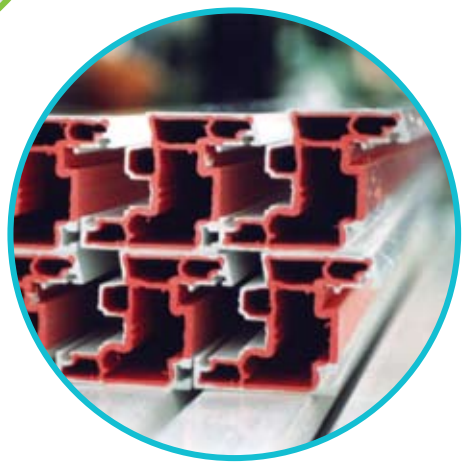
72% of all collectable waste from PVC windows are recycled

The 'European PVC Window Profile and Related Building Products Association' (EPPA) has exceeded its target to recycle 50% of all collectable window profile waste in 2005. They actually recycled 72% i.e. 11.433 tonnes of the window profile waste.

There are collection and recycling systems for PVC windows in many countries of Europe: Austria, Belgium, Denmark, France, Germany, Great Britain, Ireland, Italy, the Netherlands, and Spain.

As plastic windows function without problems for several decades, larger quantities of waste are expected to become available in the future. Nevertheless, adequate recycling capacities are already being provided for. In professional recycling all plastic windows, including fittings and glass, are usually pre-crushed in a shredder. By means of special separators all metal components and glass are excluded from the material flow. Subsequently all PVC, which at first exists as coarse grinding stock of 15 to 25 millimetres in diameter, is hacked to some millimetres grain size in a cutting mill.

Additional separation and processing steps for quality improvement follow in line. The cleaned PVC powder is then heated, pressed through a screen and granulated. This granulate is then used as raw material for the production of new PVC-construction products.



Trends in feedstock recycling

Feedstock recycling is an integral part of many vital industrial processes, for example in the production of iron in blast furnaces. Waste plastics can be used as a substitute for coke as feedstock in this process, where they act as a reducing agent to produce iron from iron ore. Industry has invested considerably over many years in innovative, eco-efficient waste management technologies. This has been practised on a large scale in Germany for many years. Also Voest Alpine in Austria has the installations ready to use up to 200.000 tonnes of pre-treated plastics in the blast furnace.

The Volkswagen-SiCon process is such a development. The EU Commission recognized this achievement in car recycling technology and presented on 2 June 2006 Volkswagen with the "European Business Award for the Environment.

In this process Automotive Shredder Residue (ASR) is treated to produce several fractions, two of them originating from plastics: "granules" which can be used in the blast furnace and "fibres" which can be used as fuel in a gasification plant.

Another large scale feedstock recycling plant is that of the Sustec Schwarze Pumpe GmbH gasification unit in Germany which produces methanol from syngas.

One interesting recent development has been the use of an integrated non-ferrous metal smelter for the treatment of WEEE plastics having a non-ferrous metal content. Again the plastics in used wiring boards act as a reducing agent. Successful trials were also held in Sweden (details in references). It is likely that this will be replicated at other integrated precious metal smelting installations.

Other feedstock recycling developments have been aimed at specific plastic types. Pilot scale trials have successfully demonstrated the possibility of converting used PET back into the base monomers to make new plastics.

Trends in energy recovery

In 2005 29% (i.e. 6.4 million tonnes) of the postconsumer plastics waste was recovered as energy in the EU25+Norway and Switzerland, up 3% points on 2004.

Municipal incinerators remain the most common form of energy recovery.

Capacity has been added as a consequence of the Landfill Directive and countries like Switzerland, Denmark, Sweden have above 75% of their post-consumer waste treated in energy recovery plants. Austria, the Netherlands and Belgium are all achieving around 60%. Other countries have less than 20% of their postconsumer waste recovered in energy recovery plants. This includes not only new Member States, but also countries such as Finland, Greece, Ireland, Spain and the UK.

There is growing recognition in e.g. Ireland and the UK of the need to increase capacity, but the planning process is time-consuming and planning permission is frequently challenged by NGOs and local interest groups.

Another form of energy-from-waste is to produce solid recovered fuel (SRF) by concentrating high calorific waste and converting it into a defined specification. The use of such solid recovered fuels is expected to grow after the introduction of CEN standards for the classification of this type of fuel. This kind of "concentrated", high-calorific fuel has huge potential in partly replacing other fuels in cement kilns, for power plants and in pulp/paper plants. SRF capacity is being expanded in Germany. Ineos – a plastics producer – is seeking permission for a SRF-fuelled power plant in the UK and a Finnish power company is building a new SRF-fed power station.

Further convergence of EU waste and energy policies will make a major contribution to the sustainable use of resources and form the platform on which continued innovation can develop.

Spittelau in Vienna - a model incinerator installation

Spittelau is a combined heat and power incinerator located in the city centre of Vienna – only 3km from the St Stephen Cathedral. The plant was developed in late 1980s into a striking design by Friedensreich Hundertwasser.

The plant has a capacity of 260.000 tonnes/year and produces 66MW, with an efficiency of up to 86%. Of the total output 60MW goes to heating the Vienna district heating system and 6MW is generated as power for the Vienna grid.

Plastics make up around 10% by weight of the feed but as much as 50% of the calorific content thanks to the high specific calorific value of plastics. When the flue gas leaves the 128m high chimney it has passed one of the most effective cleaning processes, securing full compliance with the Waste Incineration Directive.

In a public poll held several years after it began operations 3% were against waste incineration and 81% were positive to waste incineration and district heating. The magic recipe of investing in a comprehensive educational campaign, securing the highest technical standards and choosing an outstanding design can surely be copied elsewhere!

Used plastics by sector

Packaging

An important part of plastics recovery is from packaging applications, and this is also the sector with most mechanical recycling, whether the main focus is on household packaging (as in Germany) or commercial/ industrial packaging (as in the Netherlands). Mechanical recycling is favoured for clean streams in bigger quantity such as water or soft drink bottles.

Overall, mechanical recycling for all packaging is over 25% in a number of old Member States (Austria, Belgium, Germany, Italy, the Netherlands, Norway, Sweden and Switzerland). In addition, new Member States like the Czech Republic and Slovenia exceed 25%.

However, there is significant progress to be made in other countries, some of which still have mechanical recycling rates under 10%.

Agricultural films

Agricultural plastics waste such as silage film is a good source for mechanical recycling as it is made from a limited range of plastics, mostly polyolefins, although contamination poses a challenge. Half of the volume comes from the 3 biggest countries in tonnage terms - Germany, Italy and Spain - with a combined recycling rate just over 20%.

Automotive

The recycling rate for automotive plastics waste continued to increase to just under 10% in 2005. Volkswagen won an environmental award for their VWSiCon process - a mechanical process treating the post shredder, non-ferrous residuals from vehicles shredded at the end of their useful life.

Plants to use this technology are under construction in the Netherlands and in Austria.

Electrical & electronic

Recycling in the Electrical and Electronic sector is limited by complex products with materials intermingled in a way which makes sorting an intensive and expensive activity. For these waste streams, thermal treatment via feedstock recycling or energy recovery is the most appropriate procedure. There is also some uncertainty about the actual volumes of discarded E&E equipment. It can be assumed that much is exported outside Europe.

Construction

Plastics used in construction are for long-term use and hence generate relatively little waste. Nevertheless increased recycling is being achieved in applications such as window profiles and pipes.

What has Europe learned, and what about the future?

The use of plastics is expected to continue and increase, driven by:

- potential for innovation
- energy saving in the use phase
- quality of life enhancement
- enabling of affordable products

For recovery, mechanical recycling will remain the preferred method for homogeneous plastics waste streams, whereas for mixed streams other recovery options, like feedstock recycling and energy recovery, are often preferable.

On disposal, given the high calorific value of plastics, the landfilling of plastics waste is clearly to be minimised.

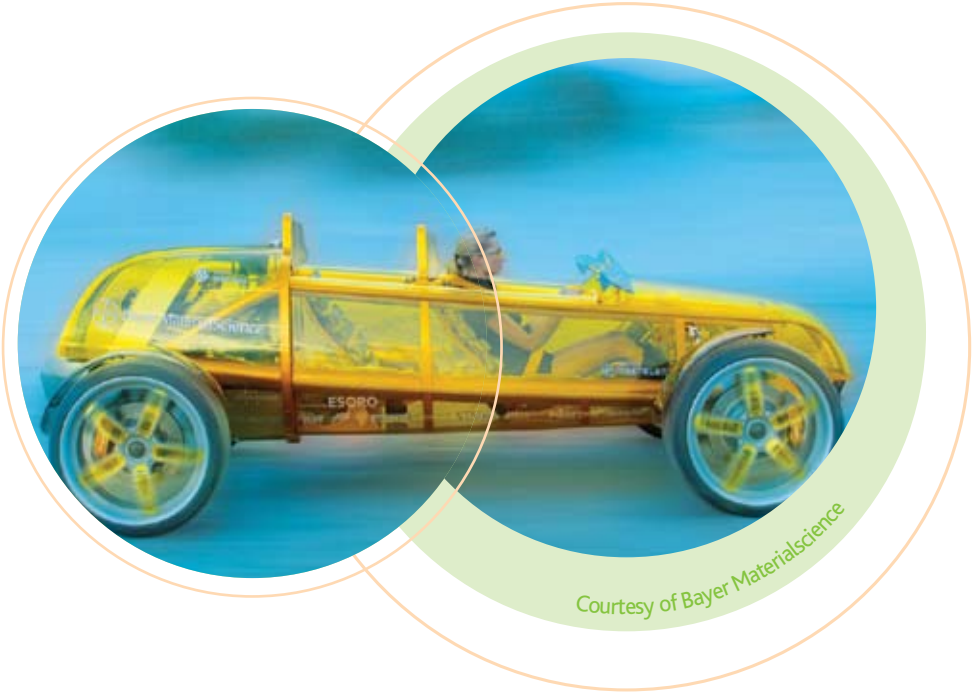
The last 10 years have seen a remarkable change in the approach to waste management across Europe. As a result, there has been a significant increase in the recycling of all materials as well as more recovery of energy from combustible waste. The situation with respect to plastics materials is no exception, and as this report demonstrates, both recycling and energy recovery of plastics waste continue to increase.

The European Commission is in the process of revising the current legal framework to integrate the need to respond to today's economic challenges of the Lisbon strategy with maintaining a high level of environment protection. In this context the process of "Better Regulation and Simplification" is an important driver.

One such revision is of the Waste Framework Directive. Important decisions will be taken relating to plastics, including the definitions of recycling and energy recovery as well as the application of the waste hierarchy.

A broad recycling definition will create drivers for innovation that will push today's recycling rates further. Similarly a flexible application of the waste hierarchy will stimulate the search for the best environmental and economic solution in each situation, which will contribute to a sustainable society better than a strict application.

In addition, with the EU Thematic Strategy on the Sustainable Use of Natural Resources, it is being increasingly recognised that waste is part of a larger picture and that energy supply and energy efficiencies play a key role in meeting the goals of sustainable development.



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The Plastics Industry

The European plastics industry makes a significant contribution to the welfare in Europe by enabling innovation, creating quality of life to citizens and facilitating resource efficiency and climate protection.

More than 1.6 million people are working in about 50.000 companies (mainly small and medium sized companies in the converting sector) to create a turnover in excess of 280 billion €/year.

The plastics industry include polymer producers - represented by Plastics*Europe*, converters - represented by EuPC and machine manufacturers - represented by EUROMAP.

For further info see the web links below:

www.plasticseurope.org www.plasticsconverters.eu www.euromap.org

Who are Plastics*Europe*?

Plastics*Europe* is one of the leading European trade associations with centres in Brussels, Frankfurt, London, Madrid, Milan and Paris. We are networking with European and national plastics associations and have more than 100 member companies, producing over 90% of all polymers across the EU27 Member States plus Norway, Switzerland, Croatia and Turkey.

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