



The data presented in this report was collected by PlasticsEurope (the Association of Plastics Manufacturers in Europe), EuPC (the European Plastics Converters), Plastics Recyclers Europe and EPRO (the European Association of Plastics Recycling and Recovery Organisations). PlasticsEurope's Market Research and Statistics Group (PEMRG) provided input on the production of and demand for plastics raw materials. Consultic Marketing & Industrieberatung GmbH helped assess waste generation and recovery data. Official statistics from European or national authorities and waste management organisations have been used for recovery and trade data, where available. Research or expertise from consultants completed gaps.

Figures cannot always be directly compared with those of previous years due to changes in estimates. Some estimates from previous years have been revised in order to track progress, e.g. for use and recovery of plastics across Europe over the past decade.

All figures and graphs in this report show data for EU-27 plus Norway and Switzerland, which is referred to as Europe for the purposes of abbreviation – other country groups are explicitly listed.

# A success story



**1850**

Celluloid

Versatile and highly inflammable material made of cellulose which was used for the production of the first films but also jewellery.

**1970**

1<sup>st</sup> plastic bumpers

Offering lightweight, high shock absorption and esthetic performance.



**1907**

Bakelite

The robust phenolic resin was used for the production of telephones, radios and light switches for instance.



**1939**

Nylon

The world's first truly synthetic fibre offering durability.

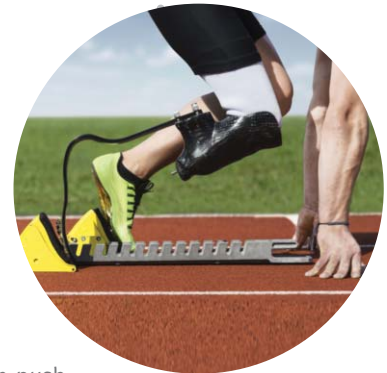


Courtesy of DuPont

**2013**

Plastic prostheses

Thanks to plastics, we can push our limits much further.



# Introduction

***Plastics – the Facts* is an analysis of the latest data related to the production, demand and waste management of plastics materials.**

It provides the latest business information on production and demand, trade, recovery as well as employment and turnover in the plastics industry. In short, this report gives an insight into the industry's contribution to European economic growth and prosperity throughout the life cycle of the material.

In 2012, the plastics industry including plastics producers, plastics converters and the plastics machinery accounted for an estimated 1.4 million jobs in the European Union's 27 Member States and had a combined turnover of above 300 billion euro. With more than 62,000 companies in operation in the EU, plastics not only enable modern lifestyles, the material also contributes to research and innovation, to higher standards of living and the overall welfare of the European citizens.

In the second half of the 20<sup>th</sup> century, plastics became one of the most universally-used and multi-purpose materials in the global economy. Today, plastics are utilised in more and more applications and they have become essential to our modern economy. The plastics industry has benefited from

50 years of growth with a year on year expansion of 8.7% from 1950 to 2012.

Plastics have become an essential part of our modern lifestyle. Without plastics, we would not be able to enjoy LCD flat screen televisions or touch-screen smartphones and tablets! We would not be able to practice most sports either, since a wide range of equipment and outfits are made of plastics, including balls, boots, racquets, helmets, skis, surf boards, swimming or diving suits while plastic prostheses which replace body parts enable athletes to compete to the highest levels of their sport. Even Formula 1 cars are built with plastics parts to boost their performance! And in Paralympics Games, plastic prostheses which replace body parts make it possible for many athletes to compete.

In the medical and safety area, plastics are enabling major breakthroughs. The latest medical techniques use plastics to unblock blood vessels, develop artificial corneas or hearing devices to name but a few. Plastics are indispensable for protection equipment such as helmets, firemen suits or bullet proof jackets. Plastics have made it possible for us to push the limits and go further, faster and safer than we have dared to go before.



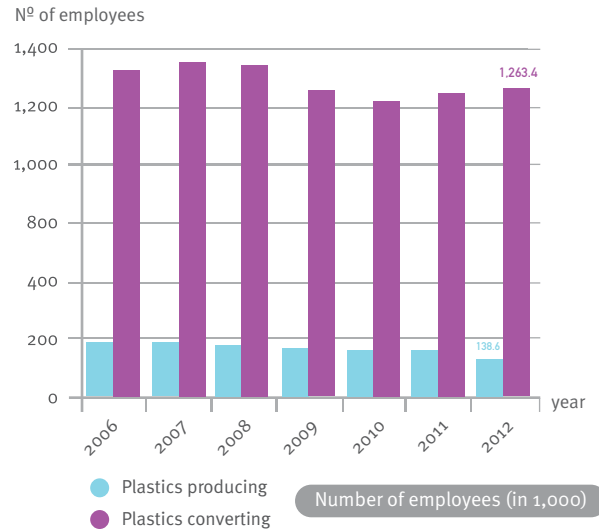
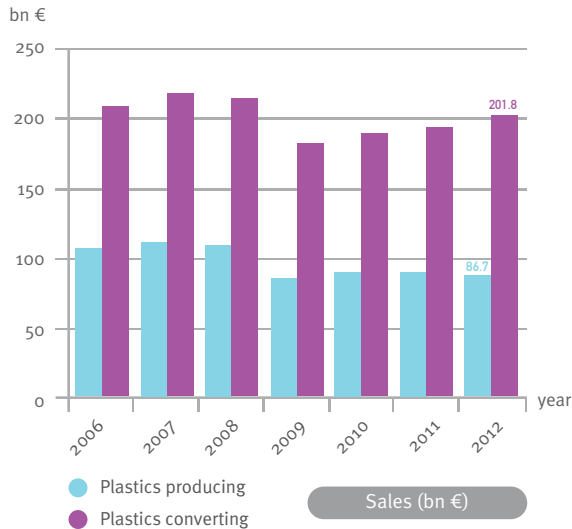
# Plastics and growth

# The European plastics industry: a pillar of economics and society



Estimated data for EU-27 (excl. N/CH), 2012

Source: Consultic



6 Figure 1: Development of sales and employment in EU-27 2006 – 2012

Source: Eurostat



# The European plastics industry in figures

## Employment and sales

**In 2012, the European plastics industry, including plastics producers, plastics converters and the plastics machinery sector, employed more than 1.4 million people.**

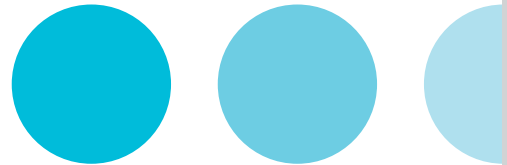
Although 2009 witnessed a fall in the number of employees as the industry as a whole faced the consequences of the global financial crisis, its labour force is now growing and approximately 30,000 new jobs have been created.

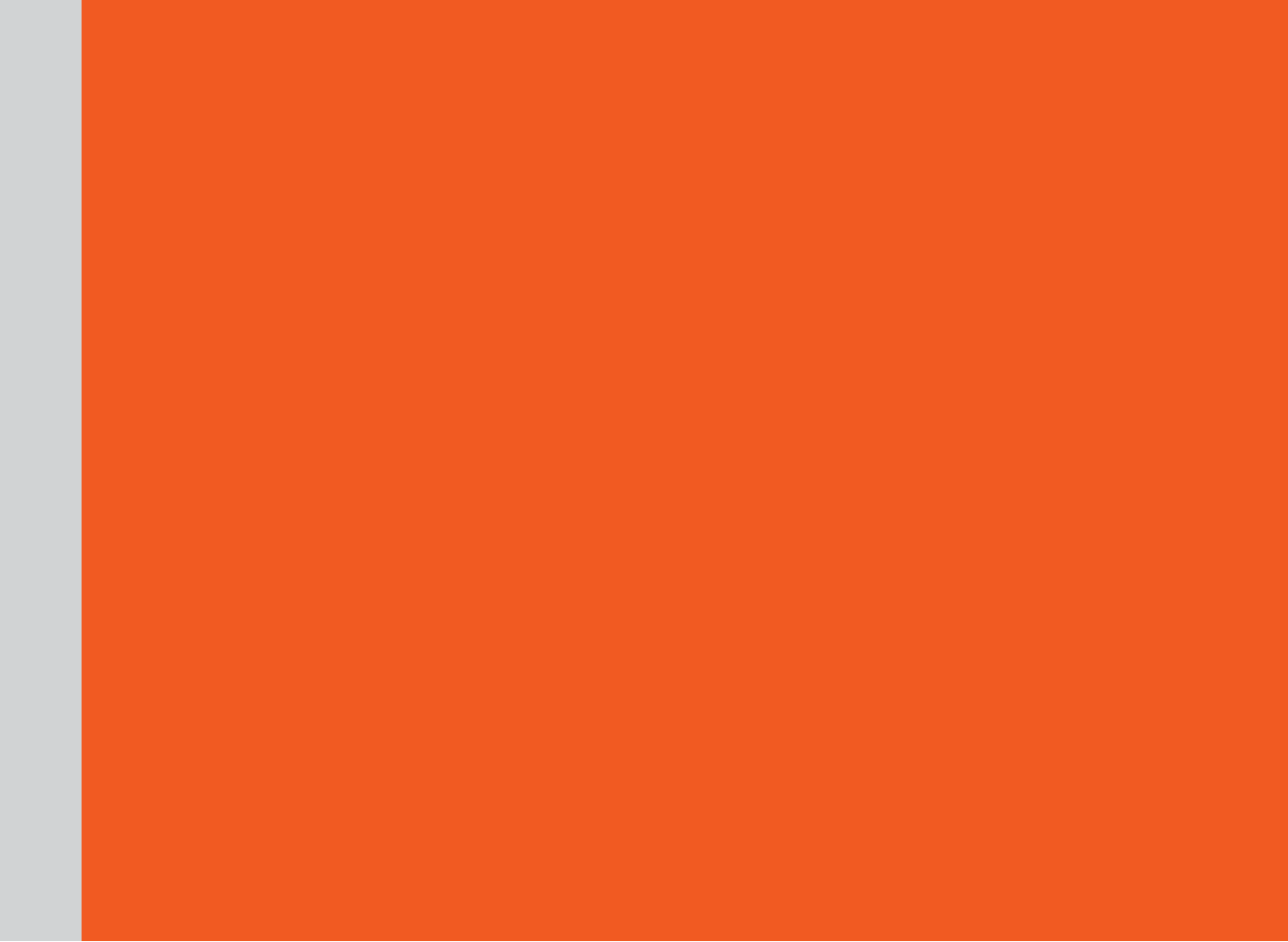
These figures are another proof that the European plastics sector is slowly but steadily recovering.

In terms of turnover, the European plastics industry has not yet reached pre-crisis levels and in 2012 sales volumes showed a slight decrease for both sectors: plastics producers experienced a turnover of 87 billion euro and converters achieved 202 billion euro in sales.

The relatively modest growth in 2012 compared to 2011 is mainly due to the continuing recession in Southern European countries as well as significant declines in manufacturing production which lead to a 0.3% contraction in terms of GDP in the European economy.

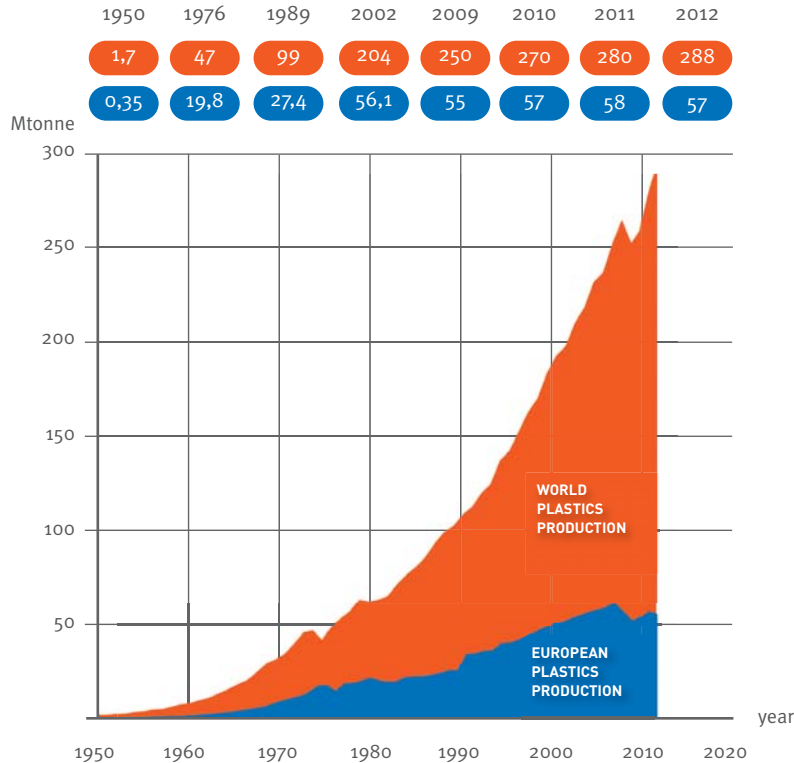
Moreover, competition in the industry is constantly growing and plastics markets are increasingly shifting towards Asia and specially China. This shift of the market combined with a stricter European regulatory framework adds to the challenge the European plastics industry faces to maintain its level of competitiveness.





# Plastics market data

# World plastics production grows



With continuous growth for more than 50 years, global production in 2012 rose to 288 million tonnes – a 2.8% increase compared to 2011.

However in Europe, in line with the general economic situation, plastics production decreased by 3% from 2011 to 2012.

Figure 2: World plastics production 1950-2012

Includes thermoplastics, polyurethanes, thermosets, elastomers, adhesives, coatings and sealants and PP-fibers. Not included PET-, PA- and polyacryl-fibers

Source: PlasticsEurope (PEMRG) / Consultic

# Europe ranks second in the global plastics production

China remains the leading plastics producer with 23.9%, and the rest of Asia (incl. Japan) accounts for an additional 20.7%.

European production (EU-27+2) accounts for 20.4% of the world's total production.

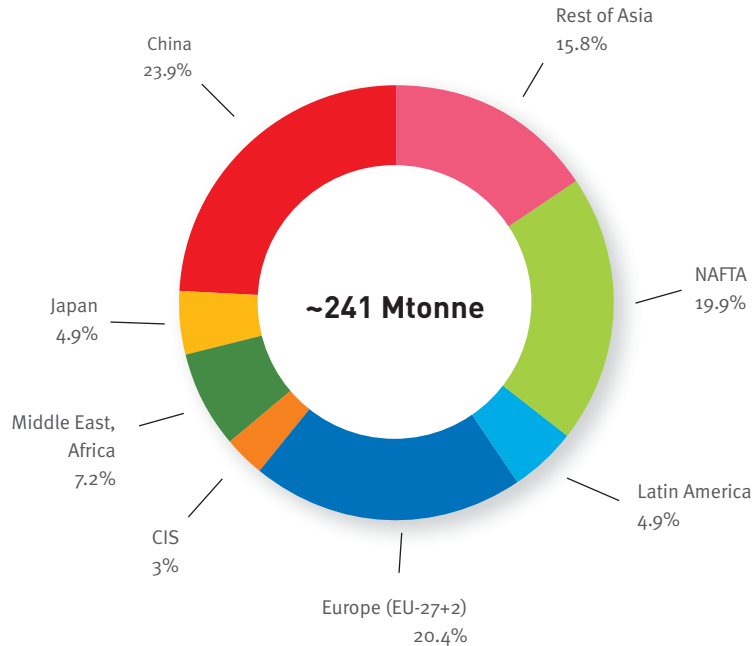


Figure 3: World plastics materials production 2012 w/o other plastics (~47 Mtonne)

Source: PlasticsEurope (PEMREG) / Consultic

## Navigating the crisis! Demand in Europe shows a slight decrease

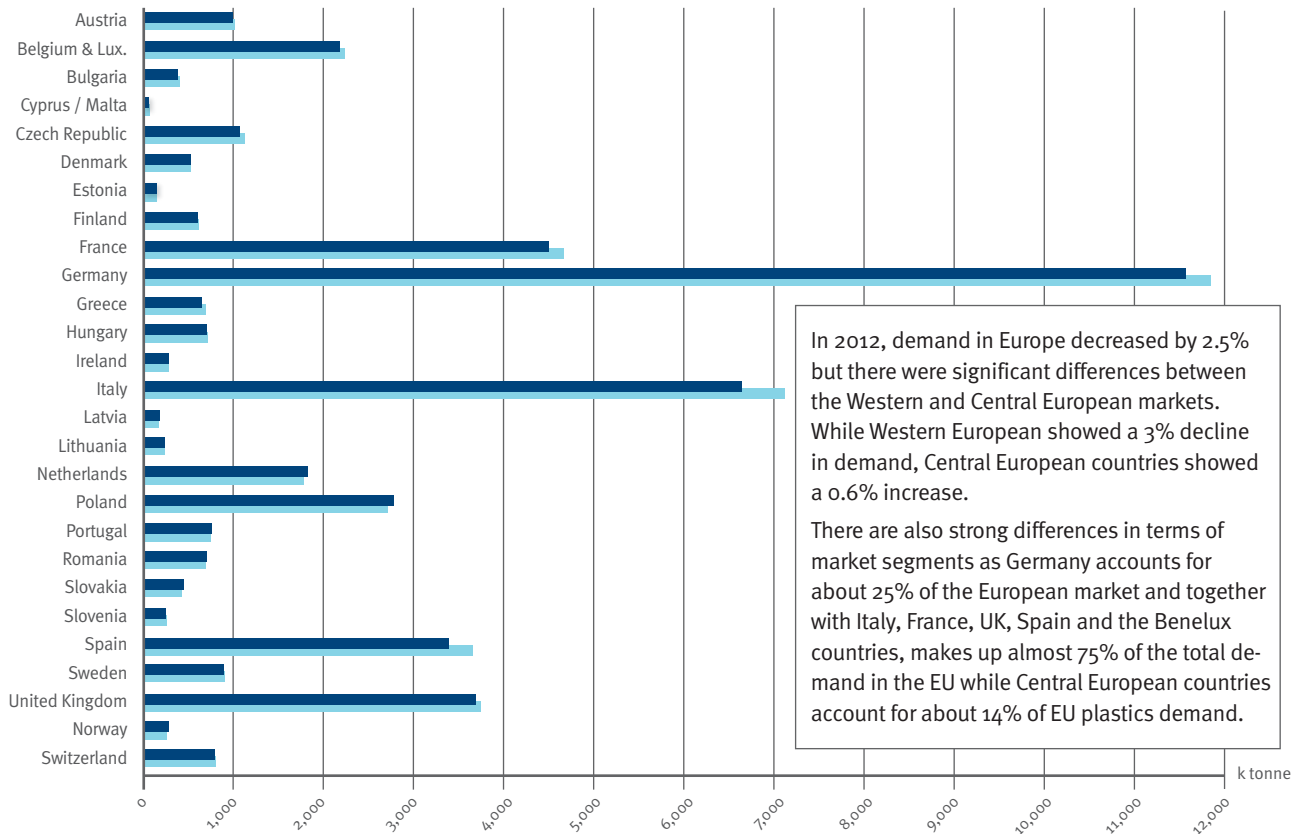


Figure 4: European plastics demand by country (k tonne/year)

Source: PlasticsEurope (PEMGR) / Consultic / ECEBD

# Plastics provide for a wide variety of markets

In Europe, packaging applications are the largest application sector for the plastics industry and represent 39.4% of the total plastics demand.

Building and construction is the second largest application sector with 20.3% of the total European demand.

Automotive is the third sector with a share of 8.2% of the total demand.

Electrical and electronic applications represent 5.5% of the plastics demand and are closely followed by agricultural applications which have a share of 4.2%.

Other application sectors such as appliances, household and consumer products, furniture and medical products comprise a total of 22.4% of the European plastics demand.

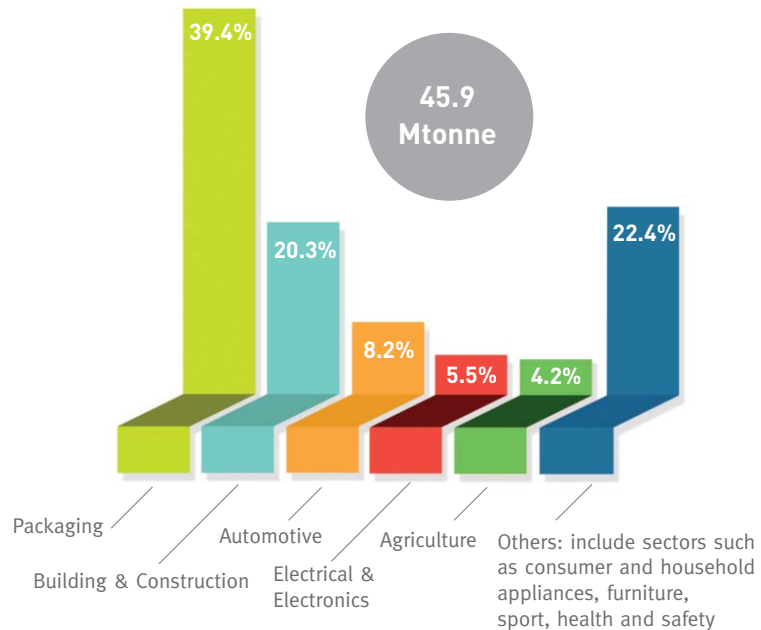


Figure 5: European plastics demand\* by segment 2012

Source: PlasticsEurope (PEMRG) / Consultic / ECEBD

\* EU-27+N/CH

# Different plastics for different needs

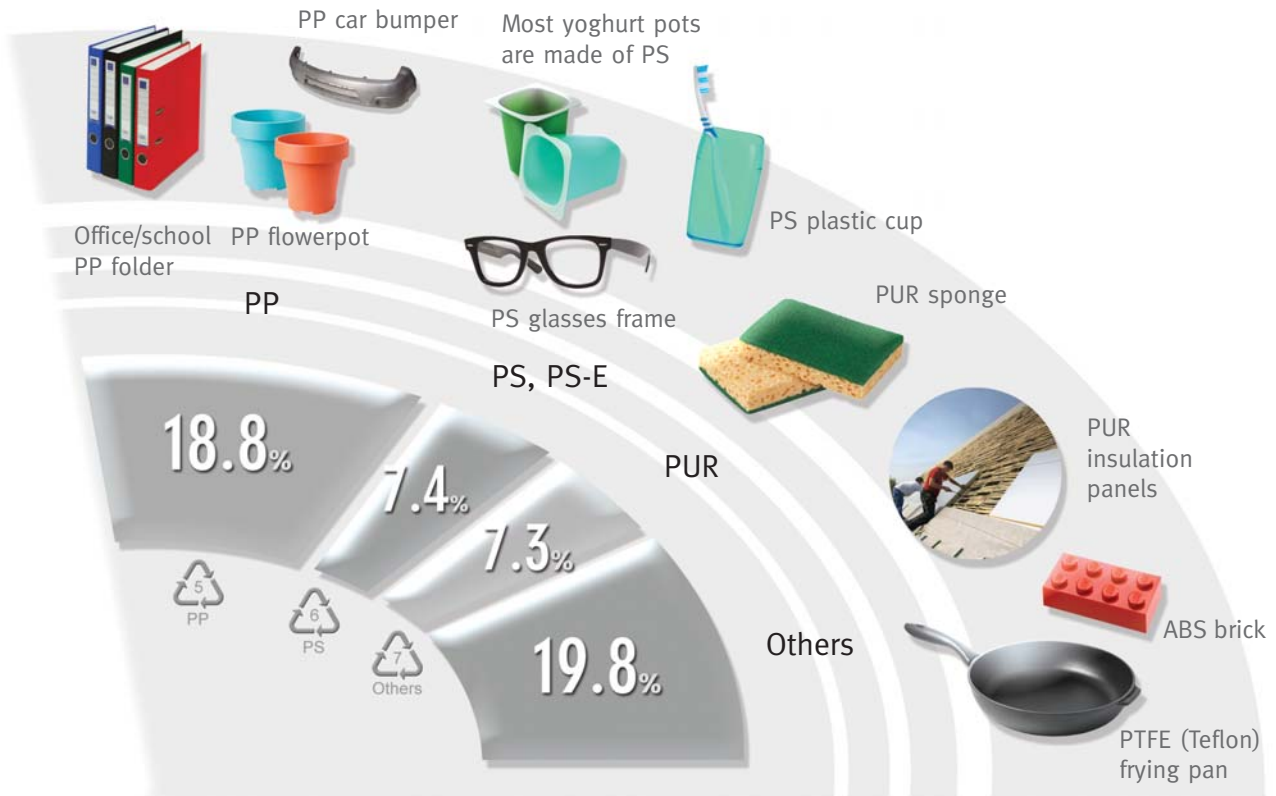


Figure 6: European plastics demand\* by resin type 2012

Source: PlasticsEurope (PEMRG) / Consultic / ECEBD

\* EU-27+N/CH





### Plastic vs. plastic

There are various types of plastics featuring different properties. The international recycling codes (ranging from 1 to 7) which are featured on most plastic products are meant to make (unmixed) separation easy.

# Evolution of plastics demand by resin type

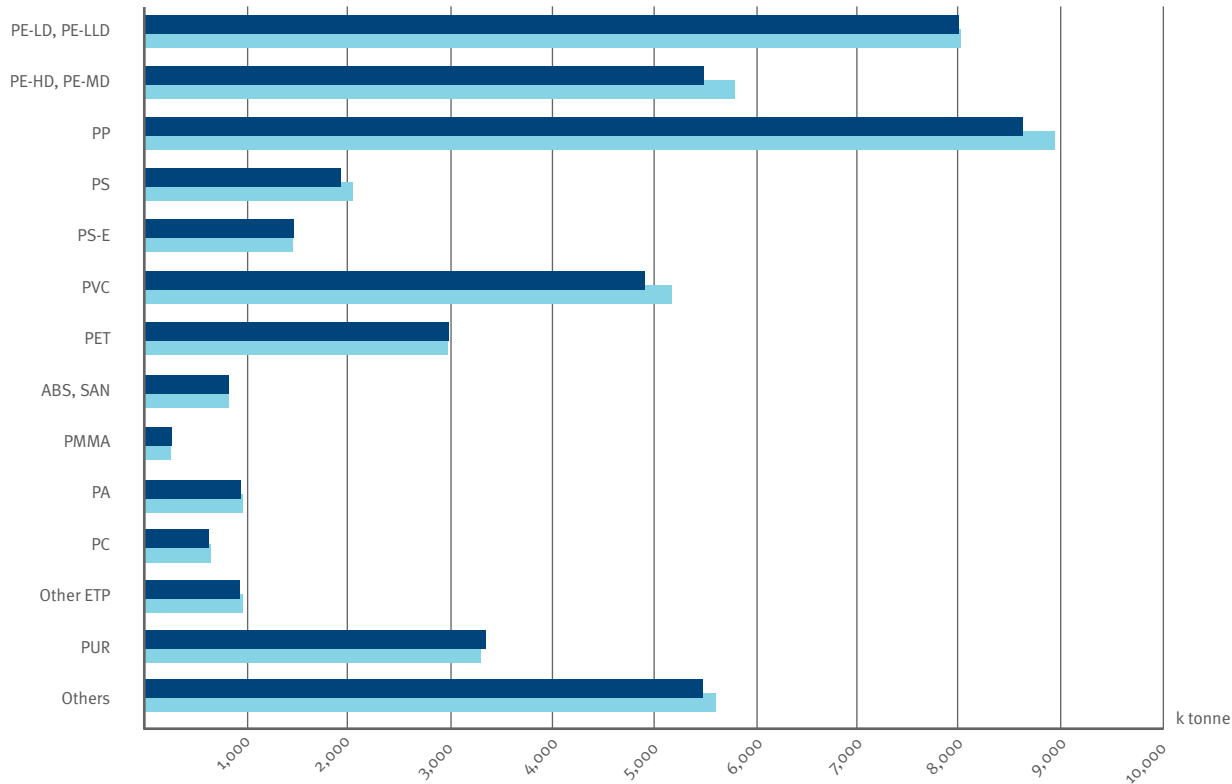


Figure 7: European plastics demand\* by resin type

Source: PlasticsEurope (PEMRG) / Consultic / ECEBD

\* EU-27+N/CH

# Plastics demand by market

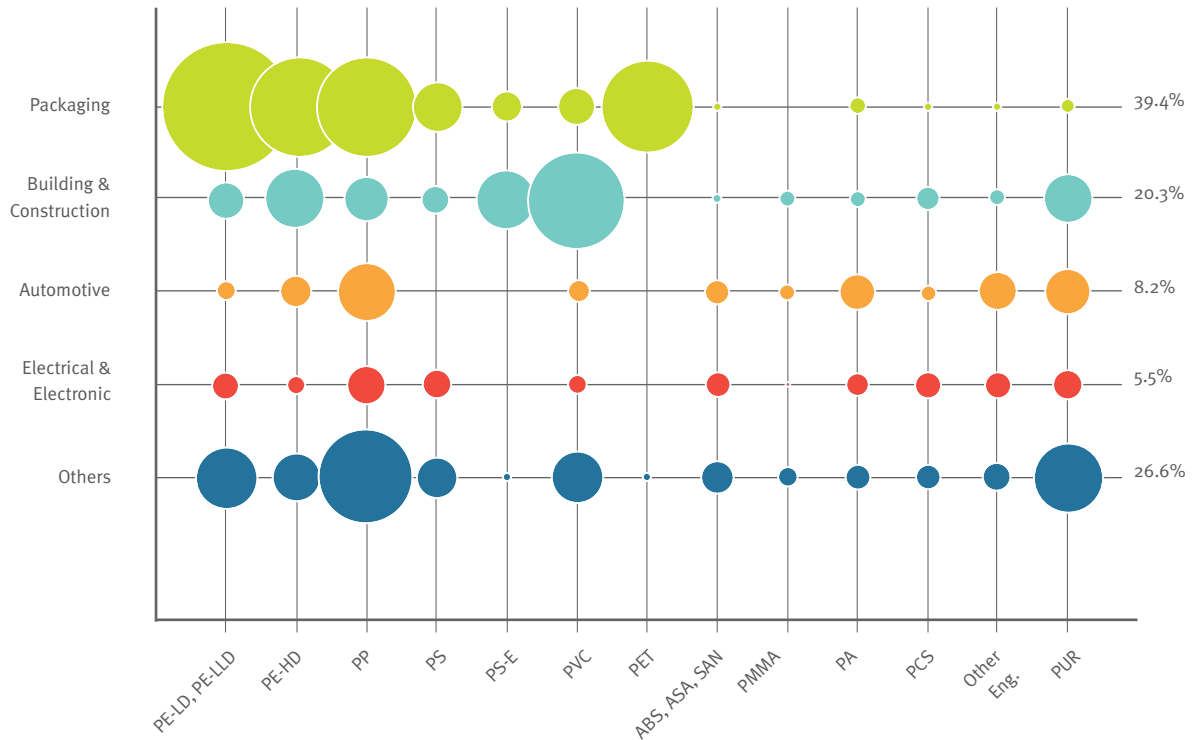


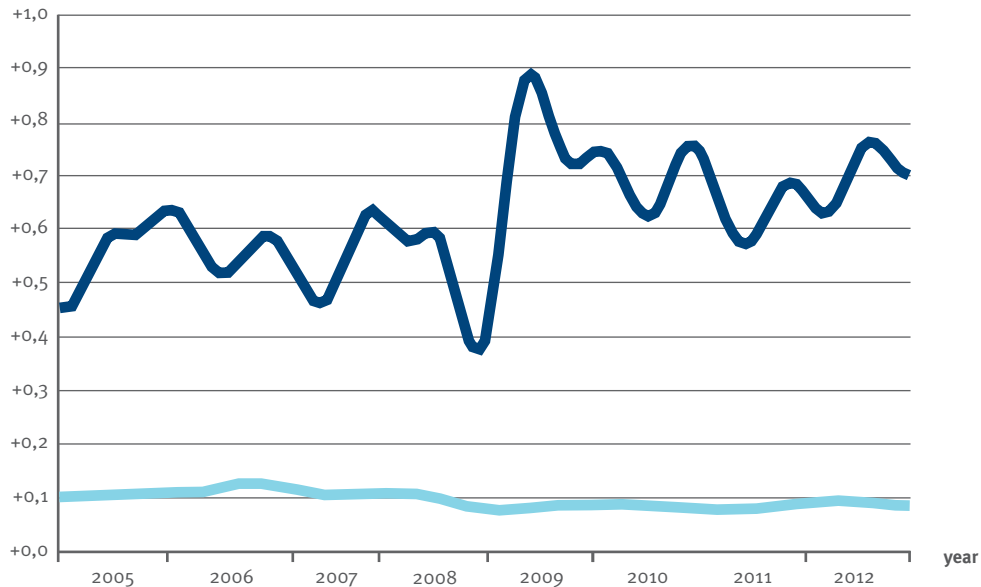
Figure 8: European plastics demand\* by segment and resin type 2012

Source: PlasticsEurope (PEMRG) / Consultic / ECEBD

\* EU-27+N/CH

# Europe is a net exporter of plastics

Mtonne, trend cycle, monthly (+ surplus, - deficit)



- Primary plastics trade balance (Extra-EU)
- Plastics products trade balance (Extra-EU)

Figure 9: EU-27 plastics industry: trade balance with non-member countries (Extra-EU)

## 2012 data

### Plastics producing sector:

- Exports 15.87 Mtonne
- Imports 7.55 Mtonne

### Plastics products sector:

- Exports 2.74 Mtonne
- Imports 1.67 Mtonne

## European imports and exports

**Historically the European Union has always been a net exporter of plastics materials.**

Exports of primary plastics from the EU-27 to the rest of the world increased by 2.9% in 2012.

These extra-EU exports accounted for 26.6% of the total EU trade in primary plastics. The trade surplus for the plastics producing industry has been volatile in recent years and after it peaked in 2009 it has remained at a level higher than the years before the crisis. The biggest demand for European primary plastics came from China (4.9%), Turkey (3.9%), Hong Kong (2.1%), Russia (2.1%) and Switzerland (1.5%).

The exports of converted plastics products to third countries also increased in 2012 by 3.6% compared to 2011. Extra-EU exports accounted for 23.2% of the total EU trade in plastics products. Since 2011, more market stability has been observed compared to 2009 and 2010. In contrast to primary plastics, the trade surplus for plastics products has remained more or less constant from 2005 to 2012. The biggest demand for European plastics products came from Russia (3.0%), Switzerland (2.9%), USA (1.7%), Turkey (1.4%) and China (1.2%).



# Waste management data

## Plastics value chain: “an overview”

The diagram below shows the main steps in the life cycle of plastics – from converter demand to disposal and recovery. Converter demand reached 45.9 million tonnes in 2012. 25.2 million tonnes of plastics ended up in the waste stream in 2012. In 2012, post-consumer plastics waste volumes stayed at the same level as the year before.

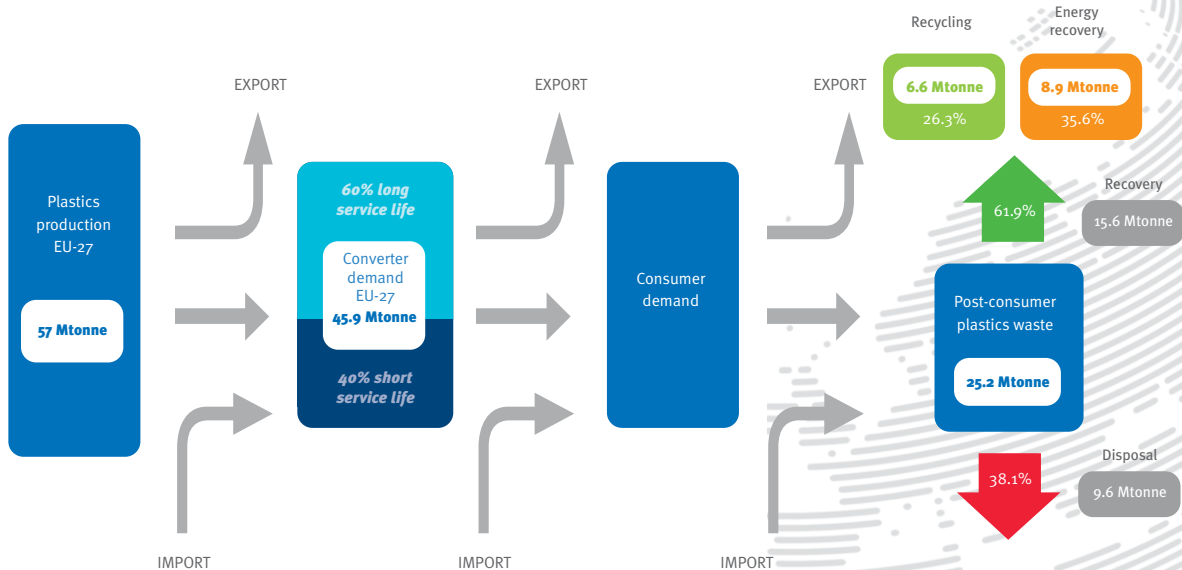
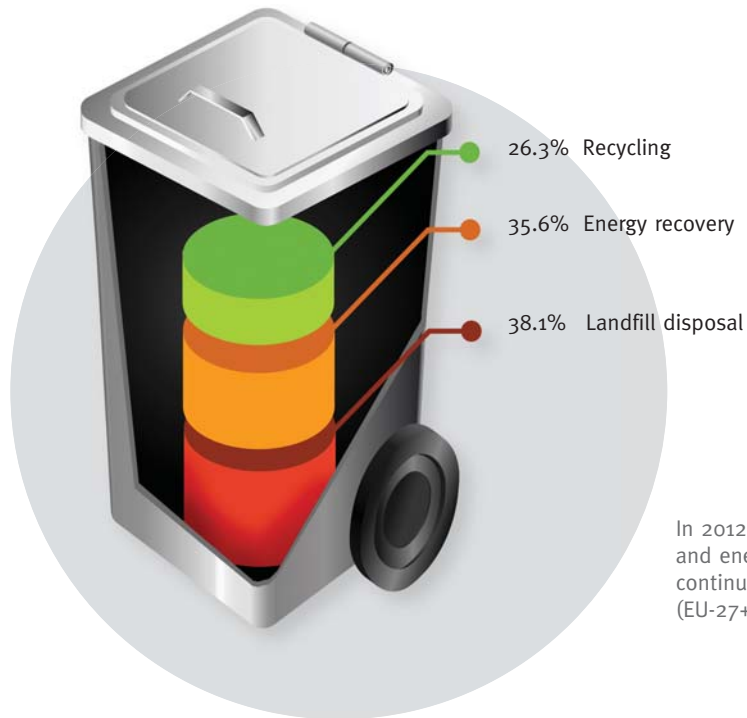


Figure 10: Life cycle of plastics in 2012 (EU-27+N/CH)

Source: PlasticsEurope (PEMRG) / Consultic



## In 2012 plastics recycling and energy recovery reached 61.9%



In 2012 plastics recycling and energy recovery rate continues to increase. (EU-27+N/CH)

Figure 11: Disposal, recycling and energy recovery in 2012

Source: Consultic

# On the road towards zero plastics to landfill

The annual average of plastics post-consumer waste generation from 2006 to 2012 is 25 Mtonne.

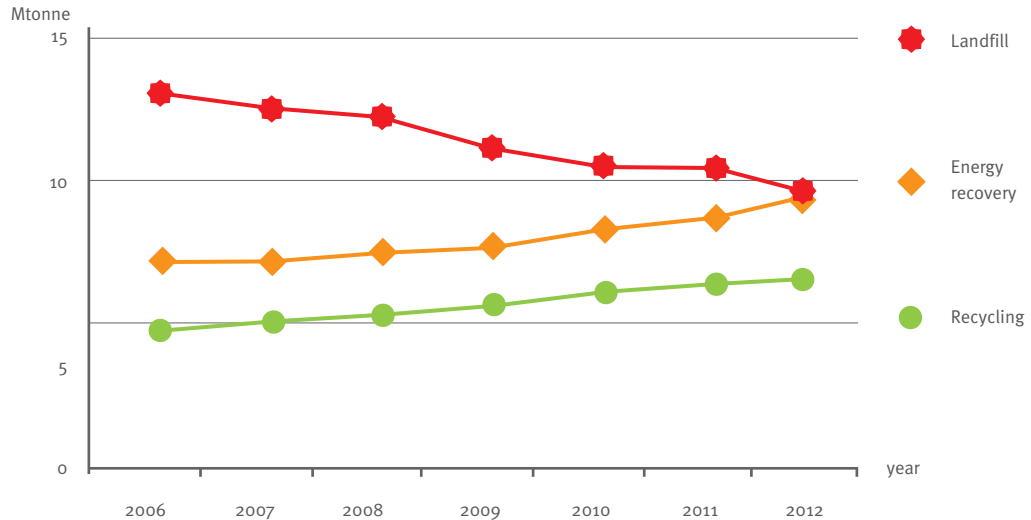


Figure 12: Total plastics waste recycling and recovery 2006 – 2012

Source: Consultic

## Post-consumer plastics waste

**The management of plastics products at the end of their service life is improving constantly and fewer of them are ending up in landfills.**

There is a positive trend to be observed in the recovery and recycling of plastics in the EU-27. In 2011, 59.6% of plastics were recovered, while in 2012 this increased to 61.9%. Thus, total recovery increased by 4% and this growth shows a continuously strong trend. At the same time, there was a reduction of 5.5% of landfilled plastics, which also shows a general positive development. Collection for mechanical recycling shows a growth of 4.7%, while feedstock recycling even on a lower level of 86 thousand tonnes increased by 19.4%. Energy recovery also increased by 3.3%.

Since 2009, the total amount of post-consumer plastics waste has been increasing in Europe but since 2011 it has remained at more or less the same level with 25.2 million tonnes generated in 2012. More than three quarters (77%) of this waste was generated in the following seven countries: Germany, UK, France, Italy, Spain, Poland, and the Netherlands while the rest originated from the remaining 22 countries.

Packaging dominates the waste generated from plastics, covering 62.2% of the total. Other applications like building and construction, electrical and electronic products and agriculture count for 5 till 6% each.

# Landfill: the hurdle to resource efficiency

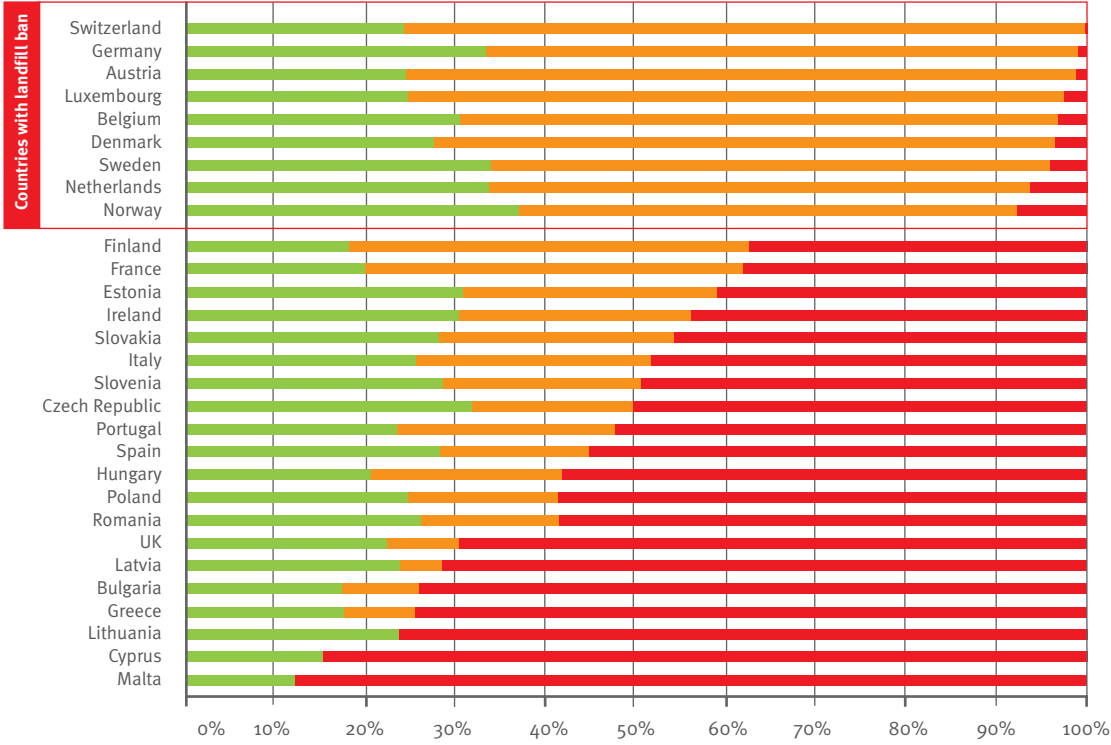


Figure 13: Treatment of post-consumer plastics waste 2012 by EU-27+2

Source: Consultic

- Recycling rate
- Energy recovery rate
- Disposal rate

## Comparative analysis of countries of the EU and applications

The largest share of recycled plastics, at about 82%, are plastics packaging products. The overall recovery rate of plastics packaging waste was 69.2%, meaning an increase of 3.3% from 2011. In total, 34.2% of packaging waste was mechanically recycled in Europe, 0.5% went to feedstock recycling and 34.5% went for energy recovery (5.4 million tonnes) both in incineration plants and as refuse derived fuel (RDF). It is encouraging that nearly all Member States have reached the 22.5% target set by the European Packaging Directive in 2012, with only Malta as an exception.

Some EU Member States such as Germany, Austria, Luxembourg, Belgium, Sweden, Denmark and the Netherlands but also Norway and Switzerland have achieved between 90% and 100% plastics waste recovery rates. This was achieved, among other methods, by imposing a ban on landfilling plastics recovery waste and should serve as an example of best-practice. By comparison, Malta, Cyprus, Greece, Bulgaria, Lithuania and Latvia all show recovery rates below 30% and these EU Member States usually have little or no capacity for energy recovery, which sets them at a disadvantage.

In 2012, about 26% of total post-consumer plastics waste was collected for mechanical recycling, 0.3% went to feedstock recycling, and 35.6% was recovered for energy. Amongst the European countries, Norway had the highest level of collection for mechanical recycling at 36.9% and Malta the lowest with 12.4%. Energy recovery data includes both plastics waste in municipal waste incineration plants and waste used as refuse derived fuel (RDF) material. In Switzerland, Luxembourg and Austria the overall energy recovery ratio reached more than 70%, which is the highest level in Europe. However, energy recovery is non-existent in Malta, Lithuania and Cyprus, while in Greece, Latvia, the UK and Bulgaria the energy recovery ratio is still below 10%. Another 11 countries have lower energy recovery rates than the average of 36%.

Overall, the trend in the last five years shows a significant decrease in landfilled plastics. However, with the disposal rate at 38.1%, there is room for improvement and further action is needed to reach a zero plastics waste to landfills by 2020 in Europe.

## Plastics recycling and energy recovery complement each other

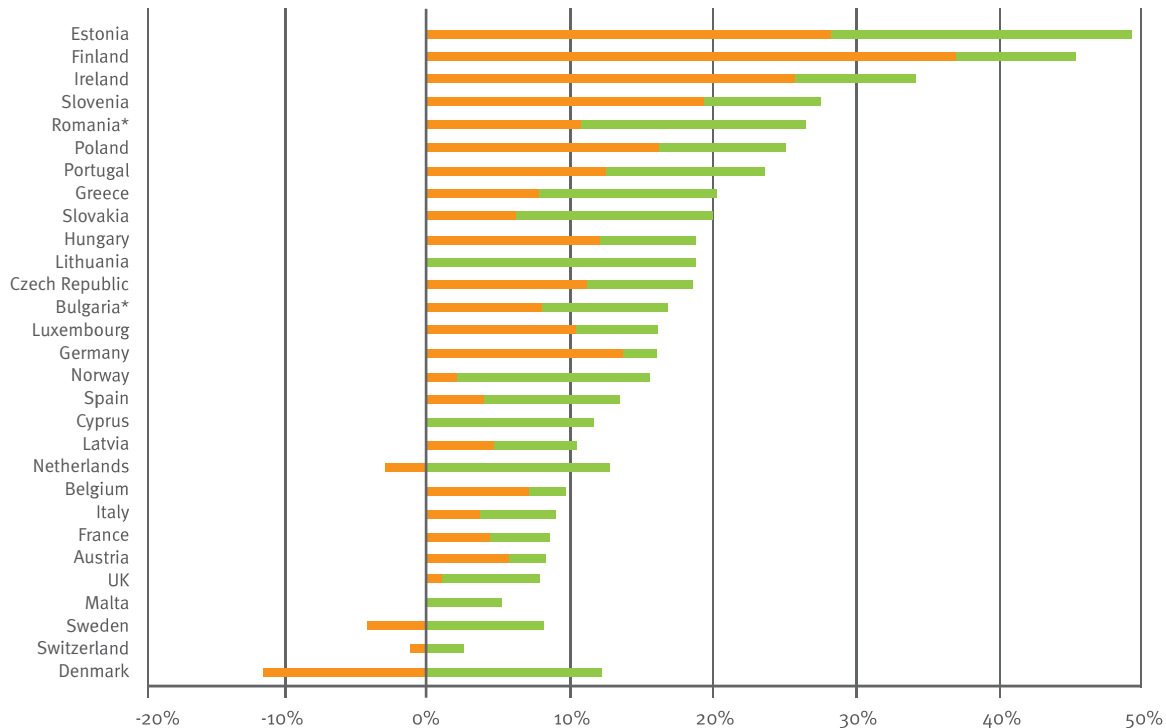


Figure 14: Change in total recovery rate by country 2006 - 2012  
(Referred to post-consumer plastic waste)

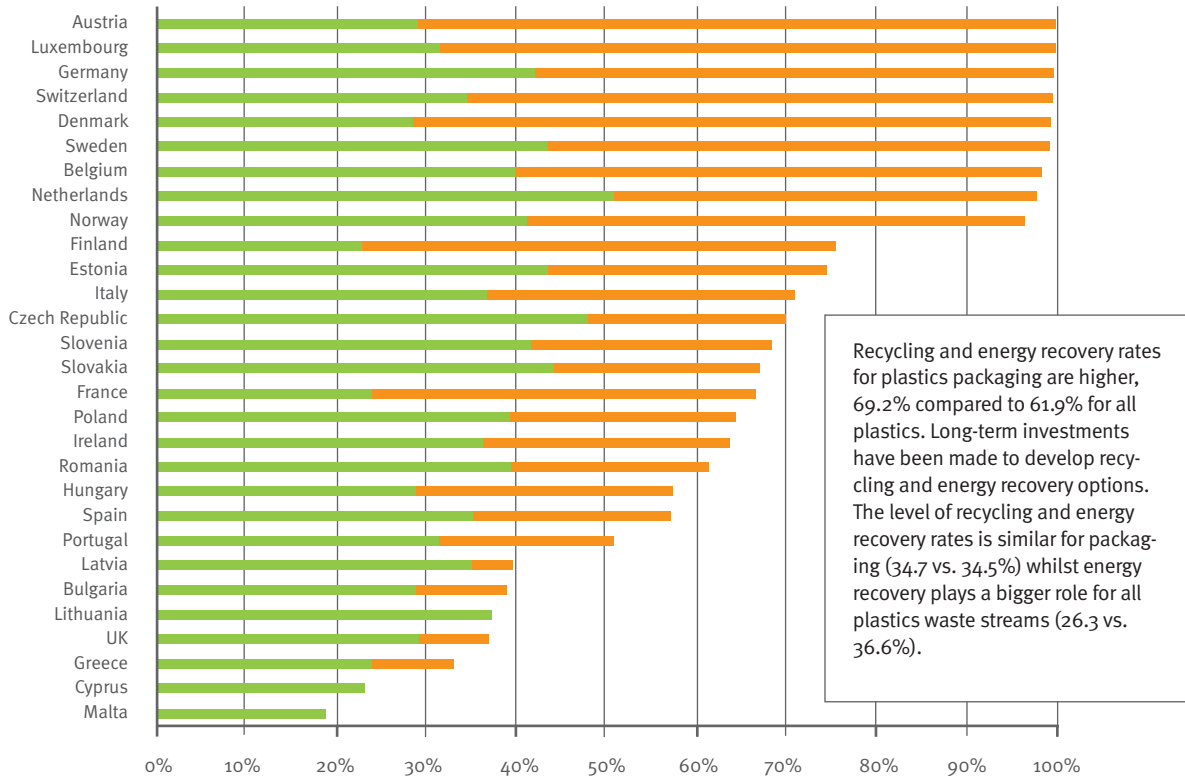
Source: Consultic

\* For Bulgaria & Romania: comparison 2012 vs. 2007

Comparison of  
rates 2012 vs. 2006

- Energy recovery rate
- Recycling rate

# Plastic packaging has the highest recycling and energy recovery rate

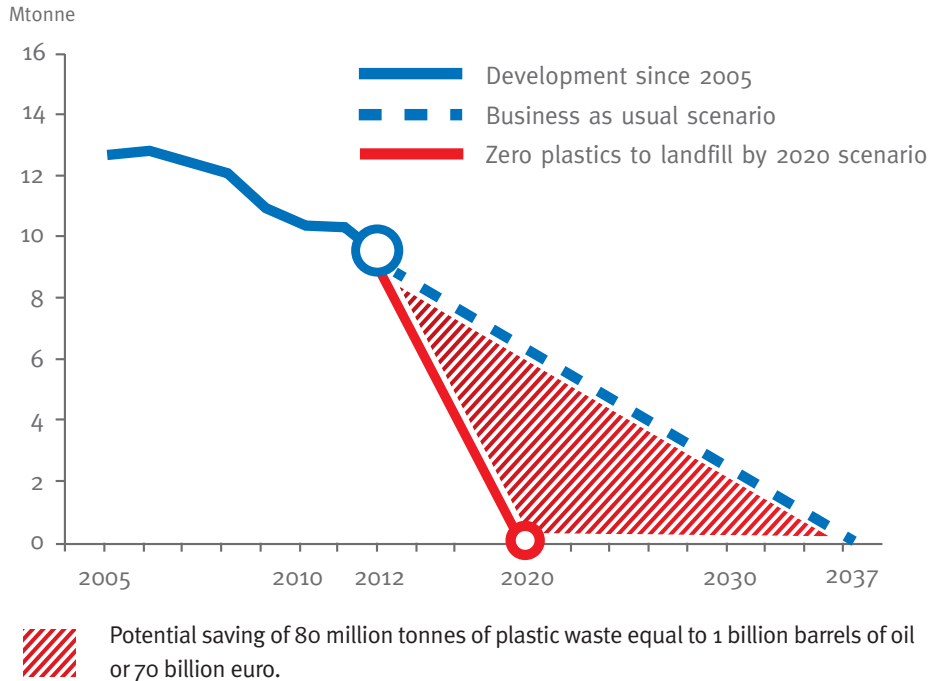


Recycling and energy recovery rates for plastics packaging are higher, 69.2% compared to 61.9% for all plastics. Long-term investments have been made to develop recycling and energy recovery options. The level of recycling and energy recovery rates is similar for packaging (34.7 vs. 34.5%) whilst energy recovery plays a bigger role for all plastics waste streams (26.3 vs. 36.6%).

Figure 15: Total packaging recovery rate by country 2012  
 (Referred to post-consumer plastics waste)  
 Source: Consultic

● Recycling rate  
 ● Energy recovery rate

# Zero plastics to landfill by 2020, a challenging but realistic goal





## Time to act: plastics are too valuable to throw away!

Turning waste into a resource is a goal the European plastics industry is committed to achieve to improve Europe's resource efficiency.

This goal is impossible to achieve with 38% of plastics waste still going to landfill.

As such, landfill is a major hurdle that must be eliminated for such an ambitious goal to be reached.

Recycling and energy recovery are both complementary and necessary to achieve the zero plastics to landfill by 2020 goal.

Since recycling may not always be the most sustainable option for plastics, energy recovery should remain a viable option to realise the full potential of the diverted waste which to generate electricity and heat.

Therefore, the industry is calling for measures to avoid the landfilling of recyclable and high calorific waste.





# Snapshot and outlook

# In 2013 plastics production is still far from pre-crisis level

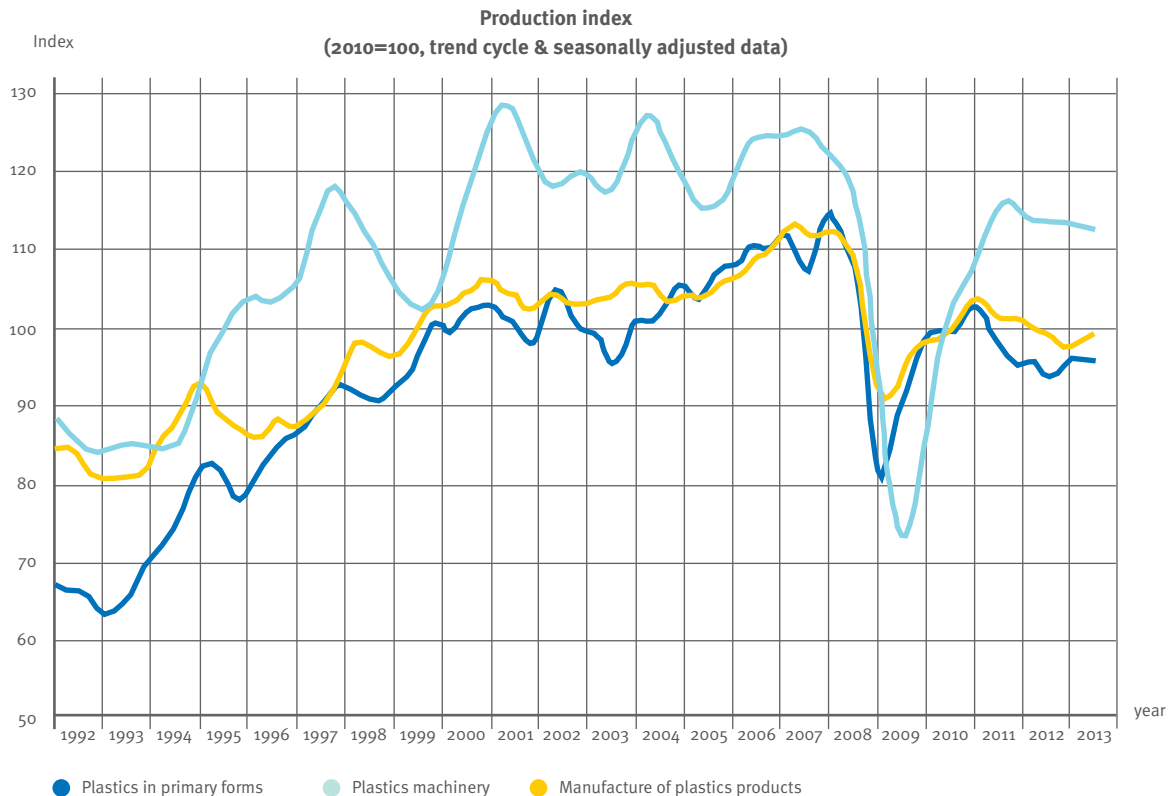


Figure 17: Plastics industry production in EU-27  
Source: Eurostat

## For 2014: slight increase expected for plastics production

The positive growth of the plastics industry in the EU-27 after the bounce back from the deep economic recession continued until the beginning of 2011 (see figure 17). Since then, the plastics producing and converting sectors have showed a clear decreasing trend.

In the first half of 2013, production figures for plastics products decreased. The production figures for the primary plastics and machinery segment show a stagnation compared to the same period in the previous year.

However, for the next two years, no new downward swing of the global economy is expected. Although structural reforms and adjustment programmes in some European countries will take time to bear fruit, a slow recovery of the European customer industries is expected and Europe should step out from the grey area between stagnation and recession. With slow recovery for the plastics industry value chain, demand for primary plastics in the EU-27-countries should also recover within the next years. Therefore, we expect primary plastics production to stabilise in 2013 and start a slow recovery in 2014 (see figure 18).

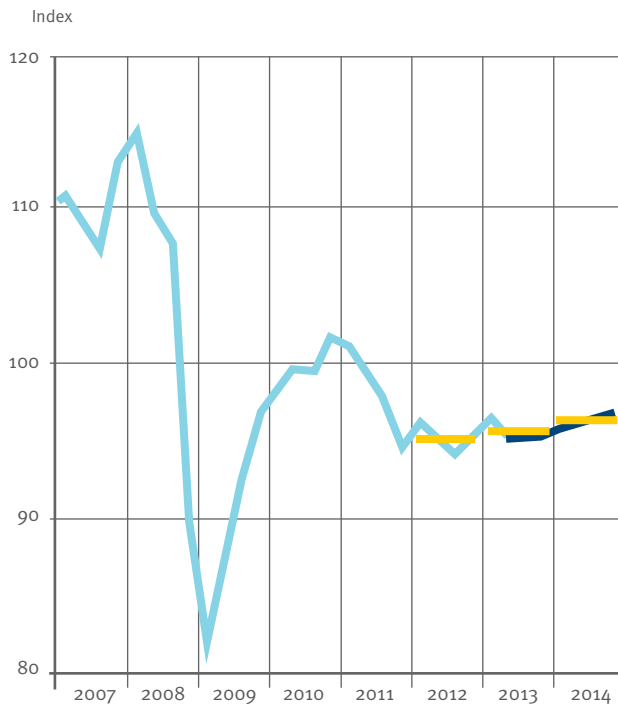


Figure 18: Production of primary plastics, EU-27

Index 2010=100 on a quarterly basis; annual average

Source: Eurostat, VCI, PlasticsEurope, \* estimation for 2013 and 2014

● Production index ● Average annual index ● Forecast

# Glossary of terms

<b>ABS</b>	Acrylonitrile butadiene styrene	<b>PA</b>	Polyamide
<b>ASA</b>	Acrylonitrile Styrene Acrylate	<b>PC</b>	Polycarbonate
<b>bn</b>	billion	<b>PE</b>	Polyethylene
<b>CIS</b>	Commonwealth of Independent States	<b>PE-HD</b>	Polyethylene, high density
<b>CO<sub>2</sub></b>	Carbon Dioxide	<b>PE-LD</b>	Polyethylene, low density
<b>Consultic</b>	Consultic Marketing & Industrieberatung GmbH	<b>PE-LLD</b>	Polyethylene, linear low density
<b>ECEBD</b>	Eastern and Central European Business Development	<b>PE-MD</b>	Polyethylene, medium density
<b>EU</b>	European Union	<b>PEMRG</b>	PlasticsEurope Market Research Group
<b>EuPC</b>	European Plastics Converters	<b>PET</b>	Polyethylene terephthalate
<b>EPR</b>	Extended Producer Responsibility	<b>PUR</b>	Polyurethane
<b>EPRO</b>	European Association of Plastics Recycling and Recovery Organisations	<b>PMMA</b>	Polymethyl methacrylate
<b>ETP</b>	Engineering Thermoplastics	<b>PP</b>	Polypropylene
<b>E&amp;E</b>	Electrical & Electronic equipment	<b>PRF</b>	Plastics Recovery Facilities
<b>GDP</b>	Gross domestic product	<b>PS</b>	Polystyrene
<b>k tonne</b>	Thousand tonnes	<b>PS-E</b>	Polystyrene, expandable
<b>Kg</b>	Kilogramme	<b>PVC</b>	Polyvinyl chloride
<b>LCD</b>	Liquid-crystal-display	<b>SAN</b>	Styrene-acrylonitrile
<b>Mtonne</b>	Million tonnes	<b>UK</b>	United Kingdom
<b>NAFTA</b>	North American Free Trade Agreement	<b>UN</b>	United Nations
<b>NGOs</b>	Non governmental organisations	<b>VCI</b>	Verband der Chemischen Industrie e.V.

### **PlasticsEurope**

PlasticsEurope 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 EU28 member states plus Norway, Switzerland and Turkey.

### **European Plastics Converters (EuPC)**

EuPC is the professional representative body of plastics converters in Europe. Its activities cover all sectors of the plastics converting industry, including recycling. Its main objective is to defend and promote the European plastics converting industries interests by:

- Voicing industry opinion to European and international institutions, and NGOs
- Maintaining relationships with corresponding European and global organisations
- Conducting surveys, studies and research projects covering all areas of the plastics processing industry

### **Plastics Recyclers Europe**

Plastics Recyclers Europe is the professional representative body of plastics recyclers in Europe. Plastics Recyclers Europe promotes plastics mechanical recycling and an environment that encourages profitable and sustainable business. It provides a platform for members who represent 80% of Europe's recycling capacity and process over 3 million tonnes of collected plastics per year.

### **European Association of Plastics Recycling and Recovery Organisations (EPRO)**

EPRO is the association of national organisations responsible for organising and promoting plastics recycling and recovery in Europe. EPRO provides a unique forum for leading European specialists in plastics waste management to exchange experience and ideas, develop integrated plastics packaging and agriculture waste strategies and support technological development.



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