

THE EUROPEAN CHEMICAL INDUSTRY

Facts & Figures 2016



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Overview

World chemicals sales: geographic breakdown

Chemicals sales by country: top 10

World chemicals sales by region

EU share in the global chemicals market

EU chemical industry sales by sectoral breakdown

EU chemical industry sales by geographic breakdown

EU chemical industry sales: structure by destination

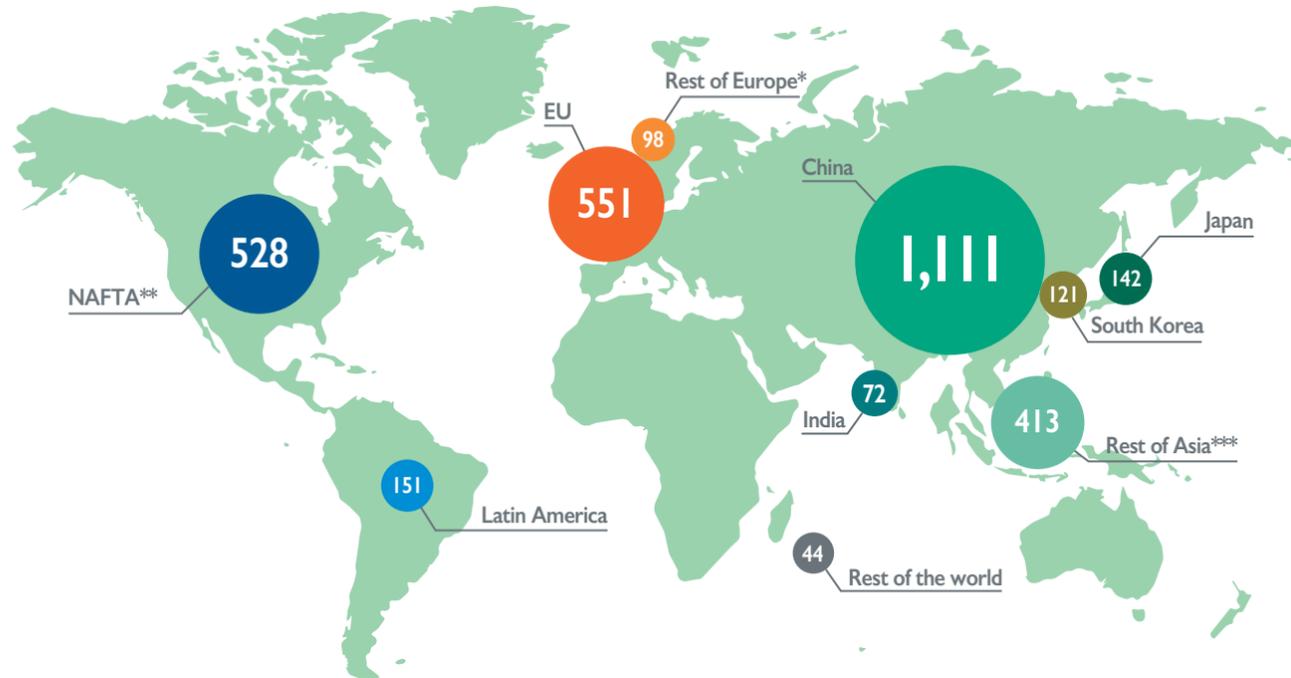
EU chemical industry by sales structure

Contribution of the chemical industry to the EU economy

Chemical Industry Profile

World chemicals sales: geographic breakdown

World chemicals sales (€3,232 billion)



Source: Cefic Chemdata International

* Rest of Europe covers Switzerland, Norway, Turkey, Russia and Ukraine

** North American Free Trade Agreement

*** Asia excluding China, India, Japan and South Korea

Unless specified, chemical industry excludes pharmaceuticals
Unless specified, EU refers to EU 28

Asia chemicals production outpaces other regions

World chemicals turnover was valued at €3,232 billion in 2014. Global sales grew by 2.6 per cent from €3,151 billion in 2013 to €3,232 billion in 2014. The sales growth rate was considerably lower compared to the 10 year trend, when average annual sales expanded by nearly 9.0 per cent from 2003 to 2013.

World chemicals sales in 2014 grew by nearly €81 billion compared with 2013, marking a modest recovery in the world chemical industry. It was largely driven by China, where chemicals sales swelled from €1,007 billion in 2013 to €1,111 billion in 2014.

The EU chemical industry ranks second, along with the United States, in total sales. When including both the European Union and non-EU countries in Europe, total sales reached €649 billion in 2014, or 20 per cent of world chemicals sales in value terms. Worldwide competition has ratcheted up in the last ten years, however, as China holds the top ranking in sales – a position once firmly held by Europe. The graph shows chemicals sales in Asia have grown to more than double those of the European Union.

World chemicals sales: geographic breakdown

Chemicals sales by country: top 10

World chemicals sales by region

EU share in the global chemicals market

EU chemical industry sales by sectoral breakdown

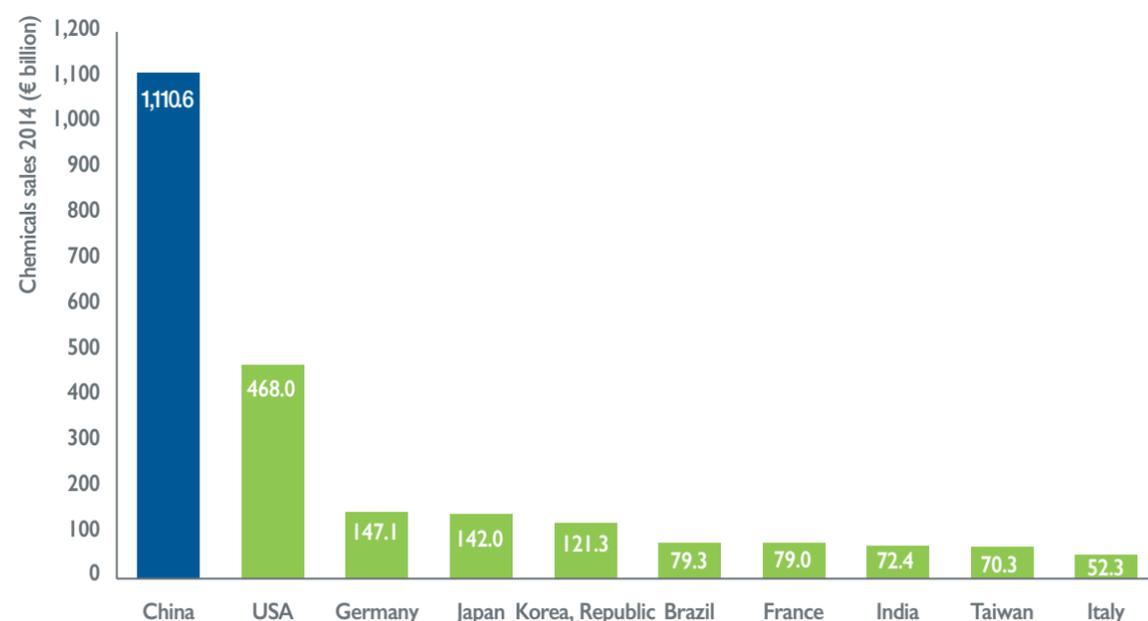
EU chemical industry sales by geographic breakdown

EU chemical industry sales: structure by destination

EU chemical industry by sales structure

Contribution of the chemical industry to the EU economy

Chemicals sales by country: top 10



Source: Cefic Chemdata International

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Unless specified, EU refers to EU 28

China dominates chemicals world ranking

China continues to dominate the world ranking. China sales levels are as high as the next six countries combined, as much as the NAFTA and EU markets put together.

In 2014, the 30 largest chemical-producing countries had a combined turnover of €2,815 billion. Twelve of the top 30 major chemicals producing countries are European, generating chemicals sales of €553 billion. This figure accounts for a 19.3 per cent share of chemicals sales in the top 30 chemicals producing countries and 17.1 per cent of global sales.

Twelve of the top 30 biggest producers are Asian, generating chemicals sales of €1,677 billion, a 58.4 per cent share of chemical sales among the top 30 producing markets and 51.9 per cent of the world market.

The chemical industry is an energy-intensive industry competing globally. The shale gas revolution in the United States is having an impact on the European chemical and manufacturing industries, as the availability of energy and feedstock from shale gas creates a significant competitive advantage for the US industry. With the exception of the Middle East, where energy and feedstock resources are plentiful, regions not having access to shale gas are suffering from a competitive disadvantage. Shale gas is being developed on a global scale, so other world regions will potentially take advantage of similar benefits in the future.

The world landscape of the chemical industry is changing rapidly. China is planning an ambitious industrial policy strategy to take its chemical industry to the next stage of development – a strategy outlined in the “13th Five-Year Plan” on the Chinese petroleum and chemical industry. China is looking to move from “following the lead” to “taking the lead” and from a “big country” to a “great power” of the petroleum and chemical industry, leading on technology innovation and trade and prevailing in international markets.

World chemicals sales: geographic breakdown

Chemicals sales by country: top 10

World chemicals sales by region

EU share in the global chemicals market

EU chemical industry sales by sectoral breakdown

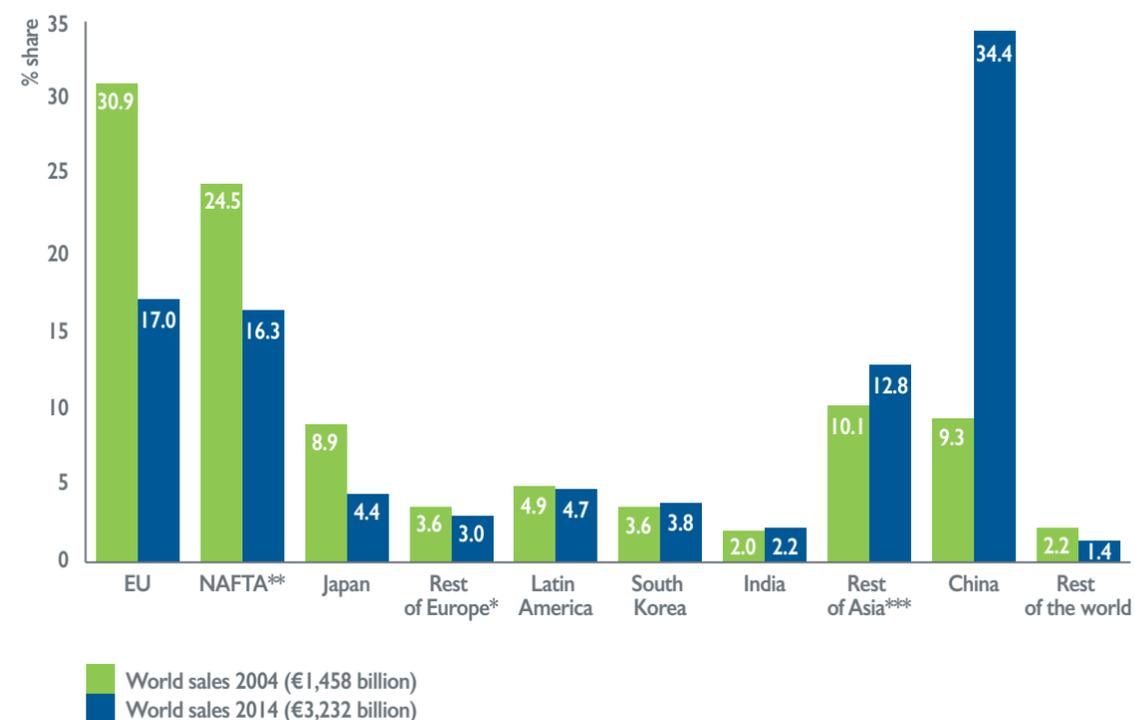
EU chemical industry sales by geographic breakdown

EU chemical industry sales: structure by destination

EU chemical industry by sales structure

Contribution of the chemical industry to the EU economy

World chemicals sales by region



Source: Cefic Chemdata International

* Rest of Europe covers Switzerland, Norway, Turkey, Russia and Ukraine

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World chemicals output doubles as emerging markets sales surge

During the period from 2004 to 2014, the European Union gradually lost its top spot in world chemicals sales to China and the rest of Asia (excluding Japan). The EU contribution to world chemicals sales between 2004 and 2014 dropped by 13.9 percentage points from 30.9 per cent in 2004 to 17.0 per cent in 2014.

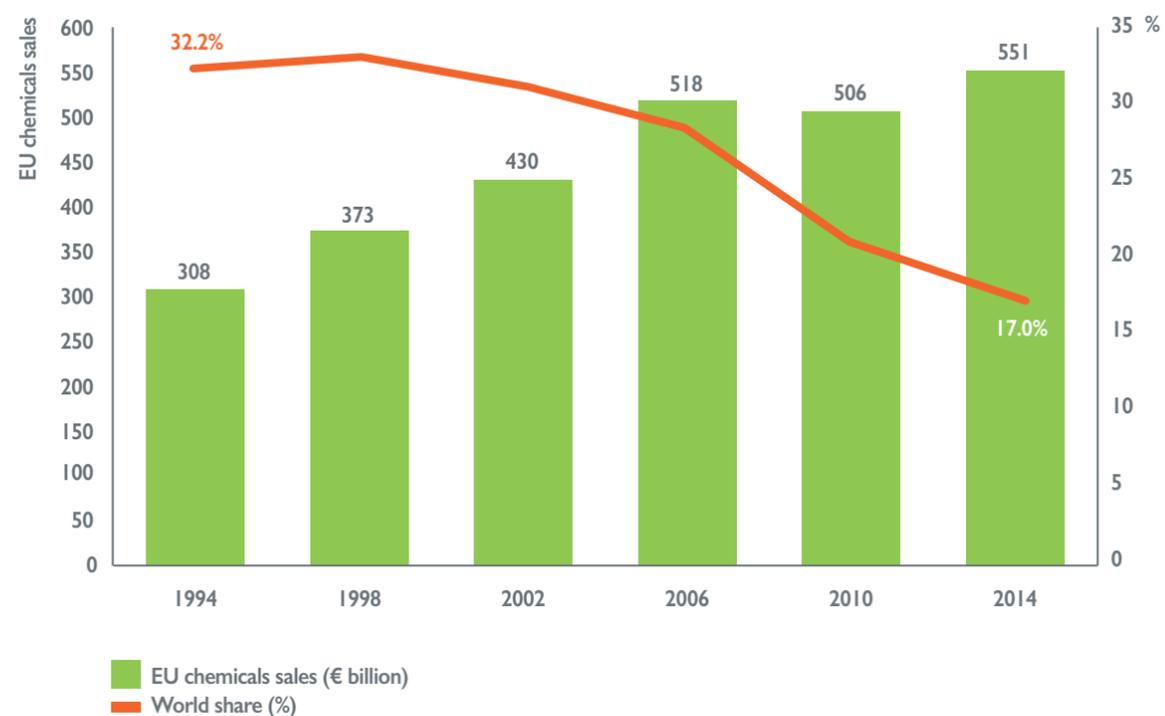
The NAFTA contribution to world chemicals sales also decreased from 24.5 per cent in 2004 to 16.3 per cent in 2014. Japan showed a less pronounced decline of its chemicals sales contribution during the 11-year period.

The total value of sales in the European Union has been continuously growing, but overall world chemicals sales have outpaced that rate of growth. World chemicals sales increased by 2.2 times in value terms in 2014 compared with 2004. China's share of world chemicals market sales in 2014 swelled to 34.4 per cent, nearly a fourfold increase on 2004 when the country held a 9.3 per cent share.

The European chemical industry continues to be a world leader, and a highly innovative sector. Though, competitive challenges for the sector are increasing. With 90% of GDP growth taking place outside Europe in the coming decades, it is crucial to secure our competitiveness. Taking advantage of emerging market opportunities will require EU leadership in creating competitive framework conditions that enhance the global position of European chemicals.

World chemicals sales: geographic breakdown	Chemicals sales by country: top 10	World chemicals sales by region	EU share of global chemicals market	EU chemical industry sales by sectoral breakdown	EU chemical industry sales by geographic breakdown	EU chemical industry sales: structure by destination	EU chemical industry by sales structure	Contribution of the chemical industry to the EU economy
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EU share of global chemicals market



Source: Cefic Chemdata International

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EU chemicals sales increase by 80% in 20 years, while its world market share nearly halves

Developments during the last 20 years indicate that the European Union position has weakened. In 1994, the EU posted sales of €308 billion, making up 32.2 per cent of world chemicals sales in value terms. Chemicals sales have been growing continuously since then, reaching an overall 79 per cent expansion in value terms.

World chemicals sales growth has outpaced European rates. Global sales posted a very impressive increase from €955 billion in 1994 to €3,232 billion in 2014. As a consequence, the EU chemicals market share nearly halved in 20 years, down from 32.2 per cent in 1994 to 17.0 per cent in 2014. This is a “dilution effect”, a trend expected to continue in the future. Data analysis showed strong chemical demand growth in China, India and other emerging countries and low growth in Europe and North America, where Europe sells most of its chemicals. Overall growth of chemicals demand and production as well as faster growth in emerging regions is a trend that is expected to continue in the future: growth in post-recession Europe remains low, mainly due to mature markets and an ageing population.

According to an Oxford Economics study on EU chemical industry competitiveness commissioned by Cefic (Oct. 2014), there are many potential reasons for this decline, including high energy prices, currency appreciation, high labour costs, regulatory and tax burdens, among other things. Using an econometric model linking changes in chemical competitiveness to these potential drivers, Oxford Economics found that sector R&D intensity, energy prices and the exchange rate all have strong quantitative links to competitiveness.

World chemicals sales: geographic breakdown

Chemicals sales by country: top 10

World chemicals sales by region

EU share of global chemicals market

EU chemical industry sales by sectoral breakdown

EU chemical industry sales by geographic breakdown

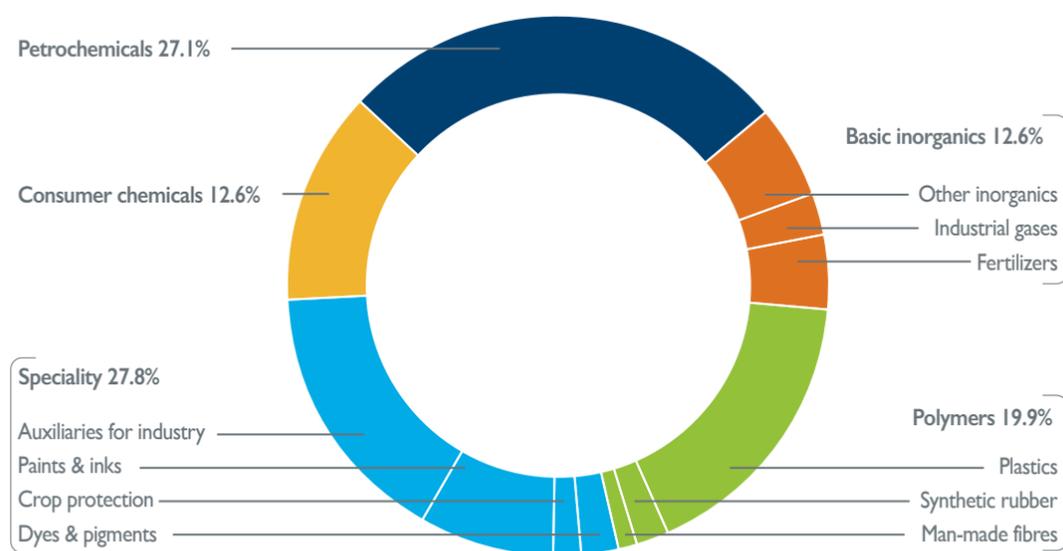
EU chemical industry sales: structure by destination

EU chemical industry by sales structure

Contribution of the chemical industry to the EU economy

EU chemical industry sales by sectoral breakdown

Sales 2014 (€551 billion)



Source: Cefic Chemdata International

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Petrochemicals and specialty chemicals account for half of EU chemicals sales

Output from the EU chemical industry covers three broad product areas: base chemicals, specialty chemicals and consumer chemicals.

Base chemicals covers petrochemicals and their polymers derivatives along with basic inorganics. Considered commodity chemicals, they are produced in large volumes and sold in the chemical industry itself or to other industries. Base chemicals in 2014 represented 59.6 per cent of total EU chemicals sales. Specialty chemicals covers areas such as paints and inks, crop protection, dyes and pigments. Specialty chemicals are produced in small volumes but they nevertheless made up 27.8 per cent of total EU chemicals sales in 2014.

Consumer chemicals are sold to final consumers, such as soaps and detergents as well as perfumes and cosmetics. They represented 12.6 per cent of total EU chemicals sales in 2014. Petrochemicals and specialty chemicals accounted for the majority – 54.9 per cent – of EU chemicals sales in 2014.

The inorganic basic chemicals subsector includes production of chemical elements, inorganic acid such as sulphuric acid, bases such as caustic soda, alkalis and other inorganic compounds such as chlorine. All processes are capital- and energy- intensive. The petrochemicals subsector includes manufacturing of chemicals using basic processes, such as thermal cracking and distillation.

Plastics in primary forms include the manufacture of resins, plastic materials and elastomers. Manufacture of polymers in primary forms is in most cases integrated into petrochemicals sites, and business units apply the same standards of compliance with HSE legislation as their suppliers of building blocks. Pesticides includes the manufacture of pesticides and agrochemicals excluding fertilisers and nitrogen compounds.

The specialty chemicals group is by far the most heterogeneous group with regard to products, applications, production processes, HSE requirements and business structure. The soap and detergents, cleaning and polishing preparations subsector comprises a very large number of end products and preparations. Products and operators can be divided into two homogeneous sub-groups – manufacturing household and consumer detergents on the one hand and industrial cleaning and disinfectants on the other hand.

World chemicals sales: geographic breakdown

Chemicals sales by country: top 10

World chemicals sales by region

EU share of global chemicals market

EU chemical industry sales by sectoral breakdown

EU chemical industry sales by geographic breakdown

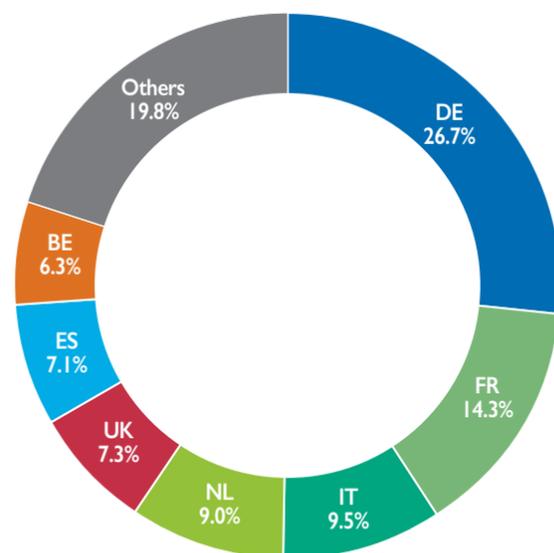
EU chemical industry sales: structure by destination

EU chemical industry by sales structure

Contribution of the chemical industry to the EU economy

EU chemical industry sales by geographic breakdown

Sales 2014 (€551 billion)



Source: Cefic Chemdata International

Unless specified, chemical industry excludes pharmaceuticals
Unless specified, EU refers to EU 28

Vast majority of EU chemicals sales generated in seven EU member states

Germany and France are the two largest chemicals producers in Europe, followed by Italy and the Netherlands. These four countries together accounted for 59.5 per cent of EU chemicals sales in 2014, valued at €327.7 billion. The share rises to 80.2 per cent, or €441.9 billion, when including, the United Kingdom, Spain and Belgium. The remaining 21 EU member states tallied 19.8 per cent of EU chemicals sales in 2014, valued at €109.1 billion, Austria and Poland are the largest two contributors to that EU21 member states bloc.

In Germany, the chemical & pharmaceutical industry is the third largest industry. While the turnover of the automotive industry and machinery & equipment production is higher, it sells more than the food & drink, electrical equipment and metal industries. In France, the chemical industry is a key component of the national economy and industry. Its added value was estimated to be €17.7 billion in 2014, close to 8% of the overall manufacturing added value and ranking third behind the food and beverages and metal industries.

At the EU level, the chemical industry (excluding pharmaceuticals) is the fifth largest industry, contributing to about 7% of total EU manufacturing added value. The top five leading sectors are machinery and equipment, food products, fabricated metal products motor vehicles and chemicals, (Source Eurostat SBS, data 2012).

World chemicals sales: geographic breakdown

Chemicals sales by country: top 10

World chemicals sales by region

EU share of global chemicals market

EU chemical industry sales by sectoral breakdown

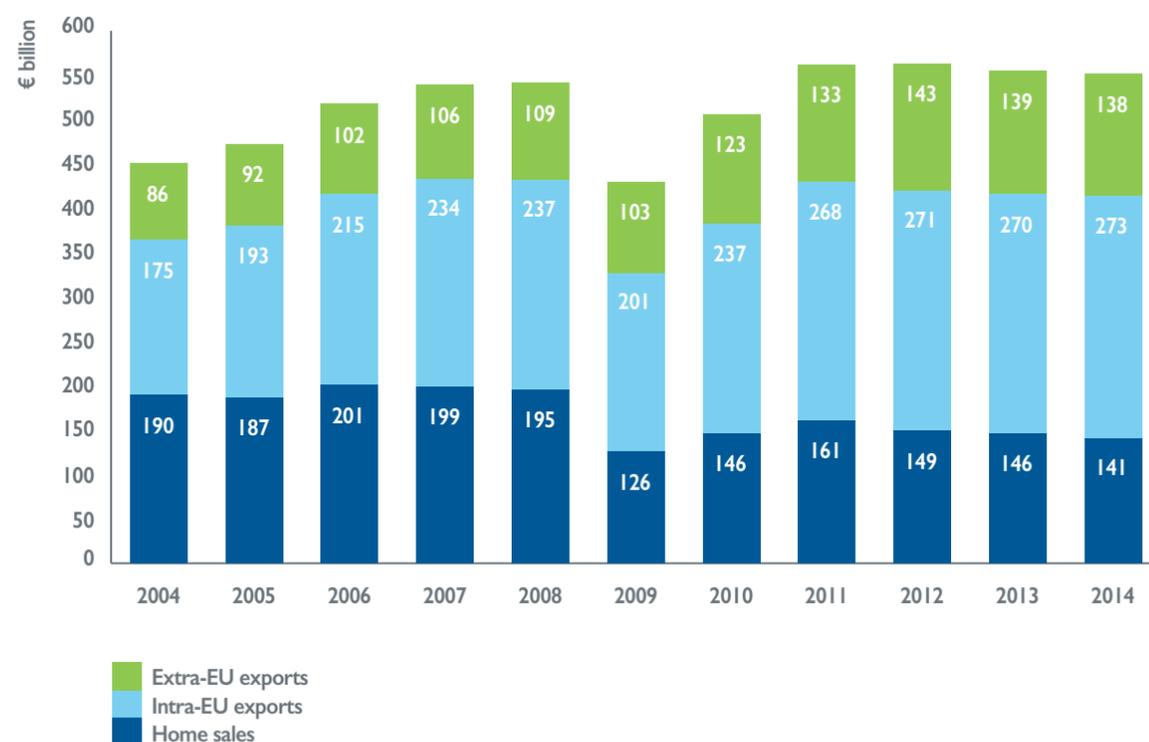
EU chemical industry sales by geographic breakdown

EU chemical industry sales: structure by destination

EU chemical industry by sales structure

Contribution of the chemical industry to the EU economy

EU chemical industry sales: structure by destination



Source: Cefic Chemdata International

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Internal market drives EU chemicals sales

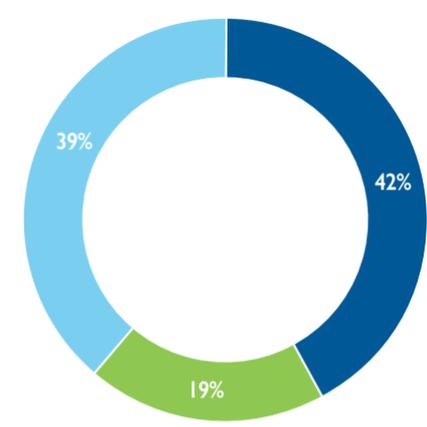
Removing both trade and non-trade barriers inside the European Union helped boost growth and competitiveness in the EU chemical industry between 2004 and 2014. The internal market, numbering more than 500 million consumers, is a determining factor for competitiveness. The accession of new EU member states in 2004 and 2007 gave the internal market an extra boost for intra-EU trade.

Total EU chemicals sales were worth €551 billion in 2014. Intra-EU sales (marked as “intra-EU exports” on the graph) climbed from €175 in 2004 to €273 in 2014 – a 56 per cent increase during the last 10 years.

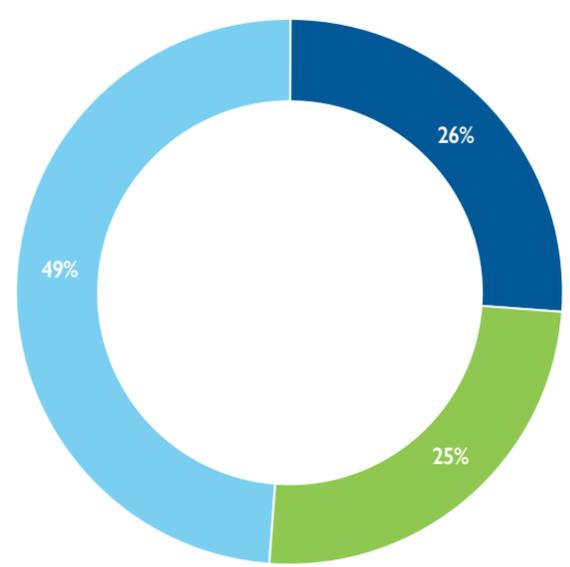
World chemicals sales: geographic breakdown	Chemicals sales by country: top 10	World chemicals sales by region	EU share of global chemicals market	EU chemical industry sales by sectoral breakdown	EU chemical industry sales by geographic breakdown	EU chemical industry sales: structure by destination	EU chemical industry by sales structure	Contribution of the chemical industry to the EU economy
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EU chemical industry by sales structure

Sales 2004 (€451 billion)



Sales 2014 (€551 billion)



■ Extra-EU exports
■ Intra-EU exports
■ Home sales

Source: Cefic Chemdata International

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 Unless specified, EU refers to EU 28

One quarter of EU chemicals are sold outside the European Union

EU chemicals sales in 2014 were 22 per cent higher compared with 2004. During the period from 2004 to 2014, EU chemicals sales increased on average by 2.0 per cent per annum. By 2014, intra-EU sales – excluding domestic receipts – accounted for 49 per cent of total EU chemicals sales.

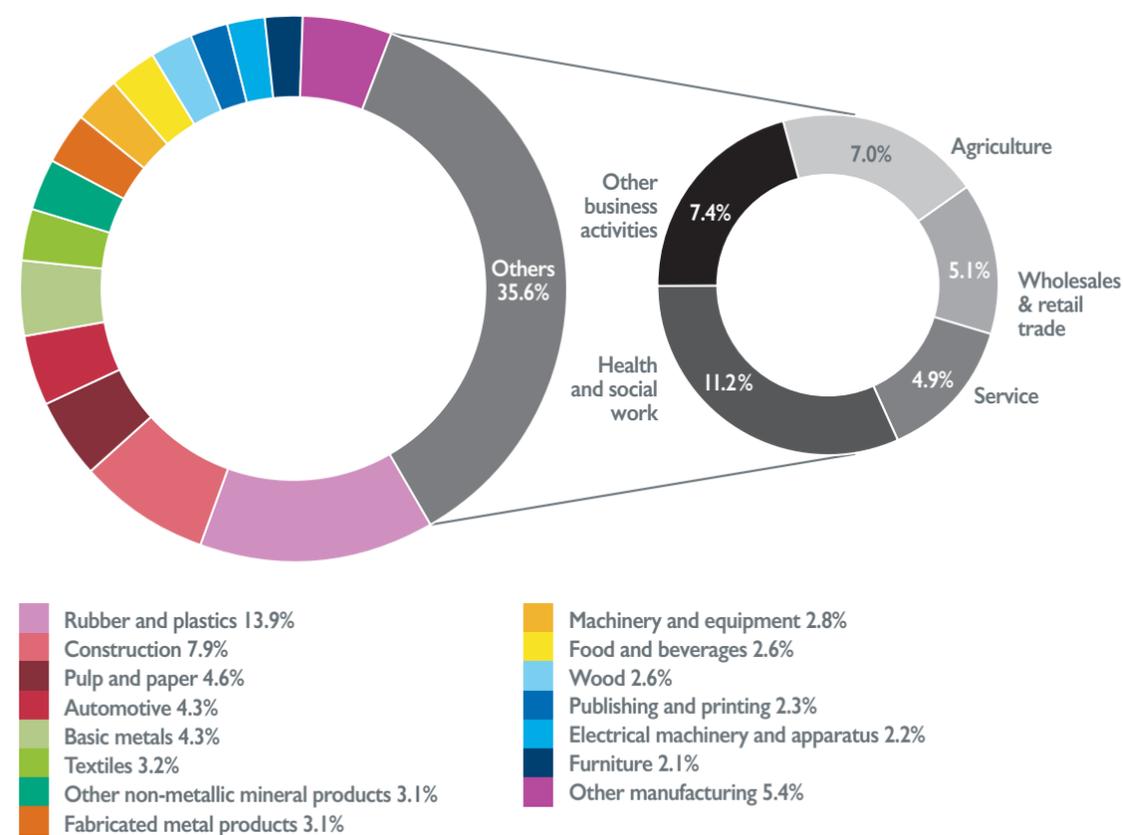
While intra-EU sales are rising, the importance of domestic sales is decreasing. In 2014 the latter accounted for 26 per cent of total EU chemical sales. Twenty-five per cent of chemicals are exported out of the EU market. The three primary markets for EU chemicals exports are the EU neighbour countries, the NAFTA trade bloc and Asia.

The European chemical industry is an exporting industry, with one-quarter of its production being exported outside the EU. Our industry needs to continue to be globally competitive to sustain its existing capacity and grow in line with global demand. However, we also see a worrying decline in domestic market share over the past ten years. The EU chemical industry not only lost competitiveness vis-à-vis the rest of the world, but also on its own market.

World chemicals sales: geographic breakdown	Chemicals sales by country: top 10	World chemicals sales by region	EU share of global chemicals market	EU chemical industry sales by sectoral breakdown	EU chemical industry sales by geographic breakdown	EU chemical industry sales: structure by destination	EU chemical industry by sales structure	Contribution of the chemical industry to the EU economy
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Contribution of the chemical industry to the EU economy

Customer sectors of the EU chemicals industry



Sources: Eurostat data (Input-Output 2000) and Cefic analysis

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 Unless specified, EU refers to EU 28

Nearly two-thirds of EU chemicals are supplied to the industrial sector

The chart illustrates how the chemical industry underpins virtually all sectors of the economy and its strategies impact directly on downstream chemicals users. The big industrial users of chemicals are rubber and plastics, construction, pulp and paper, and the automotive industry. Nearly two-thirds of EU chemicals are supplied to the EU industrial sector, including construction. More than one-third of chemicals go to other branches of the EU economy such as agriculture, services and other business activities. The EU chemical industry also makes technology transfer through sales to all other sectors.

The chemical industry contribution to EU gross domestic product (GDP) amounts to 1.1 per cent. This may seem small at first, but should be reassessed taking into consideration the shrinking contribution by manufacturing in many advanced economies, coupled with a rise in service sector output.

Cefic supports the Commission's objective for industrial activity to contribute 20% of GDP by 2020, which should be seen as a directional rather than absolute target. The scale of the task should not be underestimated. Today, industry contributes about 15% of GDP, and investment in industry is in decline. Because of decreasing investment in primary production, Europe is losing ground in terms of technological capability, and existing European value chains are at risk.

Extra-EU
chemicals trade
balance

EU chemicals
trade flows with
third countries
by sector

Extra-EU
chemicals trade
flows with top
EU partners

Extra-EU
chemicals trade
flows with major
geographic blocs

EU chemicals
trade surplus:
sectoral
breakdown

EU chemicals
trade balance
with key
countries and
regions

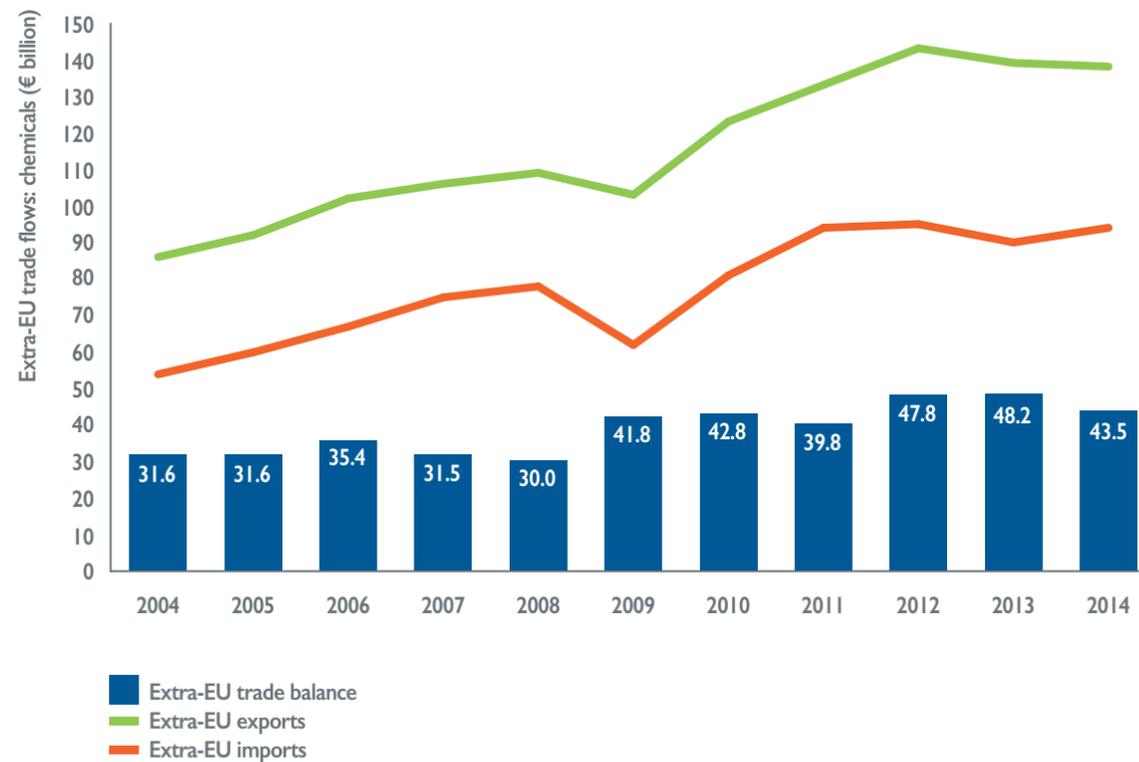
Extra-EU trade
balance 2014 vs
2013

International Trade



Extra-EU chemicals trade balance

EU chemical trade surplus at €43.5 billion in 2014



Trading chemicals around the world stimulates competition, provides an incentive to develop new markets through innovation and stimulates production efficiency. But above all, it helps to improve the quality of human life.

As an historically important player in the global chemicals market, the EU chemical industry continues to benefit from trade opportunities. The chart shows that the EU chemical industry registered a solid recovery in 2013 after the 2008 economic crisis, posting a record extra-EU net trade surplus of €48.2 billion. It registered a significant trade surplus of €43.5 billion in 2014. Data analysis indicates however that chemical imports are tending to increase while chemicals exports show a flat line.

We need more open competition and open markets. Europe's net chemical exports last year were €44 billion, but the surplus is declining. Trade agreements with key partners such as the US and Japan would enable our industry to enhance efficiency and better exploit our technical strengths.

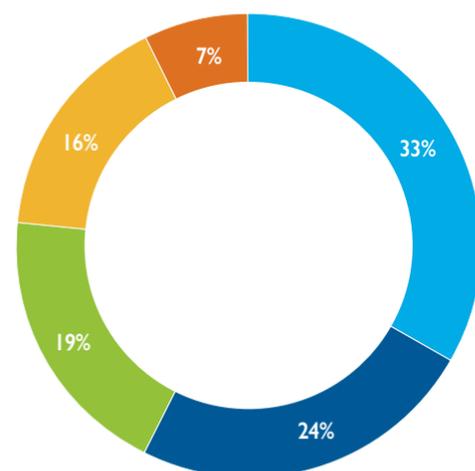
Source: Cefic Chemdata International

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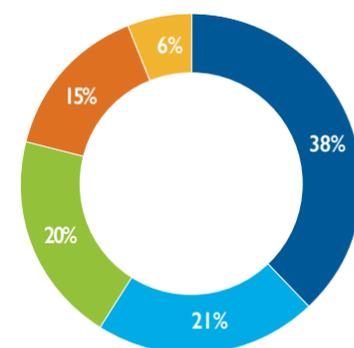
Extra-EU chemicals trade balance	EU chemicals trade flows with third countries by sector	Extra-EU chemicals trade flows with top EU partners	Extra-EU chemicals trade flows with major geographic blocs	EU chemicals trade surplus: sectoral breakdown	EU chemicals trade balance with key countries and regions	Extra-EU trade balance 2014 vs 2013
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EU chemicals trade flows with third countries by sector

Extra-EU exports 2014 (€137.7 billion)



Extra-EU imports 2014 (€94.2 billion)



Source: Cefic Chemdata International

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Unless specified, EU refers to EU 28

EU records trade surplus for most chemicals sectors

Despite domestic and international economic uncertainty, EU chemical industry exports reached €137.7 billion in 2014. EU chemicals imports from the non-EU area reached €94.2 billion in 2014. This resulted in an EU chemicals trade surplus of €43.5 billion.

On the sectoral side, specialty chemicals is the largest exporting sector, accounting for one third of total EU chemicals exports in 2014. Petrochemicals was the second largest exporting sector, contributing to nearly one quarter of total EU chemicals exports.

Import data shows that with 38 per cent, petrochemicals was the largest chemicals importer in 2014, followed by specialty chemicals and polymers, which contribute individually to about one fifth of total chemicals imports.

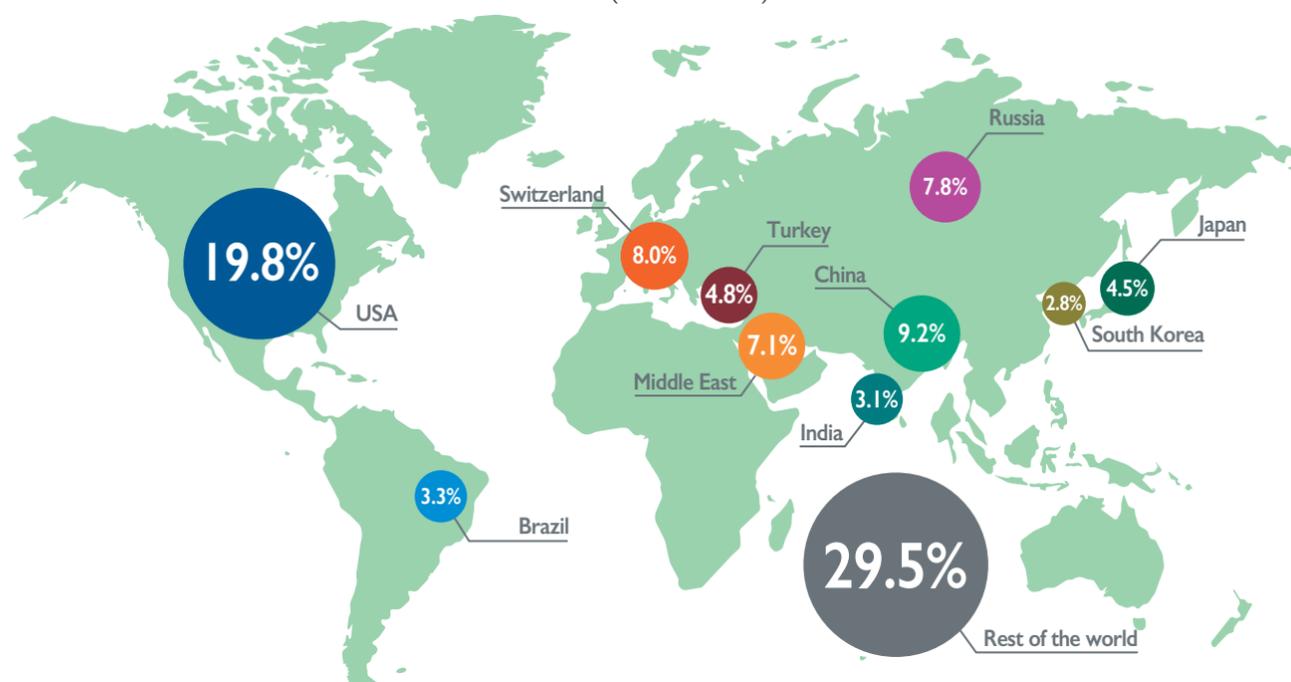
Trade analysis indicates that the EU chemicals sector recorded a trade surplus for polymers, specialty chemicals and consumer chemicals in 2014. However, basic inorganics and petrochemicals experienced a trade deficit during the same year. Petrochemicals registered a modest performance in exports in 2014 and significant import pressure compared to its long-term averages.

The chemical industry also depends on free trade and open markets, both for its raw materials and as outlets for its products. The industry relies increasingly on tightly interconnected clusters that in turn participate in global value chains. Accordingly, we strongly support the EU's efforts to conclude state-of-the-art free trade agreements that ensure unrestricted access to energy and feedstock and enhance regulatory cooperation between Europe and key trading partners, especially the US and Japan.

Extra-EU chemicals trade balance	EU chemicals trade flows with third countries by sector	Extra-EU chemicals trade flows with top EU partners	Extra-EU chemicals trade flows with major geographic blocs	EU chemicals trade surplus: sectoral breakdown	EU chemicals trade balance with key countries and regions	Extra-EU trade balance 2014 vs 2013
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Extra-EU chemicals trade* flows with top EU partners

Extra-EU chemicals trade 2014 (€232 billion)



Source: Cefic Chemdata International
* Trade = exports + imports

Unless specified, chemical industry excludes pharmaceuticals
Unless specified, EU refers to EU 28

Top 10 EU partners account for 71% of Extra-EU chemicals trade

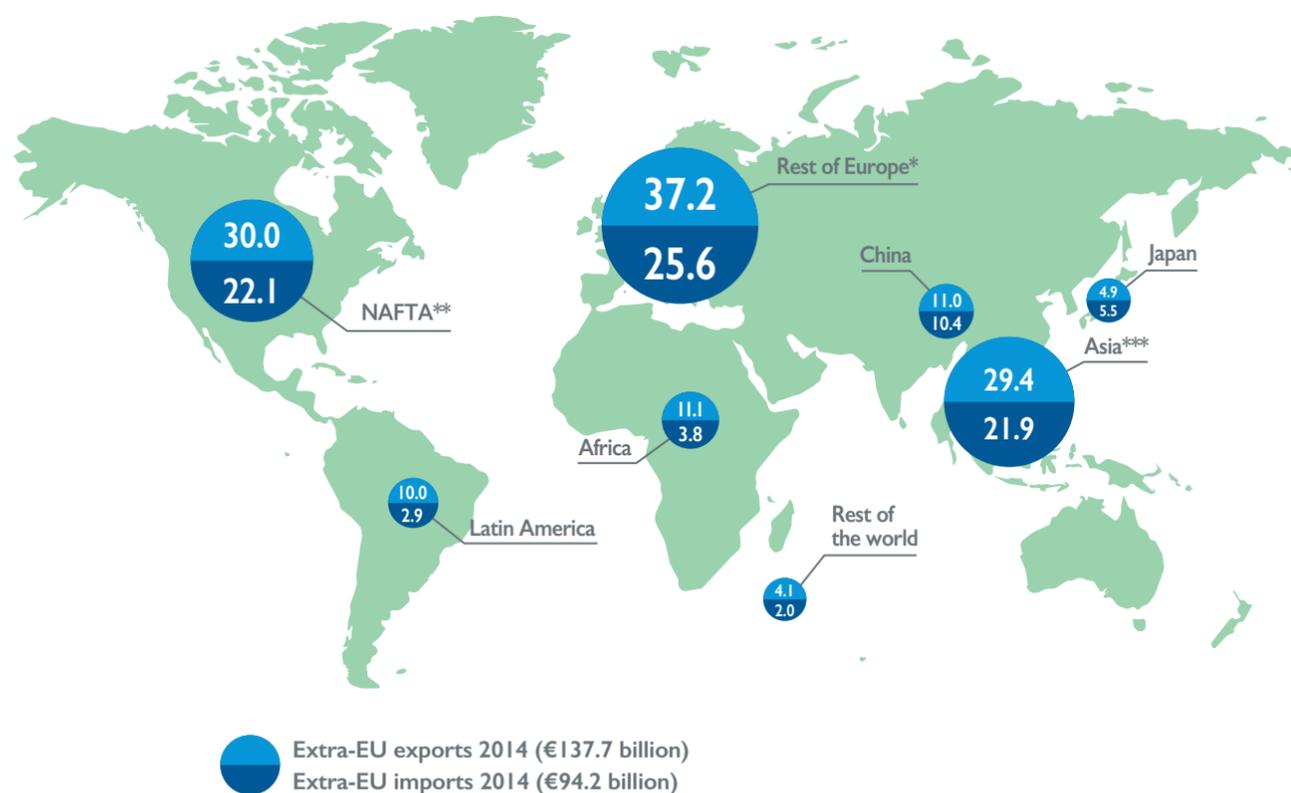
Extra-EU chemicals trade flow, calculated as total exports plus imports, was valued at nearly €232 billion in 2014. The top 10 EU partners accounted for 71% of extra-EU chemicals trade in the same year. The US was by far the EU's biggest trading partner in chemicals in 2014. It buys €25.5 billion of EU exports, nearly 20% of the EU chemicals total every year, whilst providing €20.4 billion of EU imports.

Transatlantic trade flows are expected to change considerably in the next five years, because the US shale gas boom has triggered a massive build-up of new chemicals production capacity there. Any EU-US deal therefore needs to contain strong provisions regarding access for EU companies to US energy and feedstock. This could help improve the competitiveness of the European chemical industry by narrowing the gas price gap with the US. This is especially important for sectors such as petrochemicals and polymers, which have already lost global export competitiveness in the past decade. For these sectors, gas can account for as much as 60% of operating costs, being used both as a feedstock and to provide energy for crackers.

Today China is the EU's second-biggest chemicals trading partner, accounting for 8 per cent of EU exports. China has become the most important growth market for global chemical companies and a major investment location. Whilst Chinese chemical companies are gradually increasing their focus on specialty chemicals, the country will remain a major importer of commodity chemicals for some time to come. Chinese expansion does not necessarily imply Europe loses out. Rather, there are wins for both, and China offers many opportunities.

Extra-EU chemicals trade balance	EU chemicals trade flows with third countries by sector	Extra-EU chemicals trade flows with top EU partners	Extra-EU chemicals trade flows with major geographic blocs	EU chemicals trade surplus: sectoral breakdown	EU chemicals trade balance with key countries and regions	Extra-EU trade balance 2014 vs 2013
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Extra-EU chemicals trade flows with major geographic blocs



Source: Cefic Chemdata International

* Rest of Europe covers Switzerland, Norway, Turkey, Russia and Ukraine

** North American Free Trade Agreement

*** Asia excluding China and Japan

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EU holds trade surplus with top competing markets

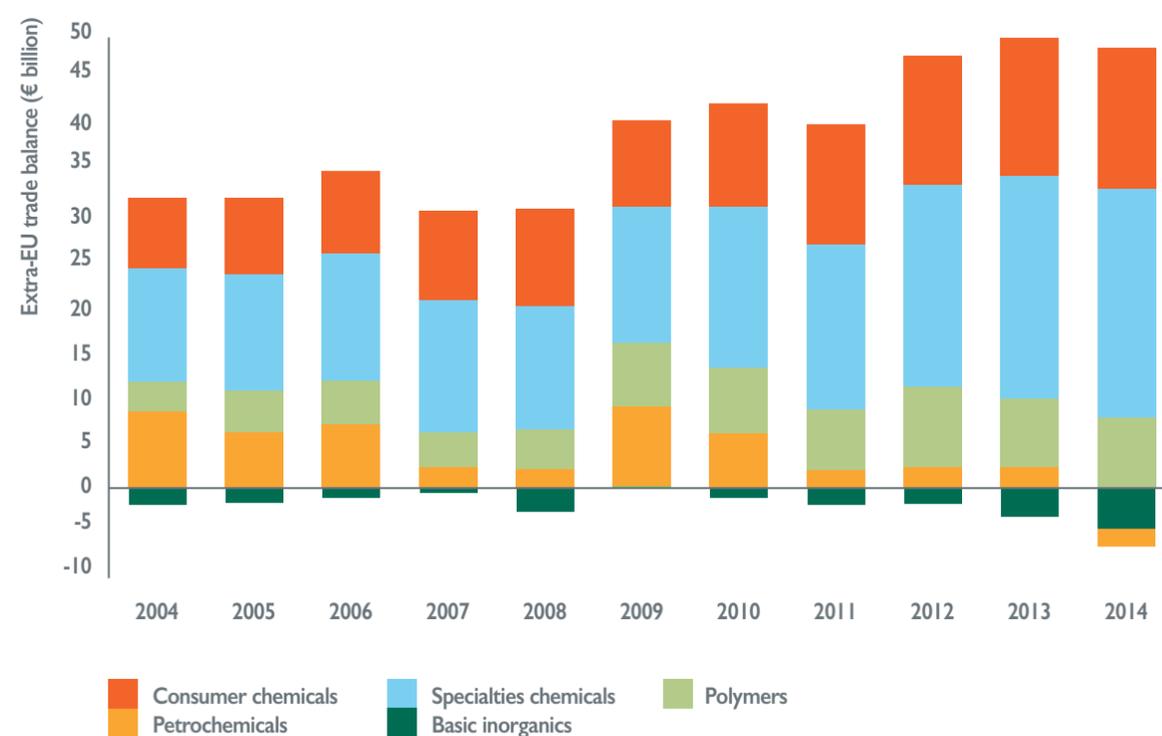
The European Union has a trade surplus with all main trading regions – NAFTA, Asia, China, Latin America, Africa, and non-EU Europe. Non-EU Europe played a major role in 2014 EU chemicals trade activity. The EU chemicals sector had a €11.6 billion net trade surplus with them. The two major geographic blocs trading with the European Union in 2014 remain the rest of Europe and North America.

Since 90% of GDP growth will take place outside Europe in the next decade, international trade should drive growth of the European chemical industry, bolstering sales and jobs. But barriers need to be stripped away. Despite some multilateral trade deals within the GATT framework and some bilateral agreements between the European Union and its partners, much remains to be done in terms of opening markets.

Our industry also needs better access to affordable energy and raw materials and greater harmonisation of standards and regulations around the world. If Europe's industry is to grow and share in the rewards, Europe must reinforce its role as a chemical exporting region.

Extra-EU chemicals trade balance	EU chemicals trade flows with third countries by sector	Extra-EU chemicals trade flows with top EU partners	Extra-EU chemicals trade flows with major geographic blocs	EU chemicals trade surplus: sectoral breakdown	EU chemicals trade balance with key countries and regions	Extra-EU trade balance 2014 vs 2013
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EU chemicals trade surplus: sectoral breakdown



Specialty, consumer chemicals contribute most to extra-EU trade surplus

The EU chemicals trade surplus in 2014 reached nearly €43.5 billion, 58.6 per cent of which came from specialty chemicals. Consumer chemicals had the second strongest external trade performance, accounting for 36.0 per cent, followed by polymers at 18.0 per cent. Basic inorganics experienced a trade deficit of €4.4 billion. Petrochemicals registered for the first time a trade deficit of €2.0 billion in 2014. Specialty chemicals and consumer chemicals performed well in 2014. The trade surplus in these sectors increased by 2.7 per cent and 1.6 per cent respectively in 2014 compared with one year ago.

Using constant market share analysis of chemical exports, a report of Oxford Economics commissioned by Cefic confirms that most of the decrease in EU export market share observed over the past twenty years is due to declining competitiveness as opposed to slow-growing destination markets. The erosion of export competitiveness is mainly attributable to petrochemicals and – to a less dramatic degree – to polymers.

Source: Cefic Chemdata International

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EU chemicals trade balance with key countries and regions

The EU generated its largest chemicals trade surplus with the Rest of Europe

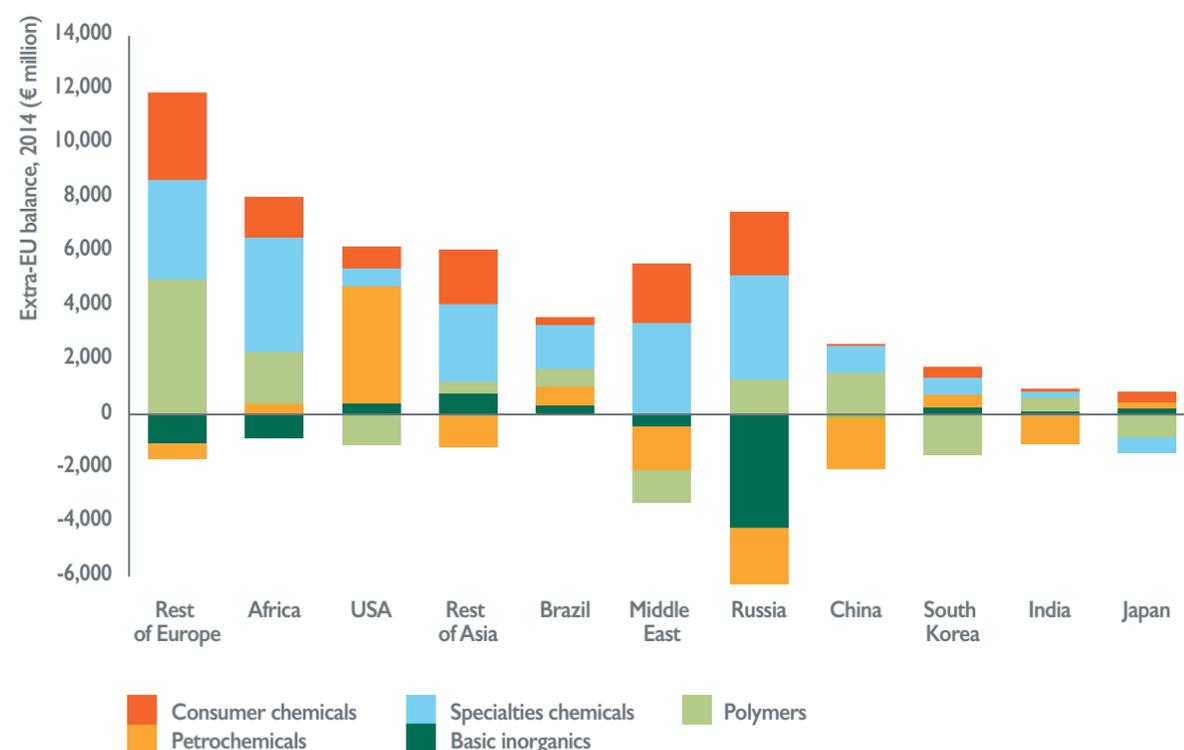
A look at the 2014 EU chemicals trade balance with key countries and regions shows:

Rest of Europe The European Union generated its largest chemicals trade surplus with the Rest of Europe, which covers Turkey, Switzerland, Russia, Norway and Ukraine. The EU surplus with Rest of Europe amounted to €10.3 billion in 2014, to which polymers and specialty chemicals contributed largely.

USA The EU generated a chemicals trade surplus of €5.1 billion with the United States, 85 per cent of which stemmed from EU-US trade in the petrochemicals sector. This sector is sensitive to the developing US shale gas boom. The US is the world's biggest producer of bioethanol, making around 54% of world production in 2013. The European Commission promotes the development of the bio-economy, but progress is hampered by uneven access to renewable raw materials. The European chemical industry seeks access to renewable feedstocks at competitive prices. Today these renewable feedstocks are mainly produced outside the EU and subject to high import duties. We need open and fair access to renewables at world market prices.

India The EU had a chemicals trade deficit with India, mainly due to the deficit that occurred in petrochemicals. The EU trade deficit with India in petrochemicals was valued at about €1.1 billion in 2014. India is the world's second-largest emerging market, and the EU is playing a key role in that transformation as India's biggest source of foreign direct investment. EU-India trade in goods and services accounted for nearly €73 billion in 2014, of which €7.3 billion was in the chemicals sector. Cefic advocates an ambitious and comprehensive Free Trade Agreement, eliminating all chemical tariffs and removing all trade barriers including export restrictions and export duties on raw materials.

Japan The EU had a chemicals trade deficit with Japan, mainly due to the deficit that occurred in polymers and specialty chemicals. In 2014, €142 billion of chemicals were sold in Japan, making it the world's fourth-biggest market, but with €10.3 billion of EU-Japan imports and exports. Japan was not amongst the top six trading partners for the EU chemical industry.



Source: Cefic Chemdata International

* Rest of Europe covers Switzerland, Norway, Turkey and Ukraine (Russia excluded)

** Asia excluding Middle East, China, South Korea, India and Japan

Unless specified, chemical industry excludes pharmaceuticals
Unless specified, EU refers to EU 28

Extra-EU chemicals trade balance	EU chemicals trade flows with third countries by sector	Extra-EU chemicals trade flows with top EU partners	Extra-EU chemicals trade flows with major geographic blocs	EU chemicals trade surplus: sectoral breakdown	EU chemicals trade balance with key countries and regions	Extra-EU trade balance 2014 vs 2013
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Extra-EU trade balance 2014 vs 2013



Source: Cefic Chemdata International

* Rest of Europe covers Switzerland, Norway, Turkey and Ukraine (Russia excluded)

** Asia excluding Middle East, China, South Korea, India and Japan

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Unless specified, EU refers to EU 28

EU petrochemicals trade surplus with Rest of Europe and the USA deteriorates

A look at the comparison of EU trade balance of 2013 to 2014 shows that the extra-EU chemicals trade surplus narrowed in 2014 by €4.7 billion compared to the previous year.

The decline was largely due to EU chemicals trade activity with Rest of Europe (including Russia), United States, China, Japan and South Korea. The European Union overall trade surplus is deteriorating, especially with US markets for petrochemicals. The EU chemicals trade surplus with the United States declined by €1.1 billion from 2013 to 2014.

Middle East The European Union overall trade surplus increased with the Middle East –especially with markets for polymers and consumer chemicals. The EU chemicals trade surplus with the Middle East rose by €718 million from 2013 to 2014. In 2014, the Gulf Cooperation Council (GCC) was the fifth largest trade partner of the European chemical industry, with a trade flow of €16.6 billion. Thanks to sustained economic growth, since January 2014 the GCC countries no longer qualify under the Generalised Scheme of Preferences (GSP) that allows preferential tariffs for the least developed countries. They are subject to full import duties when exporting chemicals to the EU.

Brazil Among the Mercosur countries, Brazil is the most important player. Its chemical output in 2014 was 79.3 billion, ahead of France (€79.0 billion). EU chemical exports to Brazil have been growing for several years, and the country is an attractive market with €6.6 billion of chemical trade flows in 2014. Brazil buys €5.2 billion of EU chemicals exports, nearly 3.3% of the EU chemicals total every year, whilst providing €1.3 billion of EU chemicals imports.

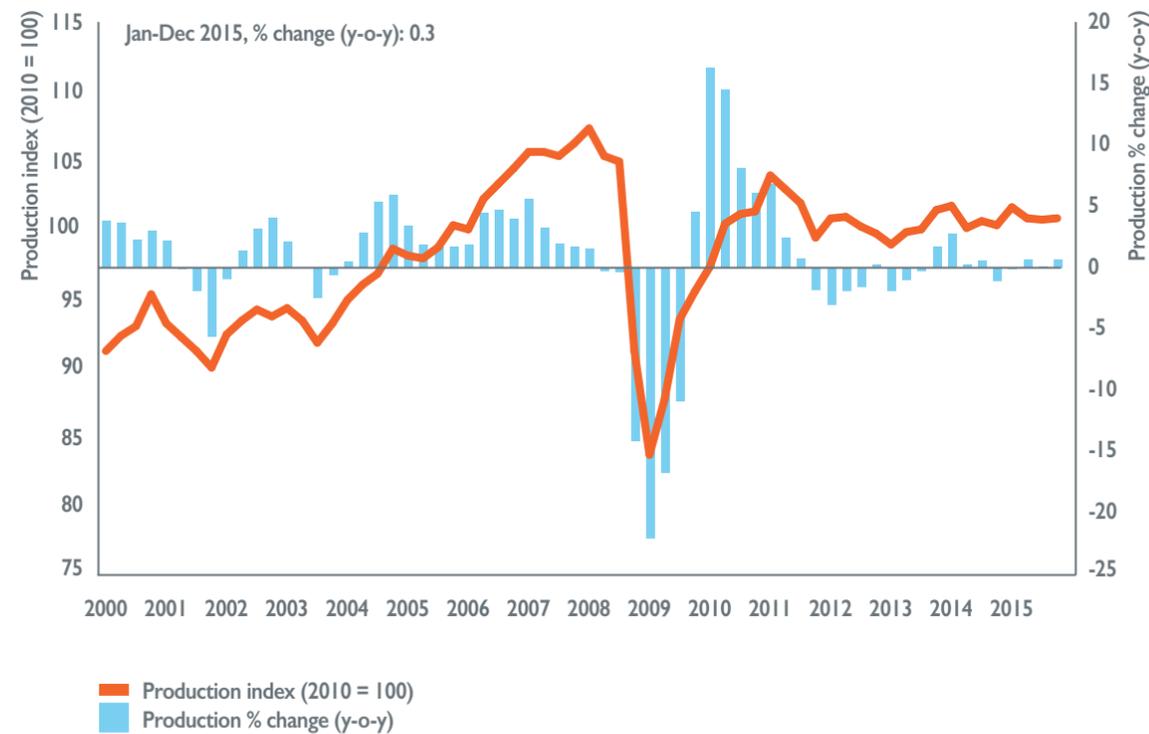
EU chemicals production growth	EU chemicals production growth by sector	Capacity utilisation in the EU chemical industry	Average ethylene cash costs in the EU vs North America	Significance of EU regulatory cost for the chemicals sector	Legislation cost during the period 2004-2014	International comparison of production growth	Growth in world chemicals sales 2014-2030
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Growth & Competitiveness



EU chemicals production growth

Stagnant growth for the EU chemical sector



During the 11-year period from 2004 to 2014, the chemical industry in the European Union had an average production growth rate of 0.4 per cent. The low growth rates stem from strong declines in chemicals production levels during the 2009 economic downturn as compared with pre-crisis levels. The EU chemical industry was profoundly affected by the spill-over effects of the economic and financial crisis.

The chemicals sector has been following the recovery trend that occurred in 2010. The EU chemicals sector posted a strong year 2010, expanding by 11.0 per cent compared with 2009. Even with strong growth rates, production in 2010 remained far below the pre-crisis level and will need several years to surpass it. This is valid until 2015.

Quarterly analysis shows that growth in the first quarter of 2011 was encouraging, expanding by a robust 6.8 per cent compared with first quarter of 2010. Production activity during the rest of the year, however, performed less well, as it was largely affected by the downbeat economic and business climate during the last three quarters of the year. The first quarter of 2011 is still considered today as the peak level after the crisis of 2009. The recovery has continued to be slow ever since.

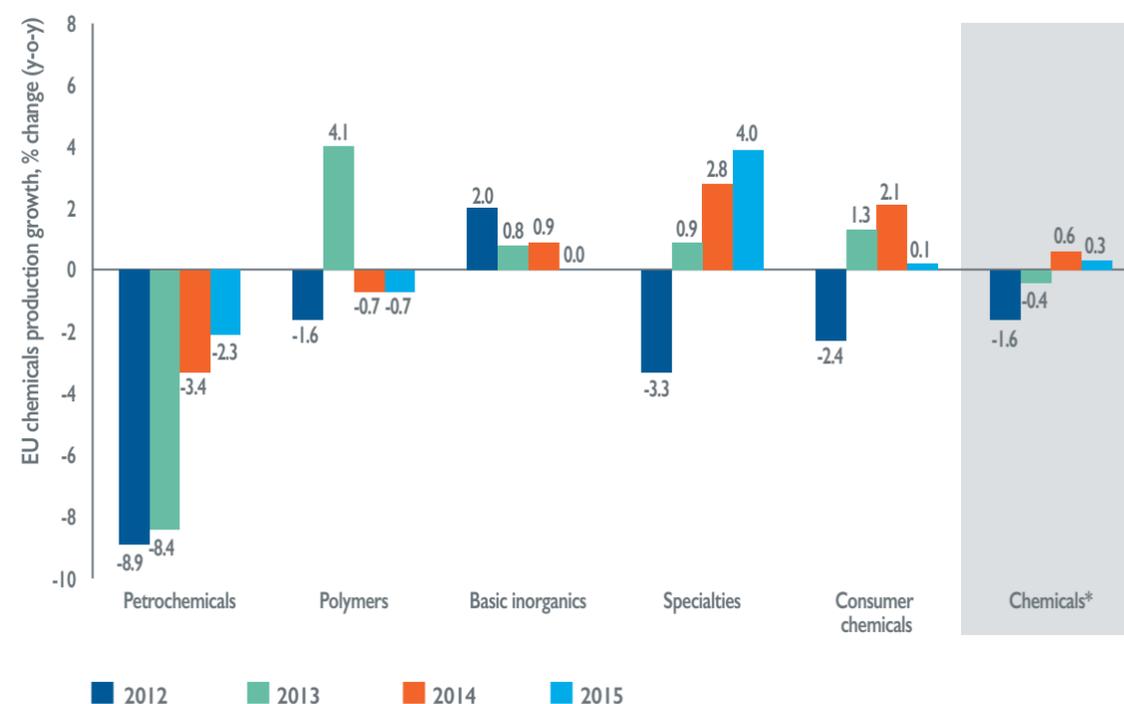
Chemical output in the European Union grew just 0.3 per cent in 2015 compared to 2014. Chemicals output followed a flat trajectory. Stagnant production levels and declining prices continue to impact chemicals sales. Exports continue to drive industry growth, which could be bolstered by delivering trade agreements that reduce trade barriers such as the proposed TTIP. Trade agreements must improve industry access to competitively priced energy and feedstock.

Source: Cefic Chemdata International
* Chemicals (excluding pharmaceuticals, Nace Rev2, C20)

Unless specified, chemical industry excludes pharmaceuticals
Unless specified, EU refers to EU 28

EU chemicals
production
growthEU chemicals
production
growth by sectorCapacity
utilisation in the
EU chemical
industryAverage
ethylene cash
costs in the
EU vs North
AmericaSignificance of
EU regulatory
cost for the
chemicals sectorLegislation
cost during
the period
2004-2014International
comparison
of production
growthGrowth in world
chemicals sales
2014-2030

EU chemicals production growth by sector



Petrochemicals face sharp decline

Looking at the EU chemical industry broken down by sector, apart from specialty chemicals and consumer chemicals, no chemicals sectors registered significant positive growth in 2014. Petrochemicals production further contracted in 2014, remaining under pressure since its record-setting decline in 2012.

Looking ahead, the European chemical industry is forecasting modest growth in domestic and worldwide demand for European chemicals for 2016, with challenging times ahead in the long term. This forecast comes in the face of declining demand from key industries, competition from third countries and economic slowdown in important export markets.

Overall, Cefic expects around 1% growth in EU chemical production in 2016. The environment for the chemical business in 2015 proved challenging: manufacturing growth in the European Union grew only moderately, while construction growth was slower than expected in the current low-interest rate environment. Only the automotive industry over-performed in 2015, impacting demand for certain chemical products. Looking ahead, growth in industries such as food and beverages, and construction is expected to offset relatively any downturn in the automotive sector.

The EU chemical industry will continue to face relentless global competition. Access to raw materials and energy at globally competitive prices remains a prerequisite for a successful recovery for the EU chemicals sector. The US shale gas revolution is generating additional direct cost pressure on the base chemicals sector.

Source: Cefic Chemdata International

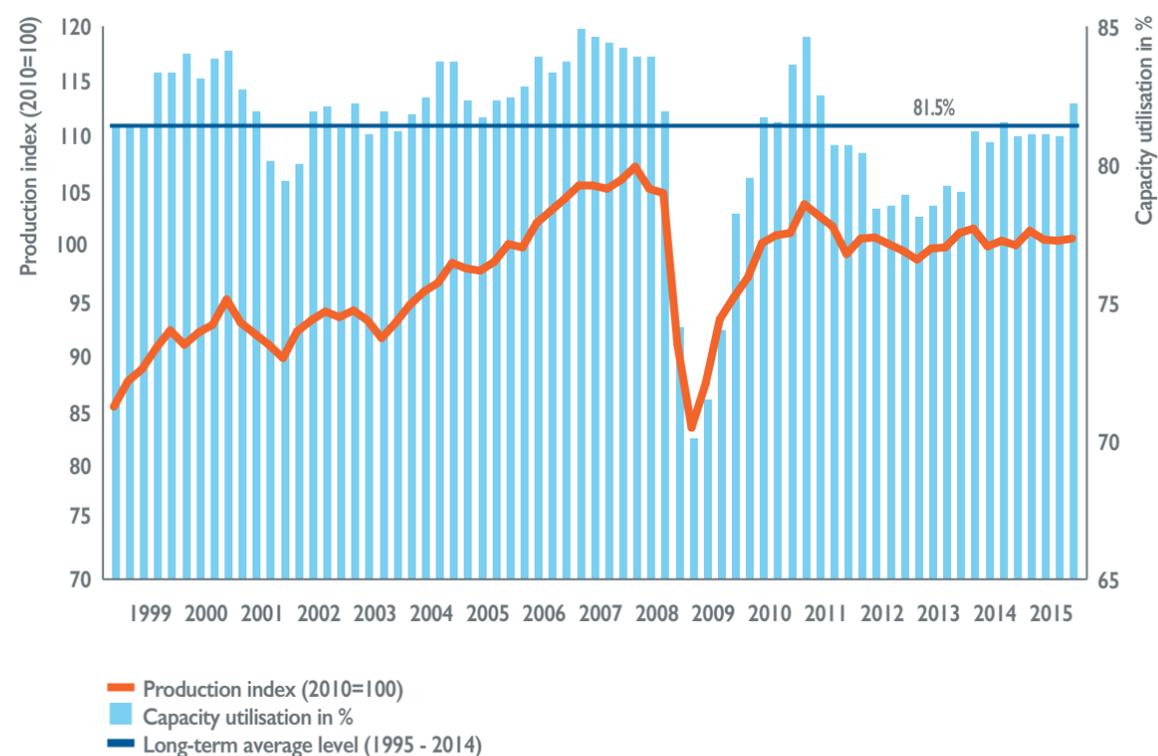
* Chemicals (excluding pharmaceuticals, Nace Rev2, C20)

Output growth figures by sector are not 100% comparable (country coverage differ across sectors)

Unless specified, chemical industry excludes pharmaceuticals
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EU chemicals
production
growthEU chemicals
production
growth by
sectorCapacity
utilisation in the
EU chemical
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AmericaSignificance of
EU regulatory
cost for the
chemicals sectorLegislation
cost during
the period
2004-2014International
comparison
of production
growthGrowth in world
chemicals sales
2014-2030

Capacity utilisation in the EU chemical industry



Source: European Commission Business and Consumer Survey; companies answering the question "At what capacity is your company currently operating (as a percentage of full capacity)?"

Unless specified, chemical industry excludes pharmaceuticals
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Capacity utilisation has stabilised and is close to its long-term average

Quarterly analysis shows that growth in the first quarter of 2011 was encouraging, expanding by a robust 6.4 per cent compared with the first quarter of 2010. In line with EU chemical production, capacity utilisation during the rest of the year, however, performed less well. Q1-2011 is still considered today as the peak level after the crisis of 2009.

EU chemicals sector capacity utilisation reached a robust 82.2 per cent in the fourth quarter of 2015, up from 81.0 per cent in Q3-2015. Capacity utilisation remains 2.8 percentage points below the post-crisis peak recorded in the first quarter of 2011, and only 0.9 percentage points below the long-term average from 1995 to 2014.

EU chemicals production growth	EU chemicals production growth by sector	Capacity utilisation in the EU chemical industry	Average ethylene cash costs in the EU vs North America	Significance of EU regulatory cost for the chemicals sector	Legislation cost during the period 2004-2014	International comparison of production growth	Growth in world chemicals sales 2014-2030
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Average ethylene cash costs in the EU vs North America



Sources: ICIS and Cefic analysis

Unless specified, chemical industry excludes pharmaceuticals
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Energy costs are the European industry's Achilles' heel

The chemical industry is an energy-intensive industry competing globally. Anything that increases energy costs in Europe relative to our competitors has a major impact on competitiveness.

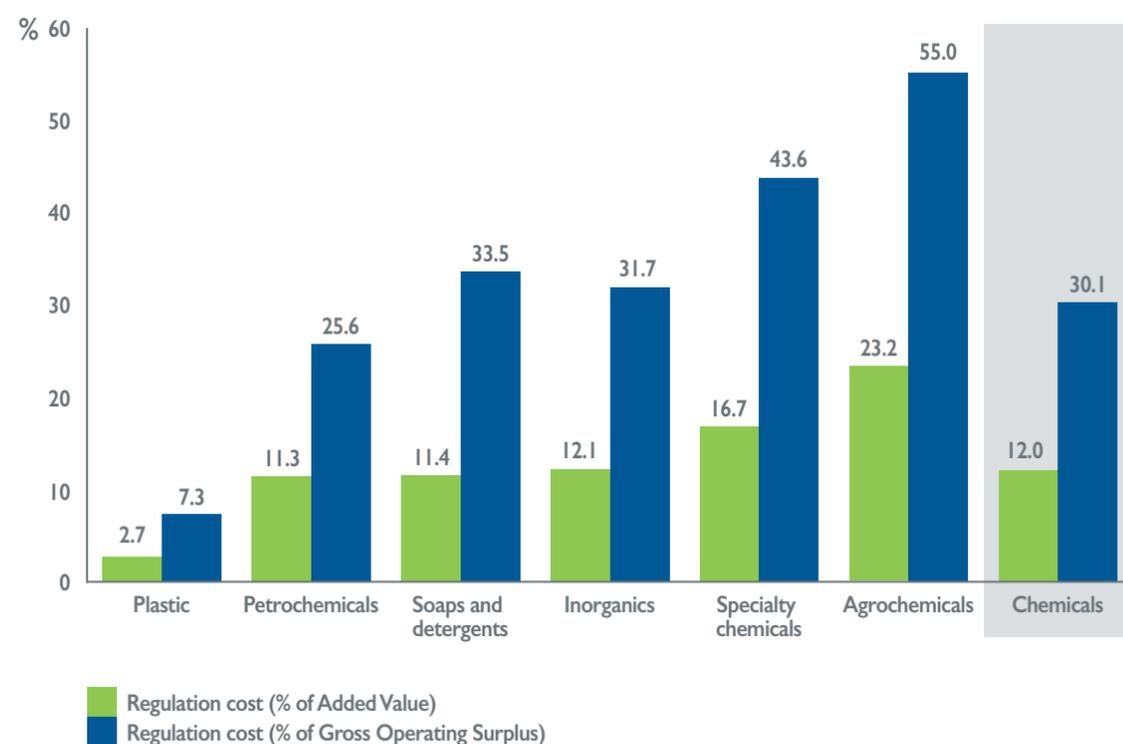
Energy costs are the European industry's Achilles' heel, especially compared to the oil and gas-rich Middle East, and more recently to the United States, which is riding on a shale gas boom. Advantageous energy and feedstock prices are a clear enabler of competitiveness. The shale gas boom in the United States has greatly reduced energy and feedstock costs. A clear indicator of this situation is the cost of producing ethylene.

Ethylene is the highest volume building block in the chemical industry globally. It is the foundation in the production of plastics, detergents and coatings amongst many other materials. Making ethylene in Europe was three times more expensive than in the US in 2013 (due to the shale gas boom) or the Middle East. This is boosting profits abroad and attracting billions of dollars in investment, including from European chemical companies. The latest developments in oil prices have significantly reduced EU costs vis-à-vis the USA. However, the EU-US gap in terms of cost remains a serious handicap for the base chemicals industry in Europe.

Last but not least, the arrival of Iran on the world's crude markets could change the scenario. For many reasons, it is good to see Iran integrating with the world's economy. Its return to the world's crude markets will contribute to the supply side, and hopefully to long-term low prices.

EU chemicals production growth	EU chemicals production growth by sector	Capacity utilisation in the EU chemical industry	Average ethylene cash costs in the EU vs North America	Significance of EU regulatory cost for the chemicals sector	Legislation cost during the period 2004-2014	International comparison of production growth	Growth in world chemicals sales 2014-2030
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Significance of EU regulatory cost for the chemicals sector



Sources: Technopolis Group, Cumulative Cost Assessment for the EU Chemical Industry, document prepared for the European Commission, 2016, not yet published

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Regulatory costs are shaping profitability of the chemicals sector

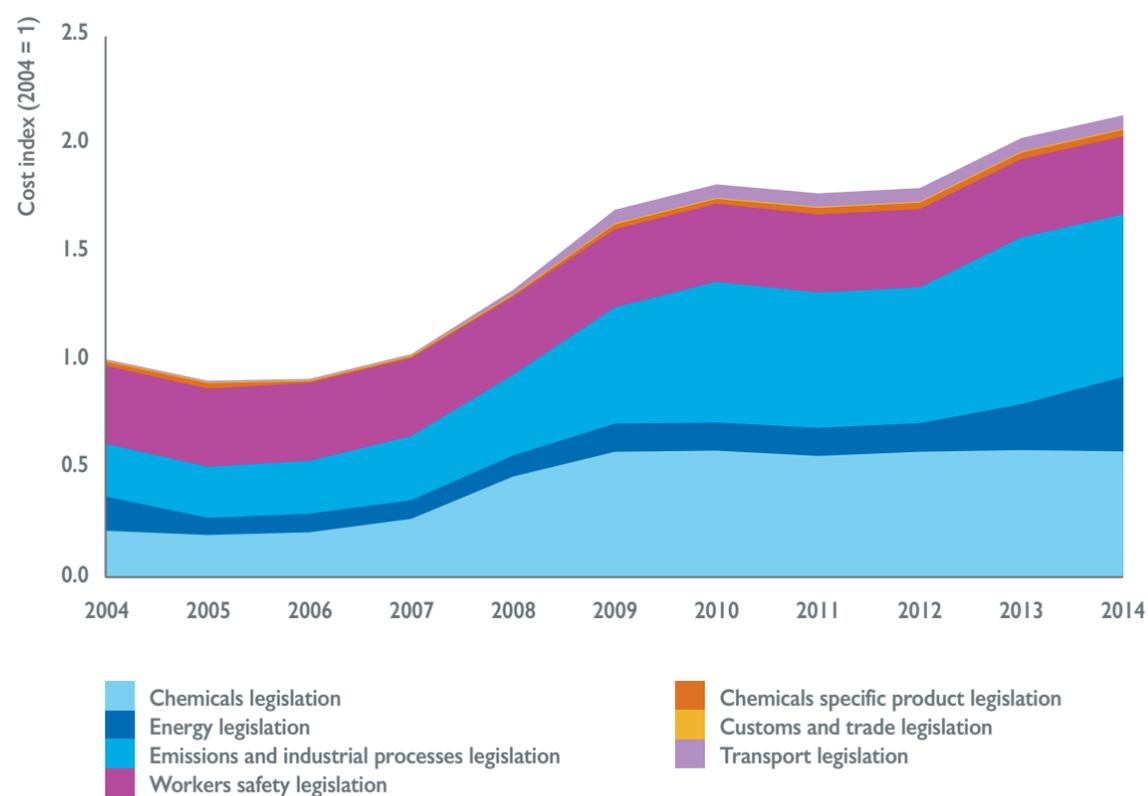
Under the REFIT Programme, the European Commission is undertaking an evaluation of the cumulative costs arising from existing EU legislation for the European chemical industry (Cumulative Cost Assessment – CCA). The aim is to have a better understanding of how costs induced by EU legislation affect the sector's international competitiveness, complementing the evidence-base for future policy-making decisions.

According to initial results of the CCA: in the EU, the total cost of legislation that companies from the six subsectors had to bear amounts to €10 billion per year on average, over the period 2004-2014. When compared to value added, which represents the value generated by the industry, the share of regulatory costs increases to 12% of the value added. Compared to Gross Operating Surplus (GOS), which can be used as a proxy for profit, the cost reaches 30%, indicating that the legislation cost is among the important factors shaping the profitability of the chemical industry.

Among the legislation packages, the three main drivers of regulatory cost are industrial emissions (33%), chemicals (30%) and workers safety (24%) – amounting to 87% of the total regulatory costs. The variability of cost across the different subsectors is significant. The higher cost as a percentage of value added is observed in pesticides and other agrochemicals, amounting to 23,2%, and the lowest in plastics at 2.7%. The cost for specialty chemicals represents 16.7% of the value added, for inorganic basic chemicals amounts to 12.1%, for organics basic chemicals is 11.3% and for soaps and detergents is 11.4%.

EU chemicals production growth	EU chemicals production growth by sector	Capacity utilisation in the EU chemical industry	Average ethylene cash costs in the EU vs North America	Significance of EU regulatory cost for the chemicals sector	Legislation cost during the period 2004-2014	International comparison of production growth	Growth in world chemicals sales 2014-2030
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Legislation cost during the period 2004-2014



Regulatory cost has doubled the last ten years

The chart above illustrates very well the rising legislation costs during the period 2004-2014, with major milestones being the introduction of REACH and CLP in 2007 and 2008 respectively and the investment of companies after 2009 in anticipation of the enforcement of Seveso III in 2012 and ETS Phase 3 in 2013. Energy legislation also contributes to the rising costs, especially after 2012.

The chemical industry will face increasing costs to comply with stricter emission limit values, more ambitious CO₂ emission reduction targets and energy efficiency objectives. One can expect that REACH costs will decrease after 2018, while the cost of compliance with biocidal product and plant protection product regulations will continue to expand. Costs of compliance with workers' safety and transport legislation should remain stable.

The CCA is not a deregulation exercise but a tool to inform policy-makers about the impact of regulation on the competitiveness of the chemical industry operating in Europe. Alongside the CCA, the Commission is carrying out a number of ex-post evaluations, including a Fitness Check on Chemical Legislation and a review of REACH. The ultimate goal is to check if existing legislation is achieving its objectives in the most efficient way, consistently with other rules and policies. Where inefficiencies occur, these should be mitigated without reducing existing levels of health, safety and environmental protection.

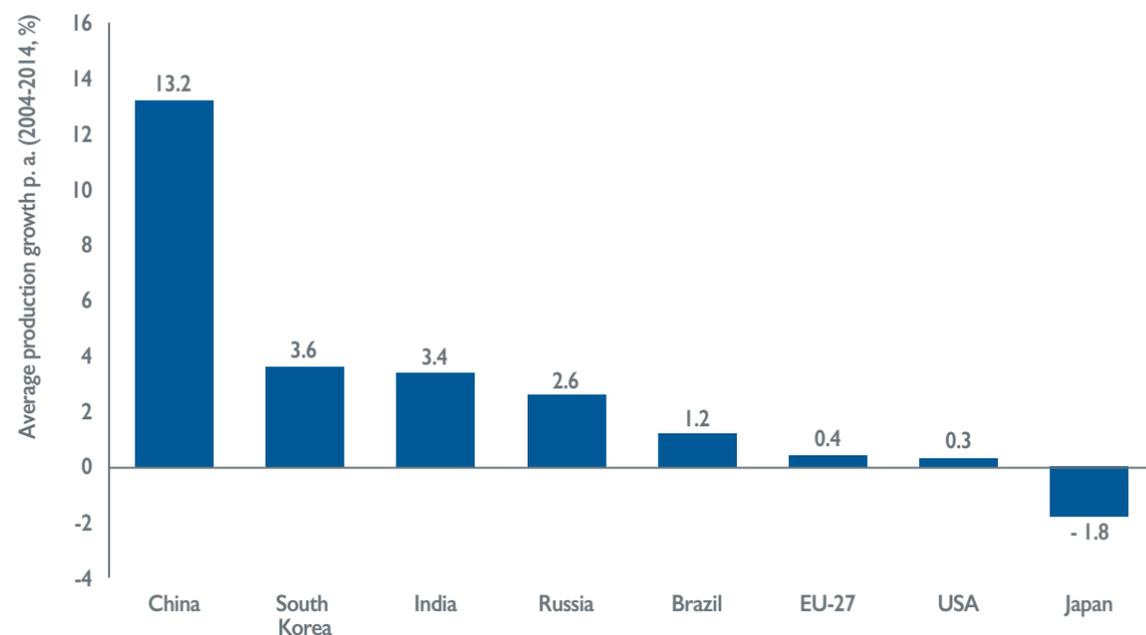
Europe's chemical industry needs a regulatory framework that is fit for purpose, consistent, cost-effective and which does not negatively impact its competitiveness vs other regions.

Sources: Technopolis Group, Cumulative Cost Assessment for the EU Chemical Industry, document prepared for the European Commission, 2016, not yet published and Cefic analysis

Unless specified, chemical industry excludes pharmaceuticals
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EU chemicals production growth	EU chemicals production growth by sector	Capacity utilisation in the EU chemical industry	Average ethylene cash costs in the EU vs North America	Significance of EU regulatory cost for the chemicals sector	Legislation cost during the period 2004-2014	International comparison of production growth	Growth in world chemicals sales 2014-2030
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International comparison of production growth



Source: Cefic Chemdata International

Unless specified, chemical industry excludes pharmaceuticals
Unless specified, EU refers to EU 28

Emerging economies outpace industrial countries in chemicals production

During the 11-year period from 2004 to 2014, the EU chemical industry had an average growth rate of 0.4 per cent, slightly higher than the 0.3 per cent average growth rate for the US chemical industry during the same period. Chemicals production in Japan has been declining since 2007. Data shows Japanese production falling by 1.8 per cent on average from 2004 to 2014.

Production in China swelled from 2004 to 2014, attaining 13.2 per cent average annual growth. China is far and away outpacing other emerging economies such as Korea (3.6 per cent), India (3.4 per cent), Russia (2.6 per cent) and Brazil (1.2 per cent).

Emerging economies are outpacing industrial countries in chemicals production and pushed up the average growth rate of world chemicals production during 2004-2014 time period. The European Union is still lagging behind the main regions in Asia.

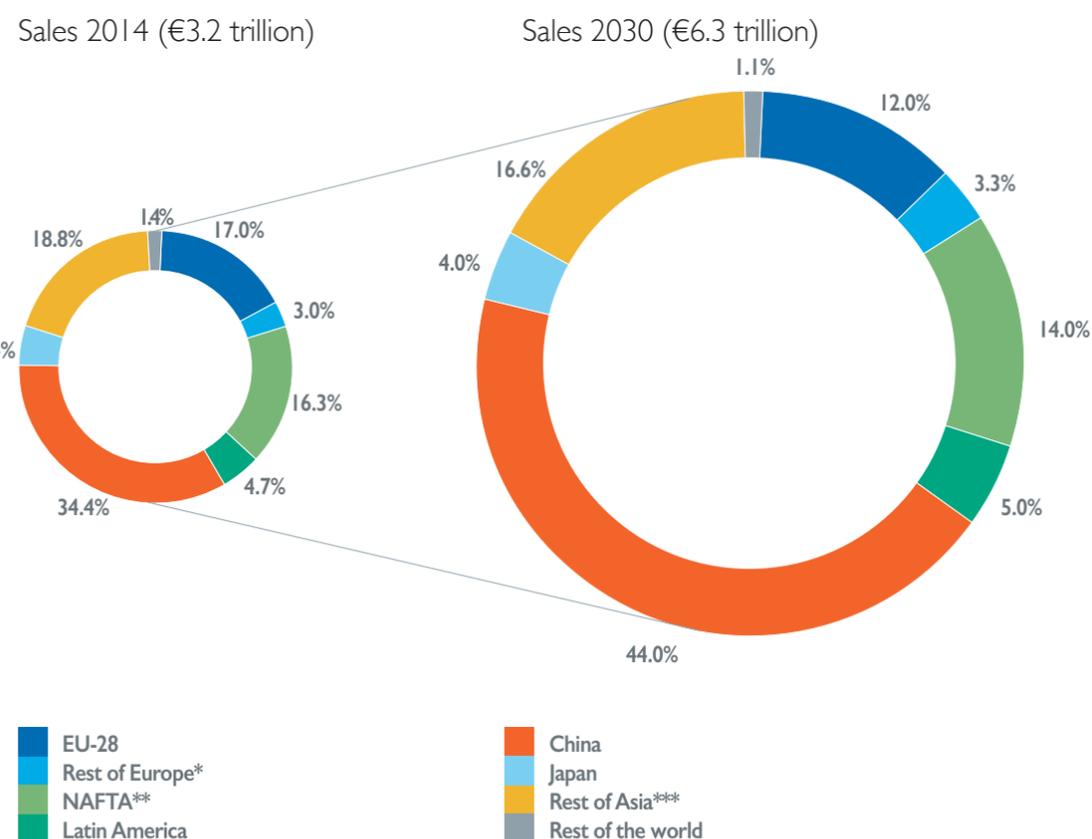
The shift of manufacturing to Asia and associated higher chemicals output growth there, an ageing population in Europe and the shift of petrochemicals production to resource-rich countries are a few examples. They all point to a declining share of the Europe based chemical industry in global sales. In absolute terms, the industry may continue to grow, but only at a low rate.

There is additional pressure coming from inside the European Union. Highly ambitious environmental, health and climate regulations are accelerating the deterioration of European industrial competitiveness. If internal European policies continue to add to existing adverse global trends, then European industry's competitiveness is inevitably set to erode further.

EU chemicals production growth	EU chemicals production growth by sector	Capacity utilisation in the EU chemical industry	Average ethylene cash costs in the EU vs North America	Significance of EU regulatory cost for the chemicals sector	Legislation cost during the period 2004-2014	International comparison of production growth	Growth in world chemicals sales 2014-2030
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Growth in world chemicals sales 2014-2030

Trends in overall growth expected to continue – EU share goes down



Long-term analysis shows that overall growth of chemicals demand and production as well as faster growth in emerging regions is a trend that is expected to continue in the future. World chemicals sales are expected to reach the level of €6.3 trillion in 2030. The EU chemical industry is expected to rank third. With 44% of world market share, China will continue to hold the top ranking in sales, a position once firmly held by Europe. The graph shows chemicals sales in Asia have grown to more than double those of the European Union.

Although competition in China's chemical market is currently intensifying and demand growth is weaker than in the past, China still offers a huge and attractive market both for chemical suppliers and their customer industries. In the mid-term, European chemical producers – due to their high technological capabilities and innovative products – are expected to benefit from a robust growth trend in China, both in increased exports or via local investments. To what extent depends on the competitive situation in each market segment and the development of final customer markets that rely on the chemical industry – for example consumer chemicals, automotive, electronics, food and nutrition, etc.

Source: Cefic Chemdata International
 * Rest of Europe covers Switzerland, Norway, Turkey, Russia and Ukraine
 ** North American Free Trade Agreement
 *** Asia excluding China and Japan

Unless specified, chemical industry excludes pharmaceuticals
 Unless specified, EU refers to EU 28

Employment in the EU chemical industry	Labour cost per employee	Labour cost per employee: chemicals vs manufacturing	Labour productivity in the EU chemical industry	Labour productivity: chemicals vs total manufacturing
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Employment



Employment in the EU chemical industry



Source: Cefic Chemdata International

Unless specified, chemical industry excludes pharmaceuticals
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Employment level stabilised since 2010

Chemical companies in the European Union in 2014 employed a total staff of about 1.2 million. The sector generated an even greater number of indirect jobs – up to three times higher than through direct employment.

Direct employment in the EU chemical industry decreased by an average annual rate of 1.7 per cent from 1997 to 2014. The number of employees in 2014 was 25 per cent less than the 1997 level. While quarterly data shows that the direct employment level has stabilised since first quarter of 2010, the level of employment in the second quarter of 2015 is 9.4 per cent below the peak level before the crisis experienced in third quarter 2007.

According to Eurostat data (2012), employment in the EU chemical industry is particularly high in five subsectors – petrochemicals; paints, varnishes and similar coatings, printing ink and mastics; plastics in primary forms; perfumes and toilet preparations; soap and detergents, cleaning and polishing preparations – all sectors with a significant presence in the EU.

Our industry faces a great and increasing need to attract new talent in the field of chemistry. To help meet this need, EU authorities must step up their support for initiatives to encourage youngsters to choose a STEM education, fully implement the single market for jobs and streamline rules governing the reallocation of workers across the EU.

STEM is an acronym for Science, Technology, Engineering and Math education. Today, the business is focusing on these areas together not only because the skills and knowledge in each discipline are essential for student success, but also because these fields are deeply intertwined in the real world and in how students learn most effectively. STEM is an interdisciplinary and applied approach that is coupled with hands-on, problem-based learning.

Employment in the EU chemical industry

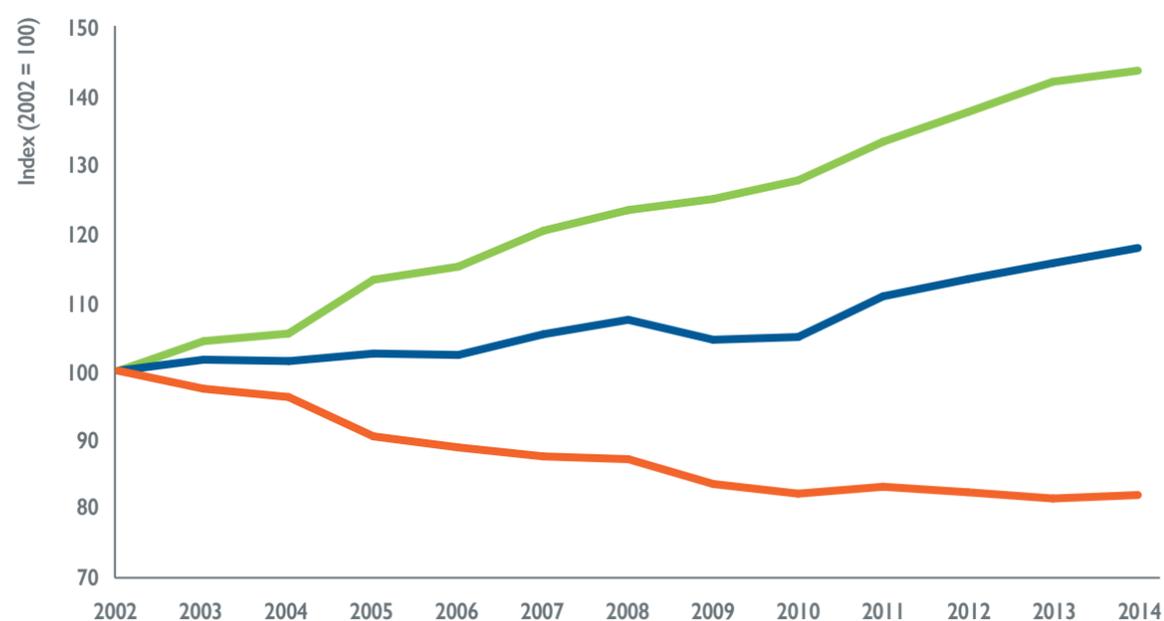
Labour cost per employee

Labour cost per employee: chemicals vs manufacturing

Labour productivity in the EU chemical industry

Labour productivity: chemicals vs total manufacturing

Labour cost per employee



Average growth p.a 2002 - 2014

- Employment (-1.6%)
- Labour cost (1.4%)
- Labour cost per employee (3.1%)

Source: Cefic Chemdata International

Unless specified, chemical industry excludes pharmaceuticals
Unless specified, EU refers to EU 28

Labour cost per employee up by 44% since 2002

From 2002 to 2014, labour cost per worker increased 44 per cent. While the labour cost per employee in the EU chemical industry increased by an average of 3.1 per cent per annum from 2002 to 2014, employment fell by 1.6 per cent on average during the same period. Between 2002 and 2014, labour costs in the EU chemical industry, including pharmaceuticals, rose by 17.8 per cent, while total employment fell by 18.0 per cent during the same period.

On the sectoral side, and according to Eurostat data, the chemicals subsectors with the highest personnel costs at the EU-aggregate level are organic basic chemicals, plastics and paints. However, the analysis indicates that some subsectors with very low absolute value at EU-aggregate level appear to have the highest costs per employee, such as synthetic rubber or pesticides/nitrogen. From 2004-12, personnel costs per employee increased in all subsectors but at a varying pace: some subsectors, such as dyes and pigments and perfumes and toilet preparations remained relatively stable (with increases of 2% and 5%), while a subsector such as inorganic basic chemicals saw personnel costs jump by up to 30% (Source: CCA Report, "Cumulative Cost Assessment for the EU Chemical Industry", Dec-2015, Technopolis Group, "Cumulative Cost Assessment for the EU Chemical Industry", document prepared for the European Commission, 2016, not yet published).

Employment in the EU chemical industry

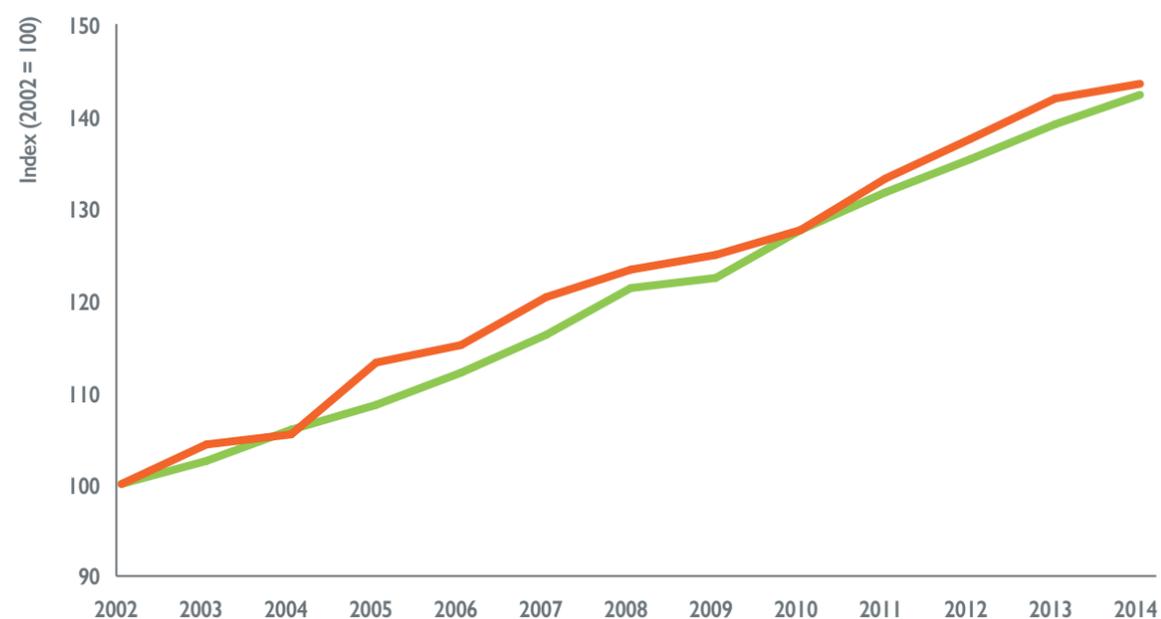
Labour cost per employee

Labour cost per employee: chemicals vs manufacturing

Labour productivity in the EU chemical industry

Labour productivity: chemicals vs total manufacturing

Labour cost per employee: chemicals vs manufacturing



Average growth p.a 2002 - 2014

— Chemicals (3.1%)
— Manufacturing (3.0%)

Source: Cefic Chemdata International

Unless specified, chemical industry excludes pharmaceuticals
Unless specified, EU refers to EU 28

Chemicals, manufacturing labour cost per employee grows at about same rate

The chemical industry labour force is more qualified, trained and better paid than the average industrial worker. EU chemical industry labour cost per employee increased by an average of 3.1 per cent per annum from 2002 to 2014, on a par with the overall EU manufacturing sector. Labour cost per employee in the EU chemical industry was 44 per cent higher in 2014 compared with twelve years ago.

The EU chemical industry salary cost factor has significant drawing power for new and young job seekers. A favourable public perception of the sector can also make the chemical industry more enticing to young people who will one day enter the workforce.

Labour costs are defined as the total remuneration, in cash or in kind, payable by an employer to an employee – regular and temporary employees as well as home workers – in return for work done by the latter during the reference period. Personnel costs also include taxes and employees' social security contributions retained by the unit as well as the employer's compulsory and voluntary social contributions. Personnel costs are made up of wages and salaries and employers' social security costs (Source: European Commission, SBS database).

Employment in the EU chemical industry

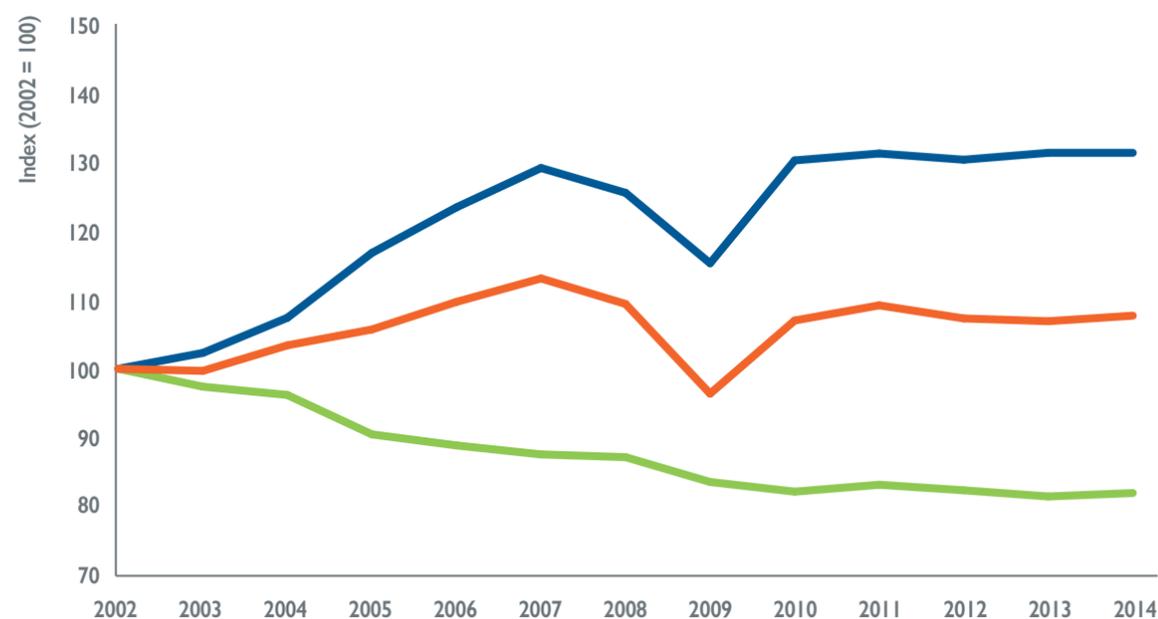
Labour cost per employee

Labour cost per employee: chemicals vs manufacturing

Labour productivity in the EU chemical industry

Labour productivity: chemicals vs total manufacturing

Labour productivity in the EU chemical industry



Average growth p.a 2002 - 2014

- Production (0.6%)
- Employment (-1.6%)
- Productivity (2.3%)

Source: Cefic Chemdata International

*Unless specified, chemical industry excludes pharmaceuticals
Unless specified, EU refers to EU 28*

Labour productivity rate grows at 2.3%

Highly educated and trained employees, coupled with continuously high investments in the workforce, have turned the EU chemicals sector into a leading industry in terms of high labour productivity.

As a consequence, between 2002 and 2014, labour productivity in the EU chemical industry rose at an average annual rate of 2.3 per cent.

Employment in the EU chemical industry

Labour cost per employee

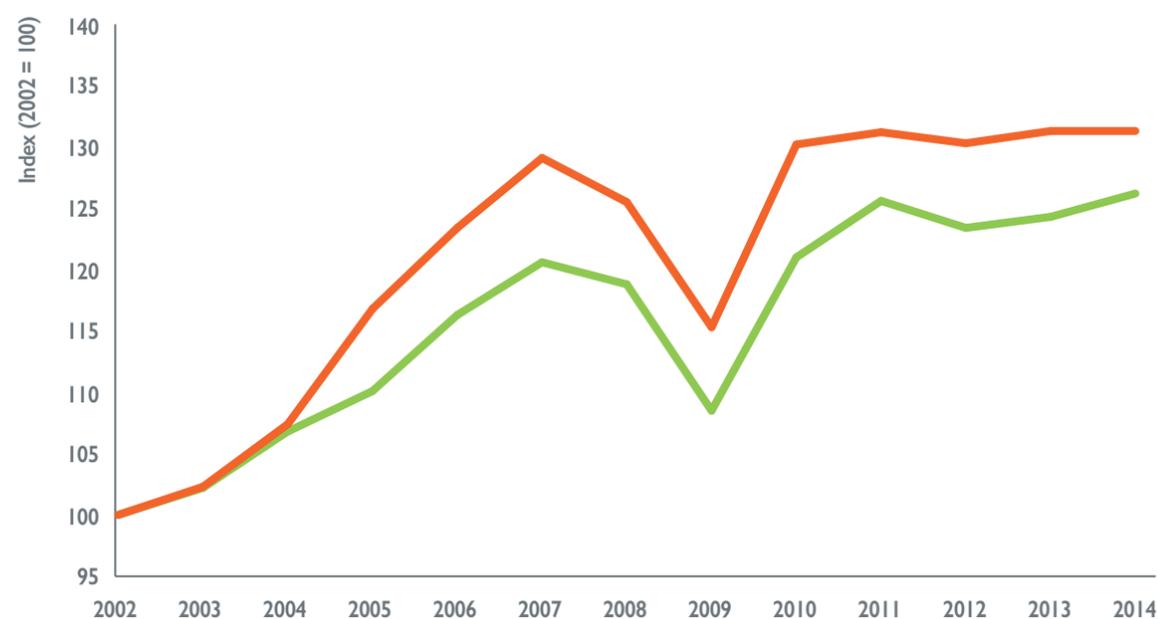
Labour cost per employee: chemicals vs manufacturing

Labour productivity in the EU chemical industry

Labour productivity: chemicals vs total manufacturing

Labour productivity: chemicals vs total manufacturing

EU chemicals labour productivity growth slightly higher than overall manufacturing



Average growth p.a 2002 - 2014

- Chemicals (2.3%)
- Manufacturing (2.0%)

Source: Cefic Chemdata International

Unless specified, chemical industry excludes pharmaceuticals
Unless specified, EU refers to EU 28

Due to intensifying global competition, the EU chemical industry has taken vigorous restructuring and cost-saving steps to improve its competitiveness over the last 13 years.

As a consequence, labour productivity in the chemical industry grew at an average annual rate of 2.3 per cent between 2002 to 2014, faster than the 2.0 per cent labour productivity rate in the total manufacturing sector for the same thirteen-year period.

Fuel and power consumption in the EU chemical industry	Fuel and power consumption by source in the EU chemical industry	EU overall industry energy consumption	Energy intensity in the EU chemical industry	EU chemicals energy intensity vs overall industry average	Energy intensity: chemicals vs total industry
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Energy

Fuel and power consumption in the EU chemical industry

Fuel and power consumption by source in the EU chemical industry

EU overall industry energy consumption

Energy intensity in the EU chemical industry

EU chemicals energy intensity vs overall industry average

Energy intensity: chemicals vs total industry

Fuel and power consumption* in the EU chemical industry



Source: Eurostat and Cefic analysis

* Chemicals including pharmaceuticals

Unless specified, chemical industry excludes pharmaceuticals
Unless specified, EU refers to EU 28

Fuel and power consumption falls 24% since 1990

The chemical industry transforms energy and raw materials into products required by other industrial sectors as well as by final consumers. The cost of energy and raw materials is a major factor in determining the competitiveness of the EU chemical industry on the global market.

In 2013, the fuel and power consumption of the EU chemical industry, including pharmaceuticals, amounted to 51.5 million tonnes of oil equivalent (TOE). The EU chemical industry, including pharmaceuticals, significantly reduced its fuel and power consumption during the period from 1990 to 2013. The amount of energy consumed in 2013 was 24 per cent less than in 1990, according to European Commission data.

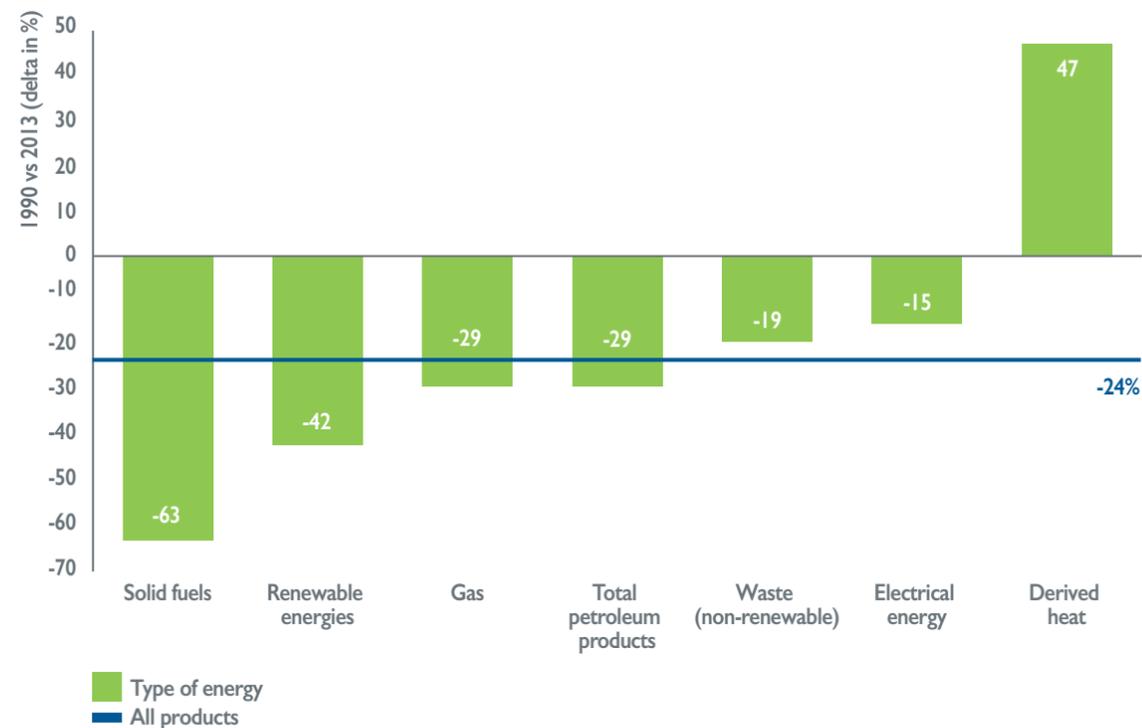
Most of the energy used by the chemical industry as feedstock is stored in products and can still be recycled.

Regarding other raw materials, the chemical industry also uses a wide variety of natural and processed feedstock, including metals, minerals and agricultural raw materials such as sugar, starch and fats.

Fuel and power consumption in the EU chemical industry	Fuel and power consumption by source in the EU chemical industry	EU overall industry energy consumption	Energy intensity in the EU chemical industry	EU chemicals energy intensity vs overall industry average	Energy intensity: chemicals vs total industry
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Fuel and power consumption by source in the EU chemical industry

Most types of energy have experienced a significant reduction in consumption since 1990



In absolute terms, the EU chemical industry significantly reduced its fuel and power consumption by 16 million tonnes of oil equivalent from 1990 to 2013. Half of this decline was driven by the reduction in gas consumption as a source of energy used by the EU chemical industry. Gas consumption amounted to 19.2 million tonnes of oil equivalent (TOE) in 2013, down from 27.2 million tonnes of oil equivalent (TOE) in 1990 (29 per cent).

The EU chemical industry dropped its consumption of solid fuels from 7.4 to 2.8 million tonnes of oil equivalent (TOE) between 1990 and 2013. The reduction of solid fuels looks very impressive, with a 63 per cent decrease in 2013 compared to 1990.

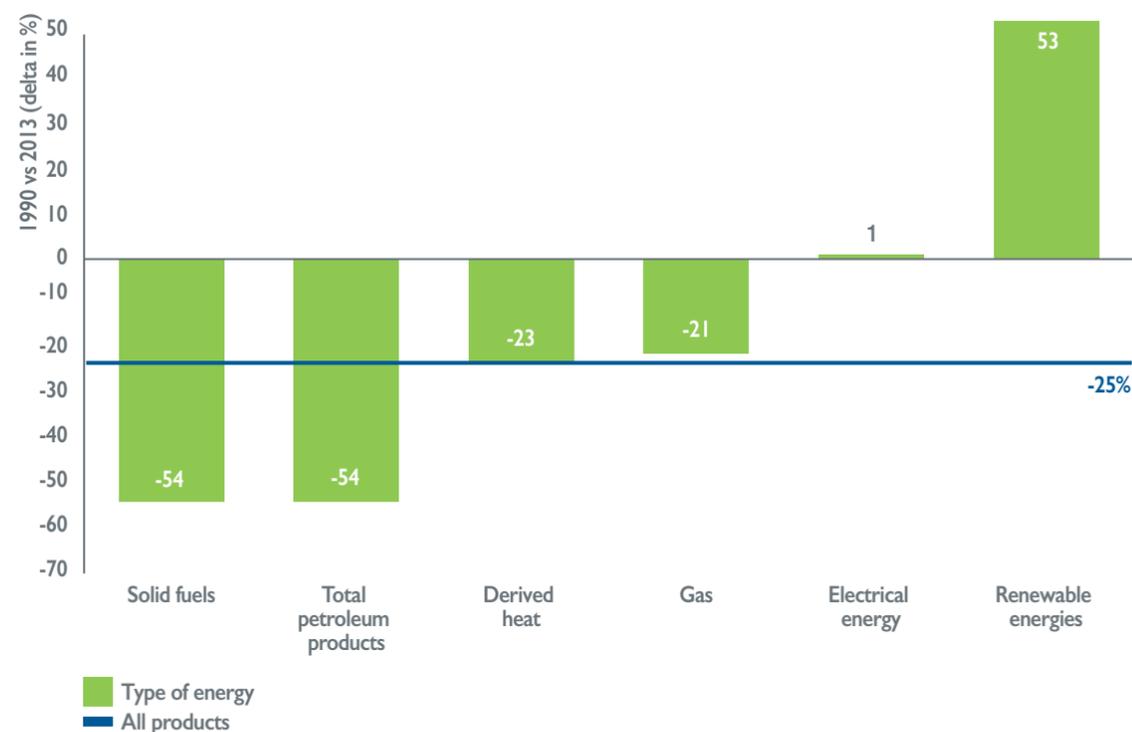
Finally, consumption of electrical energy and total petroleum products dropped by 2.7 and 2.5 million tonnes of oil equivalent (TOE) respectively during the same period.

Source: Eurostat and Cefic analysis

Unless specified, chemical industry excludes pharmaceuticals
Unless specified, EU refers to EU 28

Fuel and power consumption in the EU chemical industry	Fuel and power consumption by source in the EU chemical industry	EU overall industry energy consumption	Energy intensity in the EU chemical industry	EU chemicals energy intensity vs overall industry average	Energy intensity: chemicals vs total industry
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EU overall industry energy consumption



Source: Eurostat and Cefic analysis

Unless specified, chemical industry excludes pharmaceuticals
Unless specified, EU refers to EU 28

EU overall industry: fuel and power consumption falls 25% since 1990

In 2013, the fuel and power consumption of the EU manufacturing industry amounted to 366.8 million tonnes of oil equivalent (TOE). The EU manufacturing sector considerably decreased its fuel and power consumption during the period from 1990 to 2013.

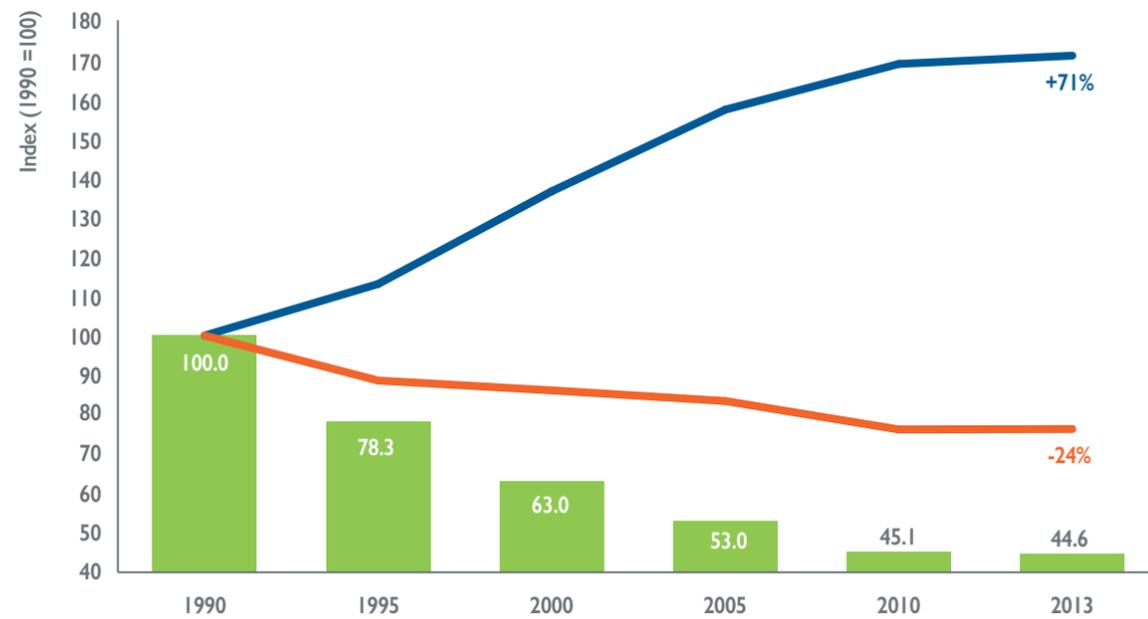
The amount of energy consumed in 2013 was 25 per cent less than in 1990. The sector reduced its fuel and power consumption by 92.9 million tonnes of oil equivalent from 1990 to 2013.

In absolute terms, nearly half of this decline was driven by the reduction in solid fuels consumption used by the EU manufacturing industry. Total petroleum and gas consumption contributed largely to the total decline of energy consumption but to a lesser extent than solid fuels.

Fuel and power consumption in the EU chemical industry	Fuel and power consumption by source in the EU chemical industry	EU overall industry energy consumption	Energy intensity in the EU chemical industry	EU chemicals energy intensity vs overall industry average	Energy intensity: chemicals vs total industry
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Energy intensity in the EU chemical industry

EU chemicals energy intensity slashed in half during 23 year period



Average growth rate p.a. 1990 - 2013

- EU chemicals production (2.4%)
- EU energy consumption (-1.2%)
- EU chemicals intensity (-3.4%)

Source: Eurostat and Cefic analysis

* Energy intensity is measured by energy input per unit of chemicals production (including pharmaceuticals)

Unless specified, chemical industry excludes pharmaceuticals
Unless specified, EU refers to EU 28

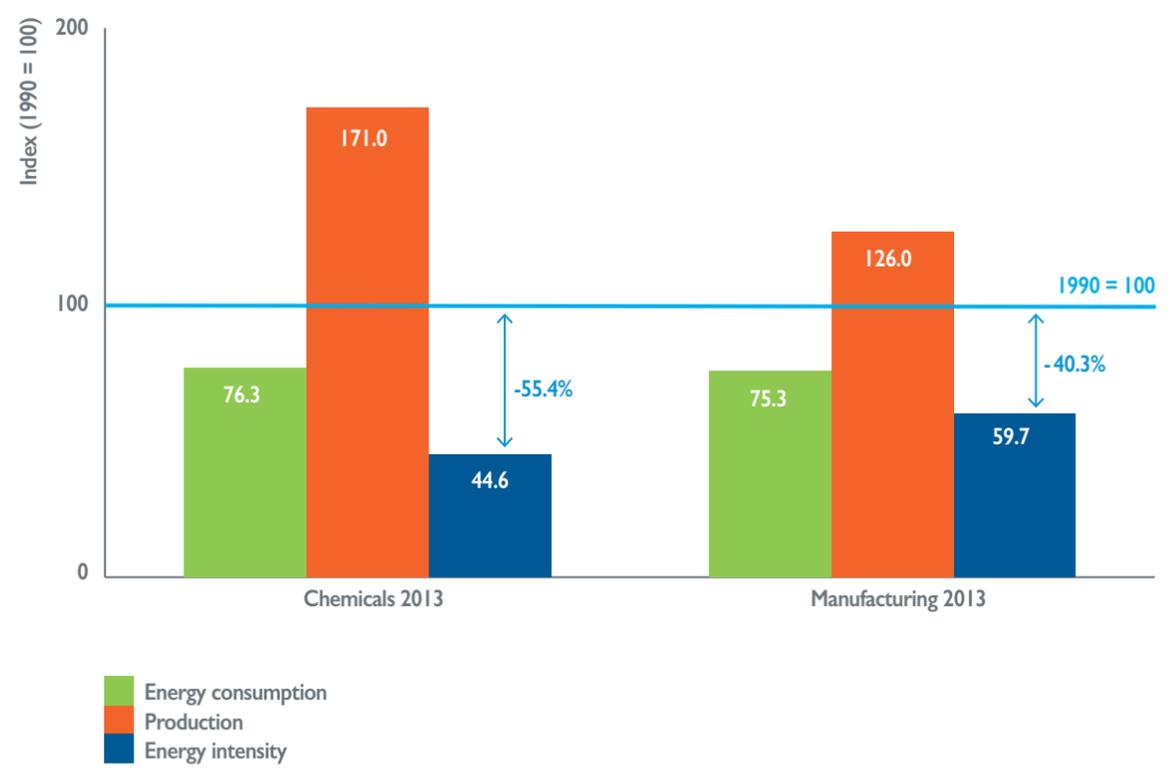
For many years, the EU chemical industry, including pharmaceuticals, has made strenuous efforts to improve energy efficiency by reducing its fuel and power energy consumption per unit of production. By 2013, energy intensity – energy consumption per unit of production – in the chemical industry, including pharmaceuticals, was 55.4 per cent lower than in 1990.

Further improvements to energy efficiency are subject to decreasing returns, however. The chemical industry succeeded during the 23 years from 1990 to 2013 in continuously increasing its output while at the same time keeping its energy input constant. As a result, the EU chemical industry has excelled in significantly lowering its energy intensity by an average of 3.4 per cent per year.

Fuel and power consumption in the EU chemical industry	Fuel and power consumption by source in the EU chemical industry	EU overall industry energy consumption	Energy intensity in the EU chemical industry	EU chemicals energy intensity vs overall industry average	Energy intensity: chemicals vs total industry
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EU chemicals energy intensity vs overall industry average

EU chemical energy intensity cuts deeper than overall industry average



The EU chemicals sector has been a pioneer in energy efficiency. It recognised early that in order to be competitive in a global market, competitive advantages must be sought at every opportunity. As one of the most energy-intensive sectors, chemical companies have also had more scope for reduction than others. By making processes more efficient, including the construction of new facilities, the energy efficiency drive has been sustained over many years. Making any further improvements will however require breakthroughs in technological innovation at high costs that do not square with economic reality.

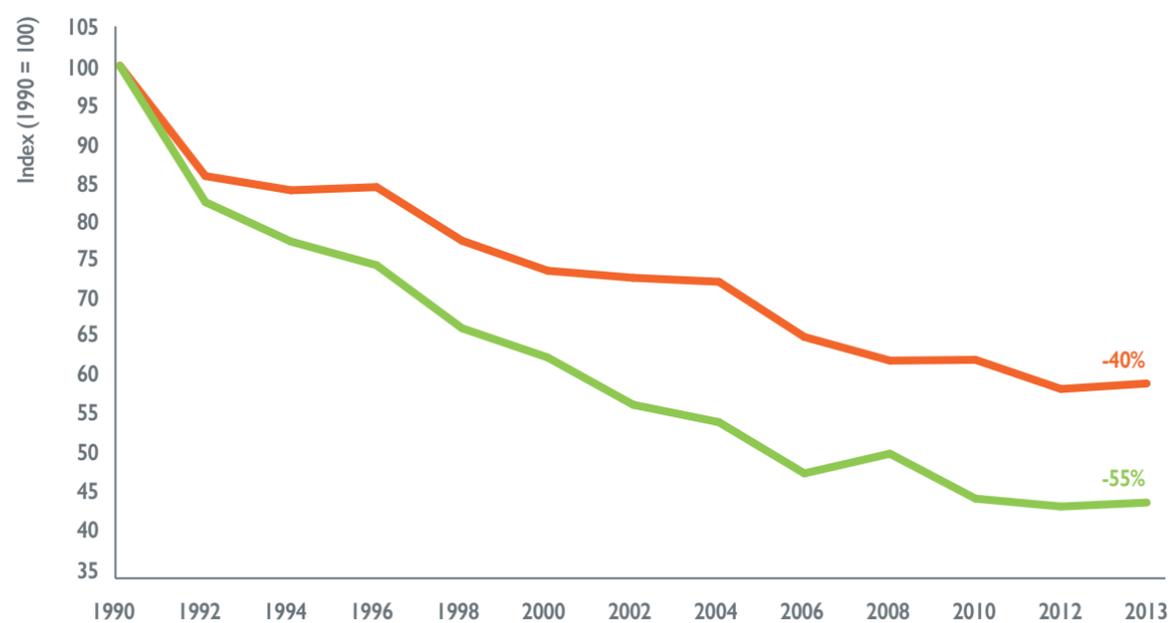
A first look at the chart above shows energy consumption in the chemicals sector having fallen 23.7 per cent since 1990. A similar effort has been made in EU manufacturing, where energy consumption declined by 24.7 per cent during the same period. However, in terms of energy efficiency, the picture is quite different. In 2013, energy intensity in the chemical industry was 55.4 per cent lower than in 1990. The energy efficiency performance of the EU chemical industry is significantly higher compared to that reached in the EU manufacturing. Energy intensity in the EU manufacturing sector was 40.3 lower in 2013 than in 1990.

Source: Eurostat and Cefic analysis

Unless specified, chemical industry excludes pharmaceuticals
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Fuel and power consumption in the EU chemical industry	Fuel and power consumption by source in the EU chemical industry	EU overall industry energy consumption	Energy intensity in the EU chemical industry	EU chemicals energy intensity vs overall industry average	Energy intensity: chemicals vs total industry
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Energy intensity: chemicals vs total industry



Average growth rate p.a. (1990 - 2013)

EU industry intensity (-2,2%)

EU chemicals* intensity (-3,4%)

Source: Eurostat and Cefic analysis

* Including pharmaceuticals

Unless specified, chemical industry excludes pharmaceuticals
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EU chemicals sector is constantly performing better than overall industry

Energy intensity in the EU chemical industry decreased by an average of 3.4 per cent per annum from 1990 to 2013. As for the whole of the EU manufacturing sector, energy intensity went down by 2.2 per cent per year during the same period. Energy intensity in the EU chemical industry was 55.4 per cent lower in 2013 compared with 23 years ago.

Innovative technologies can further improve efficiency across many energy-intensive industrial sectors. The Sustainable Process Industry through Resource and Energy Efficiency (SPIRE) Public-Private Partnership (PPP) is targeting even greater resource and energy efficiency and will work to share best practice between industry sectors. In this way, chemical industry innovation in process technologies can also boost competitiveness across the whole EU manufacturing sector.

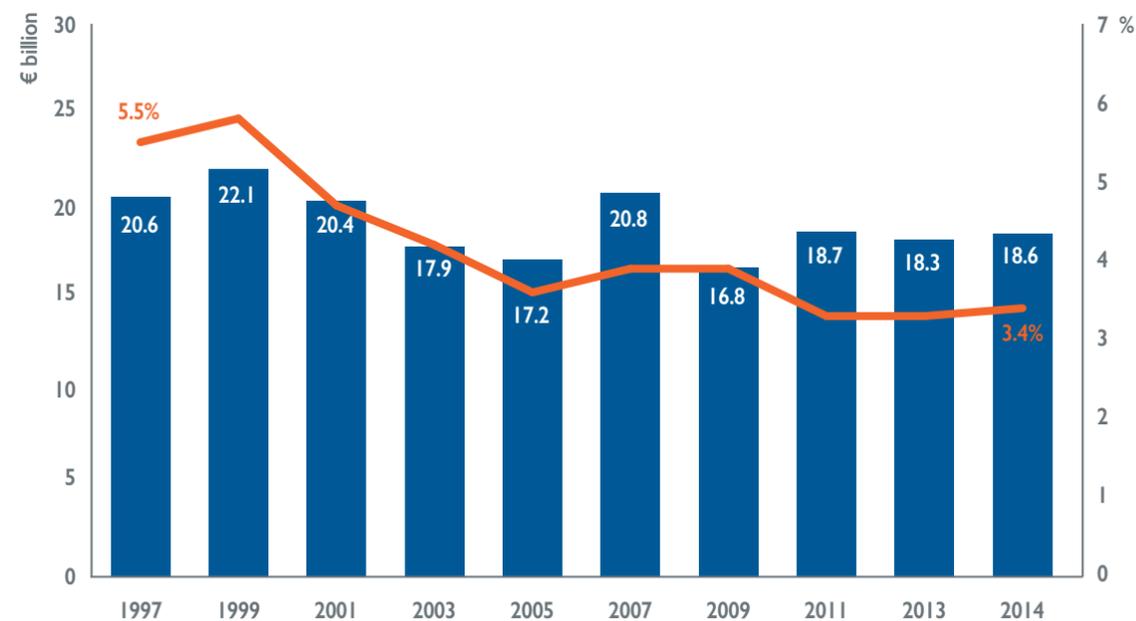
Cefic furthermore welcomes the agreement reached in Paris – at the COP21, which brought together all nations in a common effort towards fighting climate change – this is in line with our ongoing efforts as an industry to improve our efficiency and resource utility, for example. Europe's commitment in Paris has been by far the most ambitious one. So it is really important that European policymakers ensure further policy reforms – such as those proposed in the Emissions Trading System (ETS) – do not put European industry at a competitive disadvantage. A competitive European chemical industry is indispensable for EU jobs and growth, and the ultimate achievement of a competitive low carbon economy.

Capital spending in the EU chemical industry	Capital spending by region	Capital spending intensity by region	R&D in the EU chemical industry	R&D spending by region	R&D spending intensity by region
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Capital and R&D Spending

Capital spending in the EU chemical industry



Average growth rate p.a. 1997 - 2014

Sales (+2.3%)

Capital spending (-0.6%)

Capital spending (% of sales) (-2.8%)

Source: Cefic Chemdata International

Unless specified, chemical industry excludes pharmaceuticals
Unless specified, EU refers to EU 28

Investment in the EU chemical industry has been following a worrying trend

The chart above illustrates clearly that investment (in absolute figures) in the European Union had been increasing from 2004 to 2008, registering a positive trend at a consistent pace. Investment during 2010, however, experienced a steep decline compared to 2008, down by 23.9 per cent. This was followed by a significant increase from €16.2 billion in 2010 to €19.4 billion in 2012. The chemicals sector registered a decrease in investment in 2013, moving down to €18.3 billion in 2013 and slightly up to €18.6 billion in 2014.

In relative terms, however, the ratio of capital spending to sales, or capital intensity, of the European Union chemical industry has been declining since 1999, reaching the value of 3.4 per cent in 2014, down from 5.8 per cent registered in 1999.

Capital investment is a key factor in securing the future development of the chemical industry. And, in many cases, major equipment or plant renewals require long-term planning. Such investments are not only related to the improvement of productivity or introduction of new products but are also due to the need to comply with regulations or reduce operating costs (Source: European Commission (2009a), "High Level Group on the Competitiveness of the European Chemical Industry").

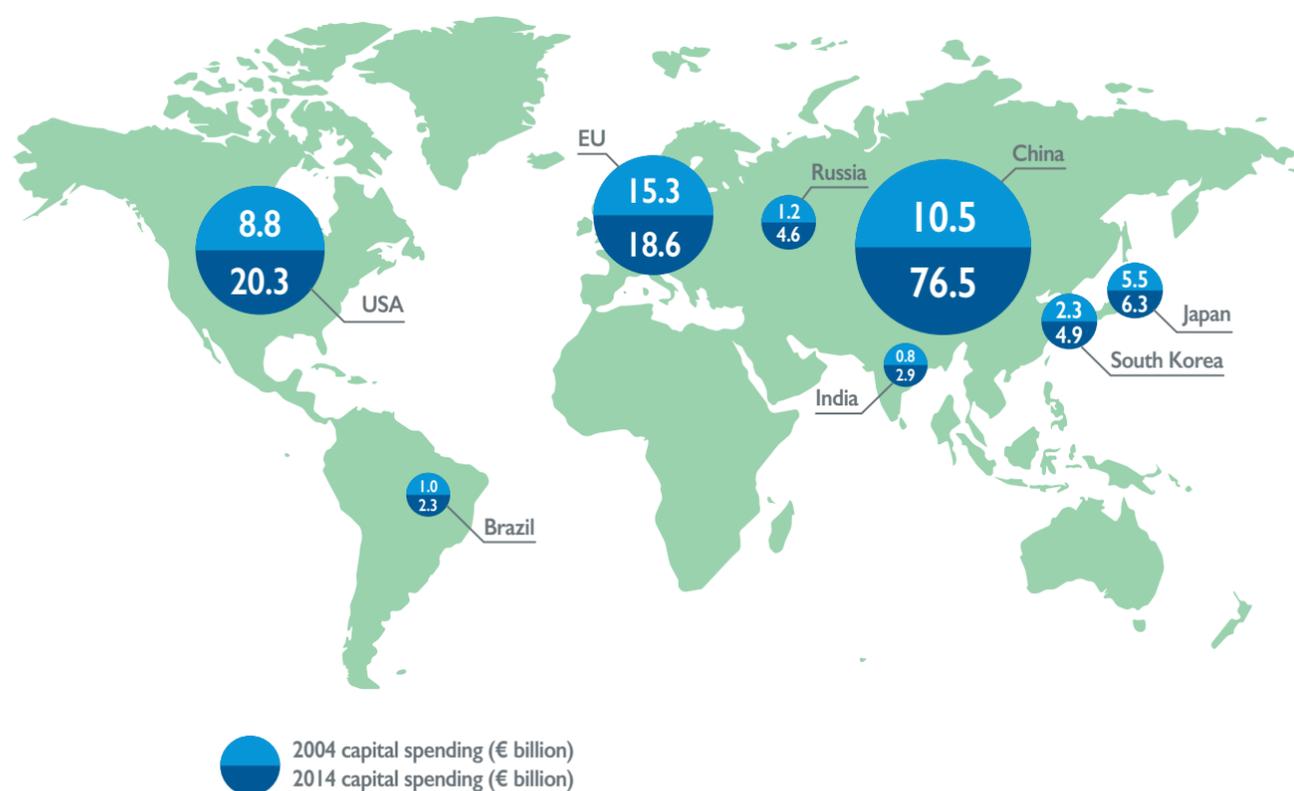
A Cefic survey among major chemical companies revealed a shift of investment from the EU to countries outside the EU between 2008 and 2013. Data analysis showed that the share of domestic investment to total investment moved down significantly by 10 percentage points between 2008 and 2013, indicating that the EU business and economic environment is becoming less attractive for EU chemical companies.

The European chemical industry needs to maintain investment in its existing infrastructure and in new production facilities to ensure the chemicals sector has a viable and vibrant future.

On the sectoral side, the chemical industry subsectors with the highest gross investments in tangible goods, in absolute and relative terms, are petrochemicals, inorganic basic chemicals, plastics in primary forms, fertilisers and nitrogen compounds. The synthetic rubber subsector, at the bottom of the scale in absolute figures, has substantial gross investments in tangible goods in relative terms.

Capital spending in the EU chemical industry	Capital spending by region	Capital spending intensity by region	R&D in the EU chemical industry	R&D spending by region	R&D spending intensity by region
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Capital spending by region



Source: Cefic Chemdata International

Unless specified, chemical industry excludes pharmaceuticals
 Unless specified, EU refers to EU 28

China dominates world chemicals investment, US capital spending surges ahead

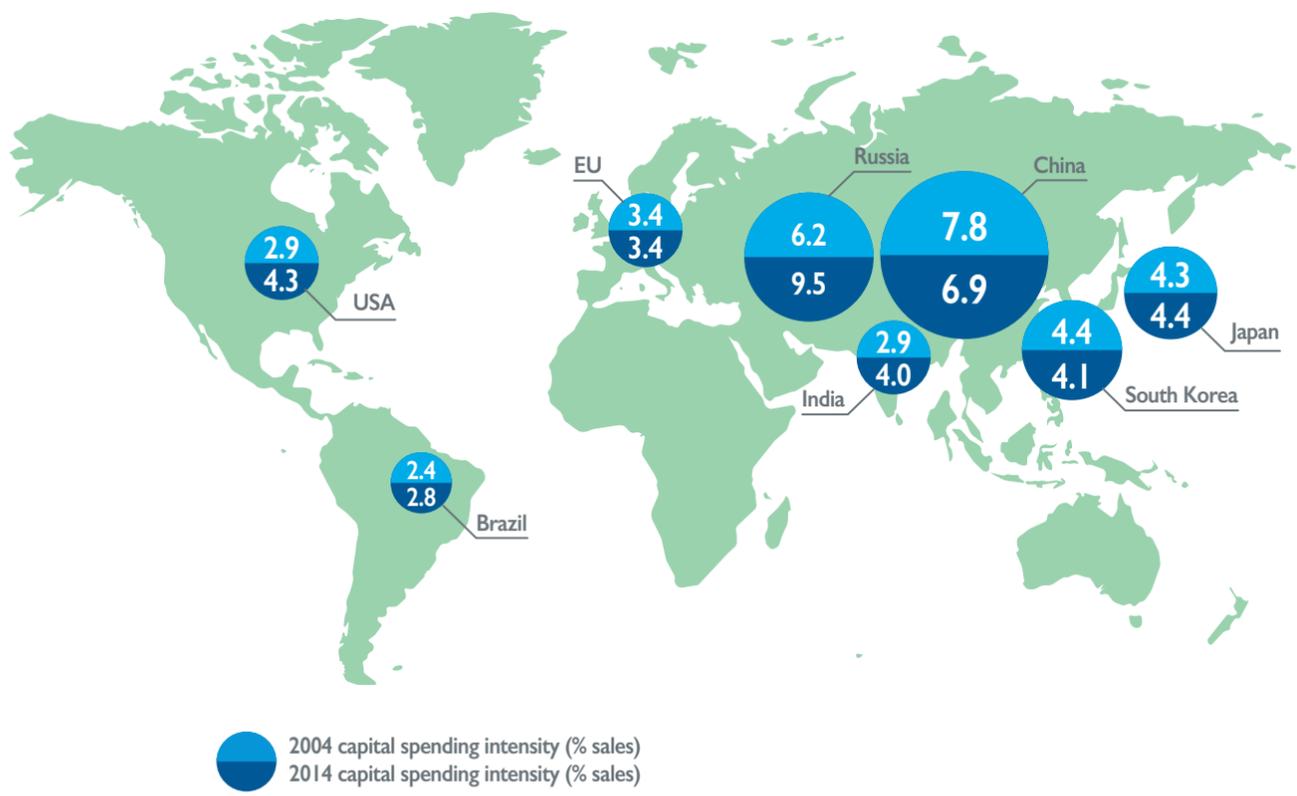
According to Cefic Chemdata, industry capital spending in the European Union reached the level of €18.6 billion in 2014. It represents 13.6 per cent of the €136.4 billion spent by the eight largest chemical-investing countries. This figure is very low compared to the one experienced 10 years ago, when EU chemicals investment represented 33.6 per cent of the €45.5 billion spent by the eight largest chemical-investing countries.

With regard to China, the situation in 2014 was very spectacular, with Chinese chemical industry spending reaching €76.5 billion, representing half of the total amount invested by the eight largest countries in terms of chemical industry capital spending.

The United States continued to see a rise in capital spending as a result of the shale gas and oil boom. The European Union is in a better position compared with Japan, Korea, Russia, India and Brazil.

Capital spending in the EU chemical industry	Capital spending by region	Capital spending intensity by region	R&D in the EU chemical industry	R&D spending by region	R&D spending intensity by region
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Capital spending intensity by region



Source: Cefic Chemdata International

*Unless specified, chemical industry excludes pharmaceuticals
 Unless specified, EU refers to EU 28*

EU capital intensity far below emerging economies

Capital spending intensity in Russia is far higher than in the rest of the world. Capital intensity for Russia increased significantly from 6.2 per cent in 2004 to 9.5 per cent in 2014. Most major chemicals producing countries increased their chemicals spending intensity from 2004 to 2014 apart from three regions: China, South Korea and the European Union. The European Union continues to lag behind leading chemicals-producing regions and has been registering a constant decline during the past 11 years.

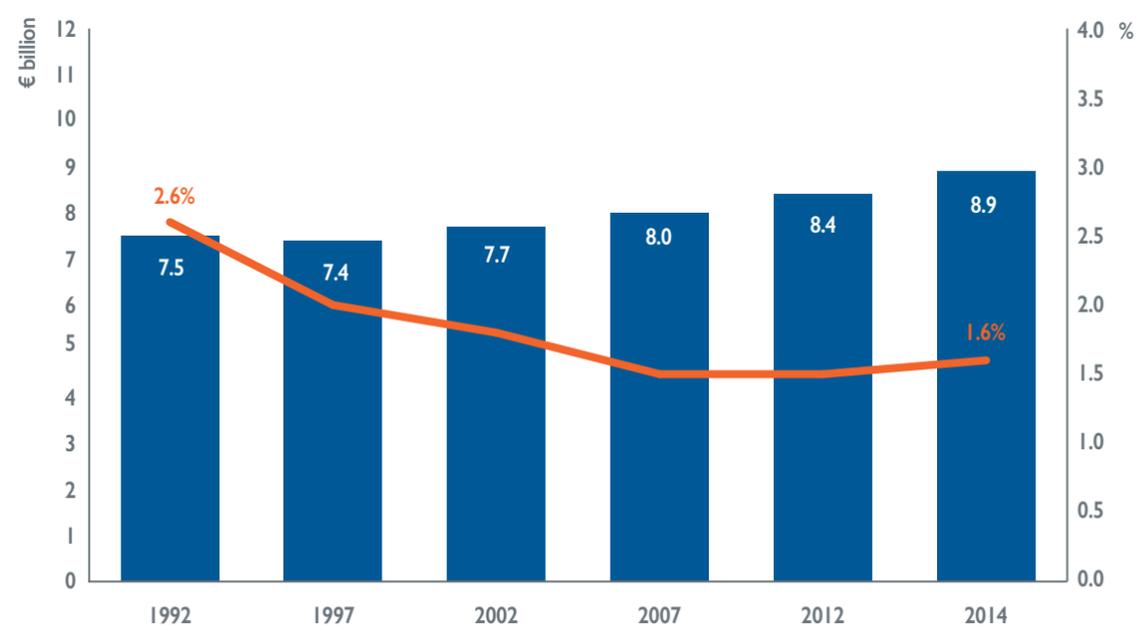
A key factor affecting competitiveness is investment levels. In the EU we see declining levels of capital spending intensity compared with other regions. Capital intensity is both an indicator of loss of attractiveness as well a driver of future competitiveness: the more investments the more competitive the region becomes and vice versa. For example, there are nearly 200 chemical investment projects in the US totalling nearly 130 billion US dollars, while China remains the key target of chemical investments.

Another factor is the growing cumulative cost of implementing European legislation in the chemicals sector. This takes both personnel and capital resources away from innovation and production and into regulatory compliance.

The chemical industry is a capital-intensive industry. Without a stable and supportive business environment (comparable regulatory burden with other regions, competitive access to energy and feedstocks, strong market demand, etc.) limited investment will be dedicated to Europe as opposed to other more competitive regions. This would limit further growth and also opportunities to invest in the latest and more effective technologies and thus address key global issues e.g., climate change, air and water quality, resource efficiency, etc.

Capital spending in the EU chemical industry	Capital spending by region	Capital spending intensity by region	R&D in the EU chemical industry	R&D spending by region	R&D spending intensity by region
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R&D in the EU chemical industry



Average growth rate p.a. 1992 - 2014

Sales (+2.9%)

R&D spending (+0.8%)

R&D spending (% of sales) (-1.2%)

Source: Cefic Chemdata International

Unless specified, chemical industry excludes pharmaceuticals
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EU chemical industry boosts spending on R&D, but less intensively

Investments in research and development (R&D) are key elements in securing the future of the chemical industry and maintain/increase its strong contribution to solving societal challenges. Indeed, the chemical industry is an enabler of innovation in numerous downstream value chains through its products and technologies.

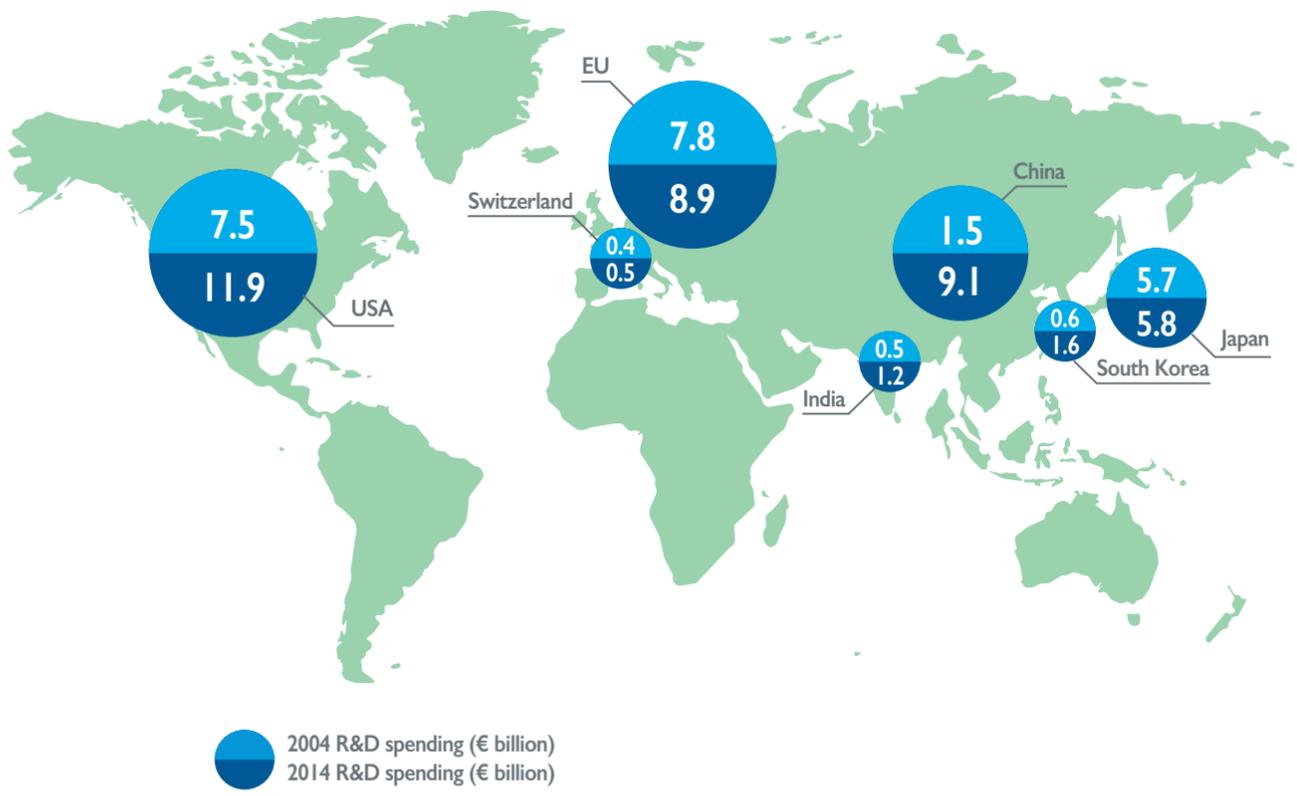
In absolute figures, spending on research and development in the EU chemical industry was valued at an average annual level of €7.8 billion during the period from 1992 to 2014. In relative terms, the ratio of R&D spending to sales, or R&D intensity was valued at an average of 1.8 per cent during the same period.

The trend analysis shows R&D spending in the EU chemical industry constantly increasing during the years 2010-2014. R&D intensity in the EU chemicals sector followed an upward trend during the period 2011-2014.

Sales of the EU chemical industry had an average growth rate of 2.9 per cent during the whole period 1992-2014. R&D spending grew by a less pronounced growth rate during the same period. As a result, R&D intensity declined from 2.6 per cent in 1992 to 1.6 per cent in 2014.

Capital spending in the EU chemical industry	Capital spending by region	Capital spending intensity by region	R&D in the EU chemical industry	R&D spending by region	R&D spending intensity by region
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R&D spending by region



Source: Cefic Chemdata International

*Unless specified, chemical industry excludes pharmaceuticals
 Unless specified, EU refers to EU 28*

US outspends industrial and emerging countries in chemicals R&D

In absolute figures, R&D spending in the EU chemical industry was valued at an average annual level of €8.2 billion during the period from 2004 to 2014. The average value of R&D spending per year in the United States was €9.6 billion during the same 10-year period and €5.9 billion for the Japanese chemical industry.

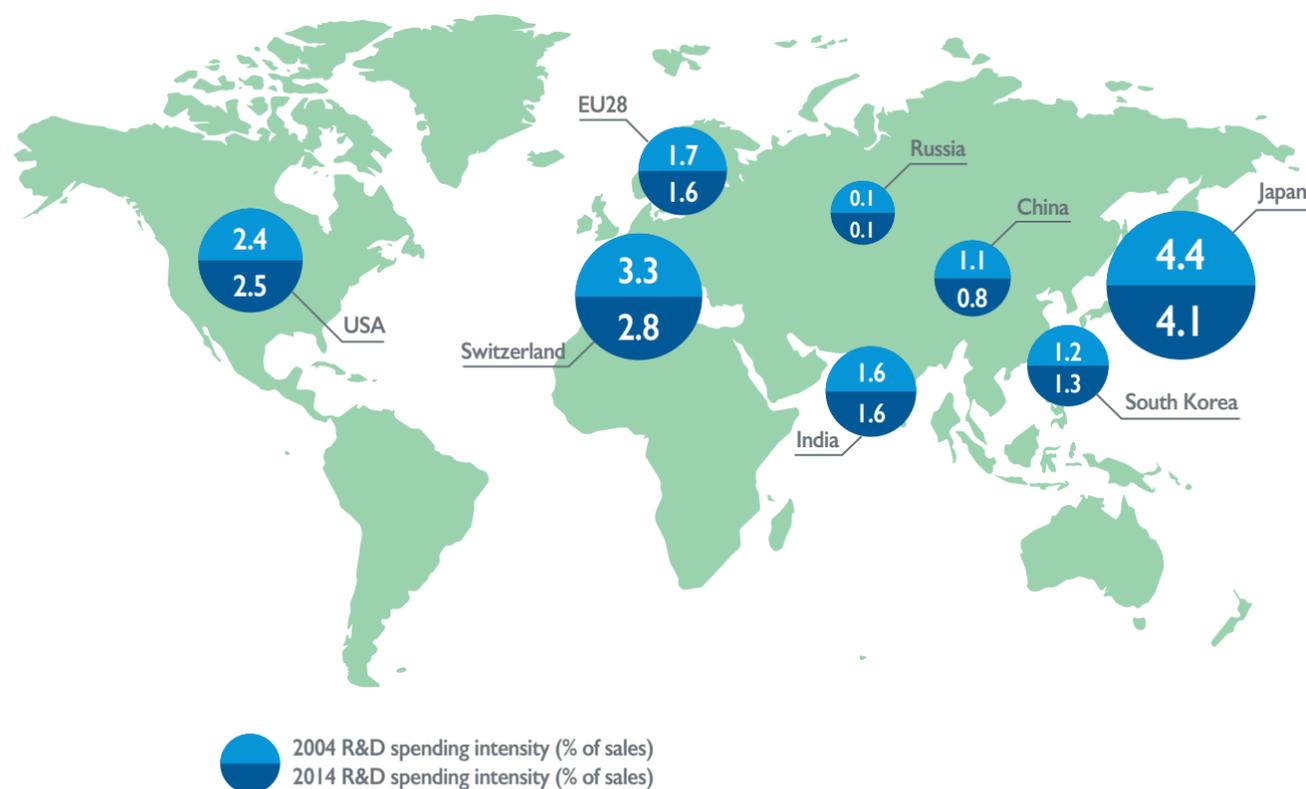
Meeting the many challenges facing European society will require a more substantial and focused EU innovation policy that increases public and private investments in closer-to-market projects with a pan-European impact and encourages investor and public confidence in new technologies.

Reaching critical mass to succeed in global competition entails embedding EU interests in national innovation programmes and ensuring the coordination and complementarity of innovation strategies between member states.

There is a direct link between innovation and global competitiveness: innovation is a must to maintain competitiveness on the global scene. Conversely, competitiveness fosters innovation by allowing more resources to be allocated to breakthrough R&D and innovation.

Capital spending in the EU chemical industry	Capital spending by region	Capital spending intensity by region	R&D in the EU chemical industry	R&D spending by region	R&D spending intensity by region
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R&D spending intensity by region



Source: Cefic Chemdata International

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Japan R&D intensity more than double EU levels

Wide variations in research and development (R&D) efforts are observed across the world chemical industry. Innovation is becoming increasingly important for a region's competitiveness.

Analysing the ratio of R&D spending to sales of the chemical industry, the R&D intensity level in the European Union was far below that of Japan and lower than in the United States. Japan chemicals R&D intensity was more than double EU levels in 2014.

EU R&D intensity was 1.6 per cent on average during the years 2004 to 2014, while the same ratio equalled 4.1 per cent in Japan. With 0.8 per cent, China R&D intensity remained still far below US and EU levels during the years 2004-2014.

The high value-added products of the chemical industry continuously open up new fields of application, paving the way to progress and innovation in numerous other industries as well. Typical examples range from health, food, consumer goods, telecommunications, aerospace and car manufacturing, to electrical engineering and electronics.

Investment in innovation is needed in the chemical industry to maintain/increase its strong contribution to solving societal challenges. Indeed, the chemical industry is an enabler of innovation in numerous downstream value chains through its products and technologies. Hence innovation in the chemical industry is leveraged by other industrial sectors to develop solutions to the grand societal challenges.

Specifically, Europe still needs to enhance interconnections between pure research, development and the commercialisation of new products and technologies. It needs to improve funding methods for good ideas and find better ways to bring commercially successful ones up to scale.

Total greenhouse gas emissions in the EU chemical industry	Total emissions by gas in the EU chemical industry	Greenhouse gas emissions and production	Greenhouse gas emissions per unit of energy consumption and per unit of production	Acidifying emissions	Non-methane volatile organic compounds emissions to air	Emissions to water	Water quality-nitrogen and phosphorous emissions
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Environmental Performance



Total greenhouse gas emissions in the EU chemical industry

Total emissions by gas in the EU chemical industry

Greenhouse gas emissions and production

Greenhouse gas emissions per unit of energy consumption and per unit of production

Acidifying emissions

Non-methane volatile organic compounds emissions to air

Emissions to water

Water quality-nitrogen and phosphorous emissions

Total greenhouse gas emissions in the EU chemical industry



Sources: European Environment Agency (EEA) and Cefic analysis

Unless specified, chemical industry excludes pharmaceuticals
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Total greenhouse gas emissions fall 58% since 1990

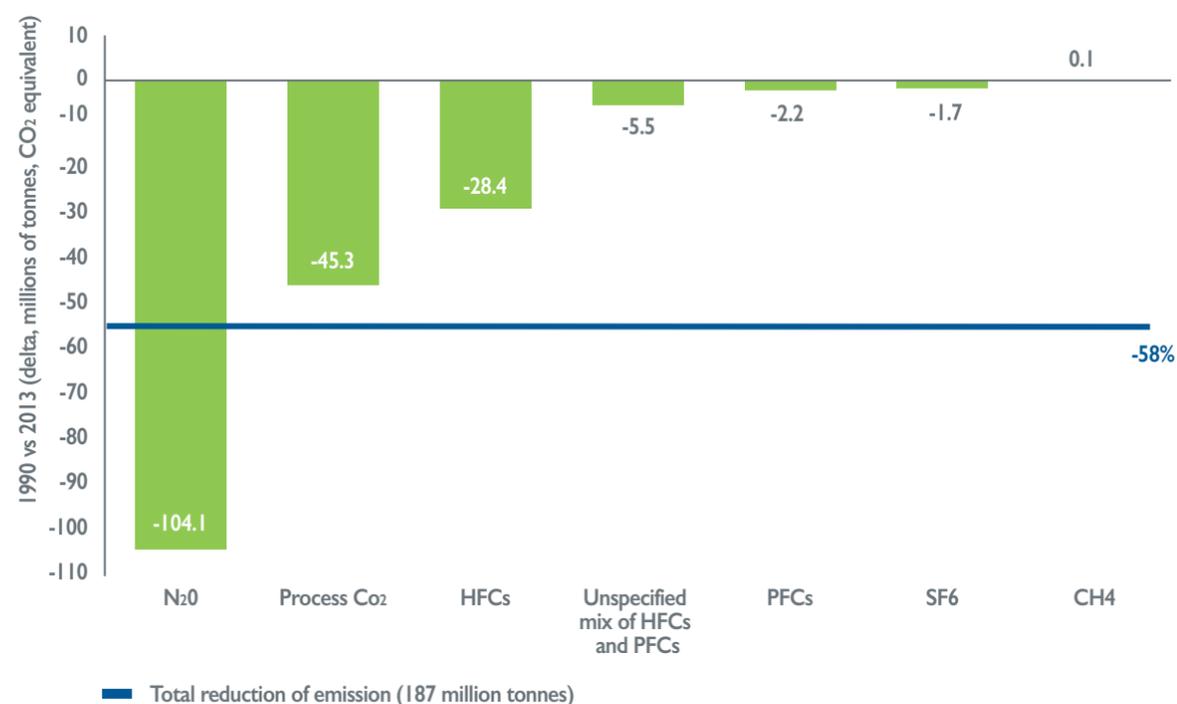
Long-term data gives evidence of the EU chemical industry, including pharmaceuticals, having a solid track record from 1990 to 2013 in reducing its greenhouse gas (GHG) emissions.

According to the European Environmental Agency (EEA), the EU chemical industry, including pharmaceuticals, emitted a total of 137.4 million tonnes of CO₂ equivalent in 2013, down from a total of 324.6 million tonnes in 1990. This 58 per cent decrease clearly illustrates how much importance the chemical industry attaches to sustainable development.

Our industry's shift to less carbon-intensive fuels has helped reduce GHG emissions. Much of the decline over the past 20 years is linked to abatement of nitrous oxide (N₂O), which has a higher global warming potential than carbon dioxide (CO₂) and is emitted by some chemical processes.

Total greenhouse gas emissions in the EU chemical industry	Total emissions by gas in the EU chemical industry	Greenhouse gas emissions and production	Greenhouse gas emissions per unit of energy consumption and per unit of production	Acidifying emissions	Non-methane volatile organic compounds emissions to air	Emissions to water	Water quality-nitrogen and phosphorous emissions
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Total emissions by gas in the EU chemical industry



Sources: European Environment Agency (EEA) and Cefic analysis

Unless specified, chemical industry excludes pharmaceuticals
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Total greenhouse gas emissions fall by 187 million tonnes (CO₂) since 1990

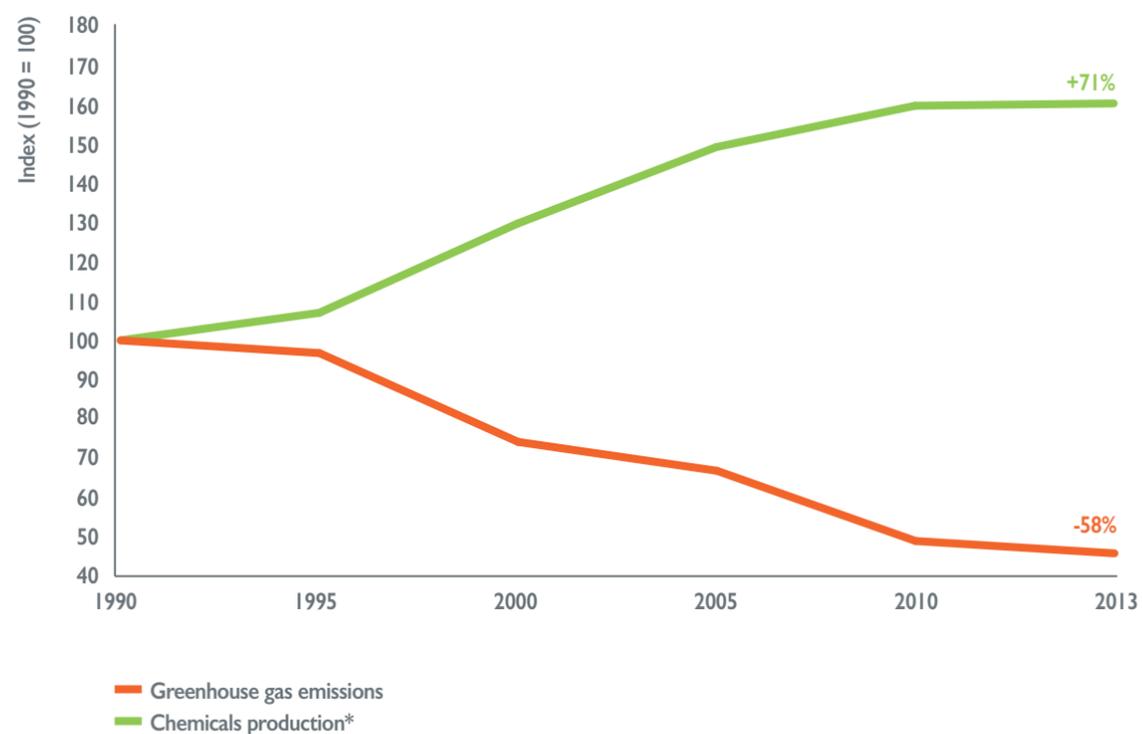
The chart above lists the six main greenhouse gases (GHG) reported in the data analysis. These are the gases for which emission reduction targets were agreed under the Kyoto Protocol. According to a European Environment Agency report, global warming factors are applied to each gas in order to present the emissions in terms of CO₂ equivalent. For example: 1 kg of N₂O is equivalent to 298 kg of CO₂ in terms of global warming effect.

Data analysis indicates that total greenhouse gas emissions fell in 2013 by 187 million tonnes (CO₂ equivalent) compared to 1990. Among the different types of GHG, N₂O emission experienced the most impressive decline during the same period, followed by "process CO₂" and "HFCS".

According to the Eurostat statistics, greenhouse gas emissions in the EU-28 stood at 4,611 million tonnes of CO₂-equivalents in 2013. This figure marked an overall reduction of 19.8 % when compared with 1990, or some 1,138 million tonnes of CO₂-equivalents. The EU chemical industry has largely (16.4%) contributed to the total EU reduction, most probably more than any other sectors.

Total greenhouse gas emissions in the EU chemical industry	Total emissions by gas in the EU chemical industry	Greenhouse gas emissions and production	Greenhouse gas emissions per unit of energy consumption and per unit of production	Acidifying emissions	Non-methane volatile organic compounds emissions to air	Emissions to water	Water quality-nitrogen and phosphorous emissions
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Greenhouse gas emissions and production



Sources: European Environment Agency (EEA) and Cefic analysis
 * Including pharmaceuticals

Unless specified, chemical industry excludes pharmaceuticals
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Chemical production, greenhouse gas emissions, decouple

The 58 per cent decrease from 1990 until 2013 in total GHG emissions is even more remarkable given that, at the same time, production in the EU chemical industry, including pharmaceuticals, expanded by 71 per cent.

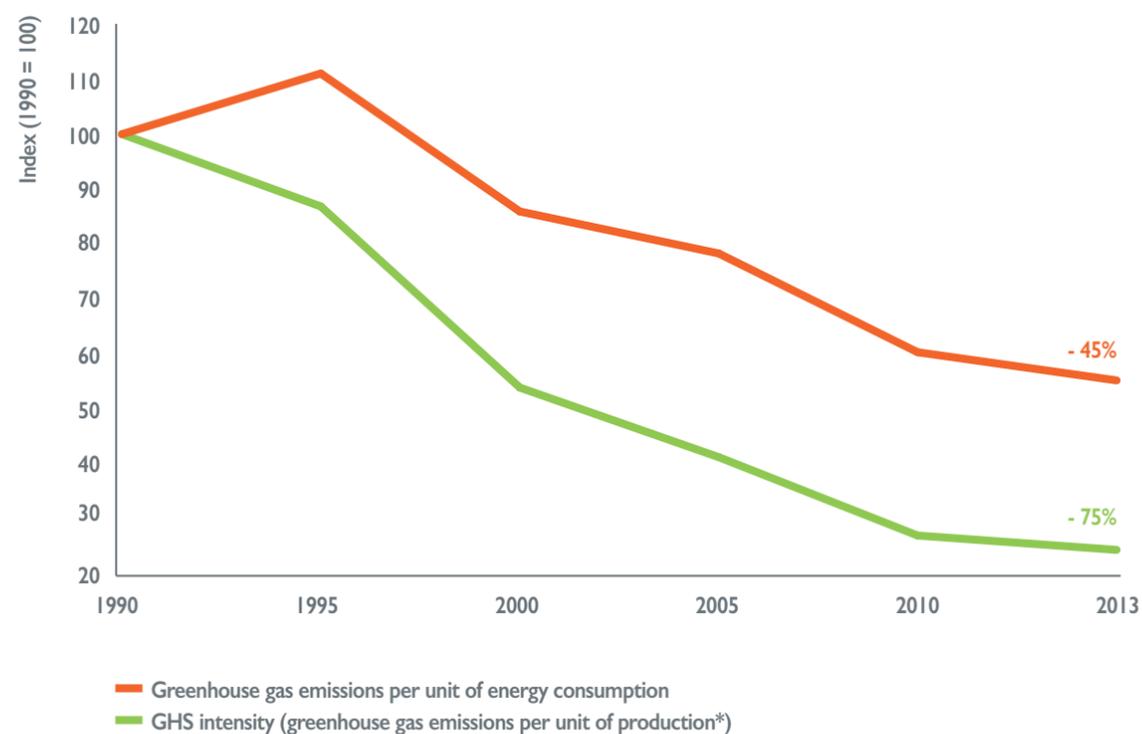
This was achieved thanks to the chemical industry's conscious effort to develop cleaner and safer technologies, waste recycling processes and new products to safeguard the environment, and above all to increase energy efficiency. Besides increasing energy efficiency of its own processes, innovations in the chemical industry also help to increase the energy efficiency in downstream users and their products.

Our products make a significant contribution to society's capacity to reduce GHG emissions. A study from the International Council of Chemical Associations (ICCA) entitled "Innovations for Greenhouse Gas Reductions, 2009" found that the products of the chemical industry, over their lifecycle, save from 2.1 to 2.6 times the GHG emissions that are required to produce them. It also concluded that this ratio could increase to more than 4.1 by 2030.

We rapidly need an ambitious global climate agreement to reduce greenhouse gas emissions effectively while ensuring a fair level-playing field between the concerned economic players across the globe. The reform of the European quota trading scheme should rapidly lead to a predictable long-term framework and ensure adequate protection for industries exposed to carbon leakage.

Total greenhouse gas emissions in the EU chemical industry	Total emissions by gas in the EU chemical industry	Greenhouse gas emissions and production	Greenhouse gas emissions per unit of energy consumption and per unit of production	Acidifying emissions	Non-methane volatile organic compounds emissions to air	Emissions to water	Water quality-nitrogen and phosphorous emissions
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Greenhouse gas emissions per unit of energy consumption and per unit of production*



Sources: European Environment Agency (EEA) and Cefic analysis
 * Including pharmaceuticals

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Greenhouse gas intensity plummets 75% since 1990

Over the last two decades, the chemical industry, including pharmaceuticals, has made an enormous effort to minimise the environmental impact of its production. Greenhouse gas (GHG) emissions per unit of energy consumption fell by 45 per cent between 1990 and 2013.

GHG intensity – the GHG emissions per unit of production – fell by 75 per cent from 1990 to 2013.

Until a global agreement on climate change provides for a level playing field for the chemical industry and other energy-intensive sectors, best performers should not be penalised by direct or indirect costs resulting from EU climate policies. The goal of a competitive, low carbon economy should not be pursued at “any price,” and cannot be achieved by making the European economy less competitive.

Total greenhouse gas emissions in the EU chemical industry	Total emissions by gas in the EU chemical industry	Greenhouse gas emissions and production	Greenhouse gas emissions per unit of energy consumption and per unit of production	Acidifying emissions	Non-methane volatile organic compounds emissions to air	Emissions to water	Water quality-nitrogen and phosphorous emissions
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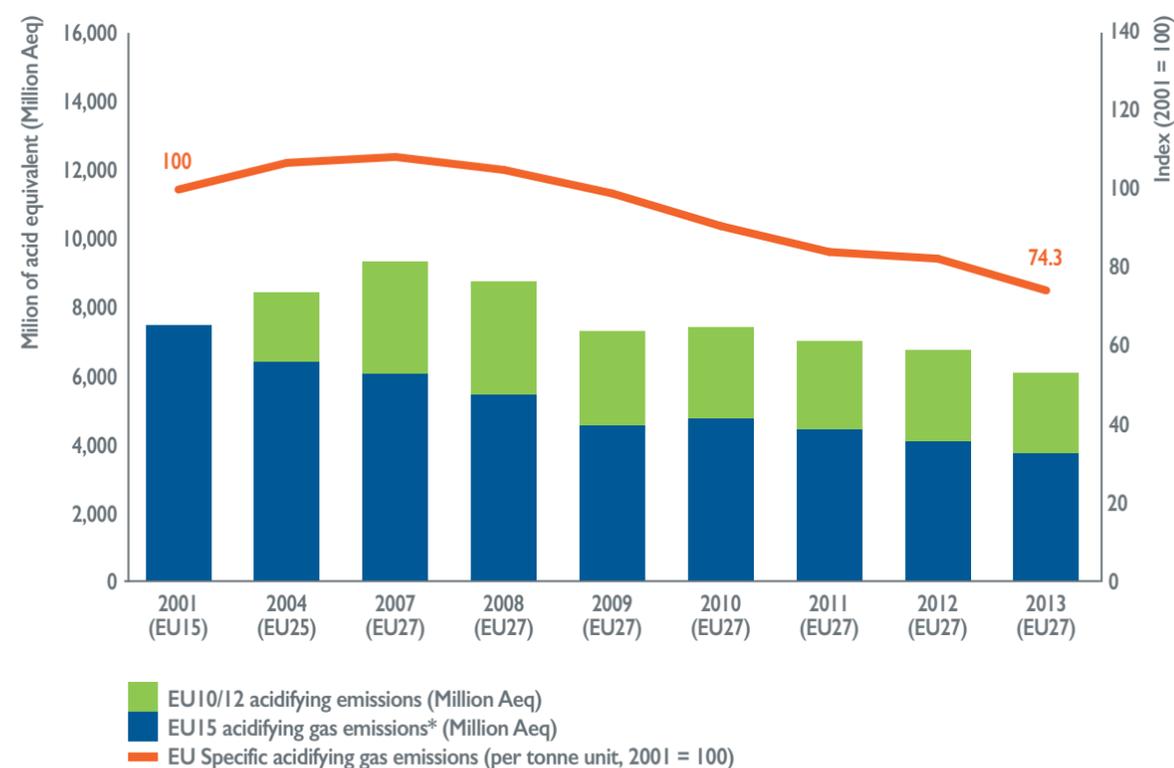
Acidifying emissions

Acidifying emission intensity falls by 31.3% since 2007

Between 2007 and 2013, the chemical industry achieved a 31.3 per cent reduction in its acidifying emissions intensity (acidifying gas emissions per tonne unit). Although the chemical industry is only a minor contributor to these emissions at EU-level, we work to reduce our specific emissions year on year.

Some emissions, such as sulphur oxides (SO_x), nitrogen oxides (NO_x) and ammonia (NH₃), together with their reaction products, lead after their deposition to changes in the chemical composition of the soil and surface water. This process interferes with ecosystems, leading to what is termed 'acidification'. In the chemical industry, potentially acidifying gases originate mainly from combustion and the production of sulphuric acid, ammonia and nitric acid.

In 2013, road transport accounted for around 40 per cent of NO_x emissions, while production and distribution of energy was responsible for around 55 per cent of SO_x emissions. The vast majority of NH₃ emissions (around 93 per cent in Europe) come from the agricultural sector.



Sources: EPER, E-PRTR, Eurostat and Cefic analysis

* Ammonia (NH₃) + Sulphur oxides (SO_x/SO₂) + Nitrogen oxides (NO_x/NO₂)

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Total greenhouse gas emissions in the EU chemical industry	Total emissions by gas in the EU chemical industry	Greenhouse gas emissions and production	Greenhouse gas emissions per unit of energy consumption and per unit of production	Acidifying emissions	Non-methane volatile organic compounds emissions to air	Emissions to water	Water quality-nitrogen and phosphorous emissions
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Non-methane volatile organic compounds emissions to air

Non-methane volatile organic compounds emission intensity falls by 55.2% since 2001

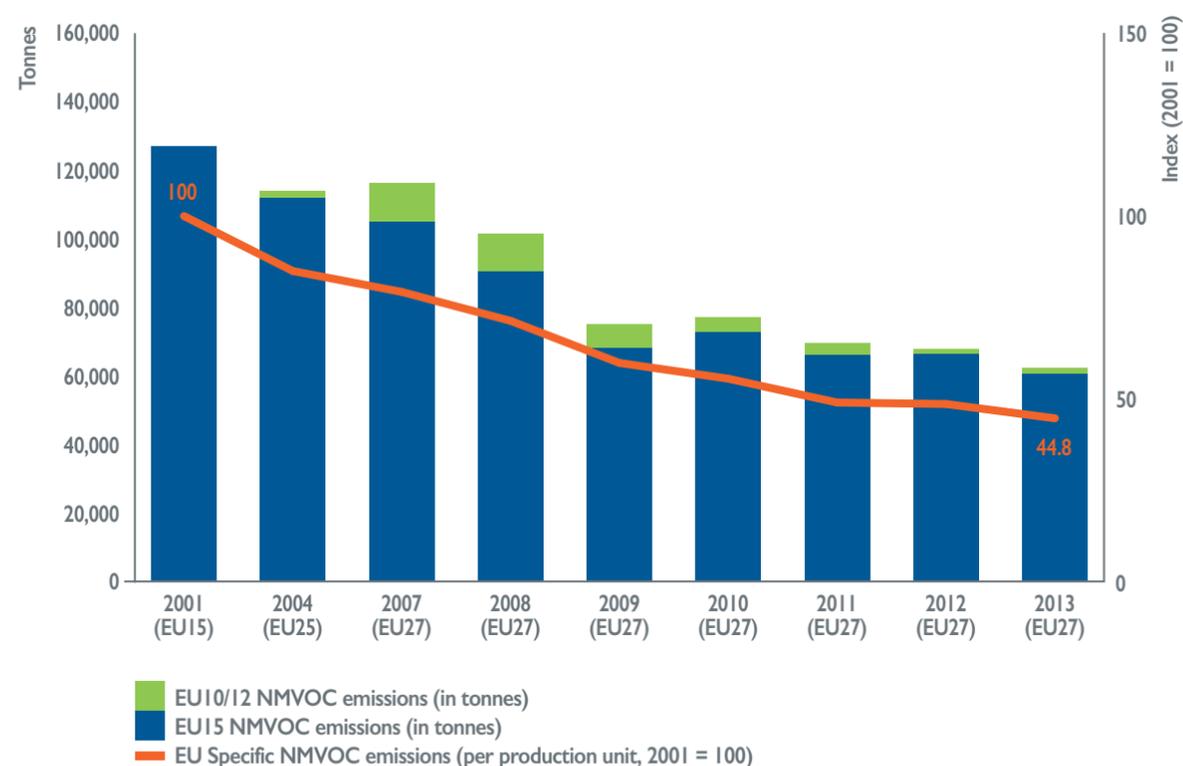
Although the contribution of its production processes to man-made non-methane volatile organic compounds (NMVOC) emissions is small – less than 10 per cent – the chemical industry is succeeding in further decreasing its emissions.

NMVOCs are ozone precursors. Exposure to high levels of ozone can cause health issues. The majority of NMVOCs, around 80 per cent, are emitted from natural sources and the rest from man-made sources, such as road transport, dry cleaning and solvents use.

The chemicals sector has seen a fall of 55.2 per cent in NMVOC emissions intensity since 2001 (European Pollutant Emission Register (EPER) data). This is the result of a range of measures including process optimisation and improved emissions control during storage and transport.

The largest source of man-made NMVOC emissions (± 45 per cent) is from solvent and product use. Data collected under the Convention on Long Range Trans-boundary Air Pollution (LRTAP) shows a 43 per cent decrease in NMVOC emissions from solvent and product use between 1990 and 2013.

The chemicals sector contributed to this reduction through a change from solvent-based to water-based paints, process optimisation to reduce emissions, and higher levels of solvent recycling.



Sources: EPER, E-PRTR, Eurostat and Cefic analysis

Unless specified, chemical industry excludes pharmaceuticals
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Total greenhouse gas emissions in the EU chemical industry	Total emissions by gas in the EU chemical industry	Greenhouse gas emissions and production	Greenhouse gas emissions per unit of energy consumption and per unit of production	Acidifying emissions	Non-methane volatile organic compounds emissions to air	Emissions to water	Water quality-nitrogen and phosphorous emissions
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Emissions to water

Chemical Oxygen Demand intensity falls by 64.2% since 2001

Chemical Oxygen Demand (COD) is used to represent the potential of emissions to water to consume the dissolved oxygen that supports aquatic life. Hence, COD is an indicator for the contamination load of wastewater.

The continuing, albeit slower improvement in the COD intensity of our wastewater follows the significant decrease obtained between 2004 and 2007, when the majority of the chemical industry's reporting manufacturing sites implemented Best Available Technologies (BAT).

Data shows that (COD) intensity at the EU level was slightly higher in 2013 compared to 2012. Production fell by 0.3 per cent in 2013 compared to one year ago and total emission went up by 2.2 per cent.

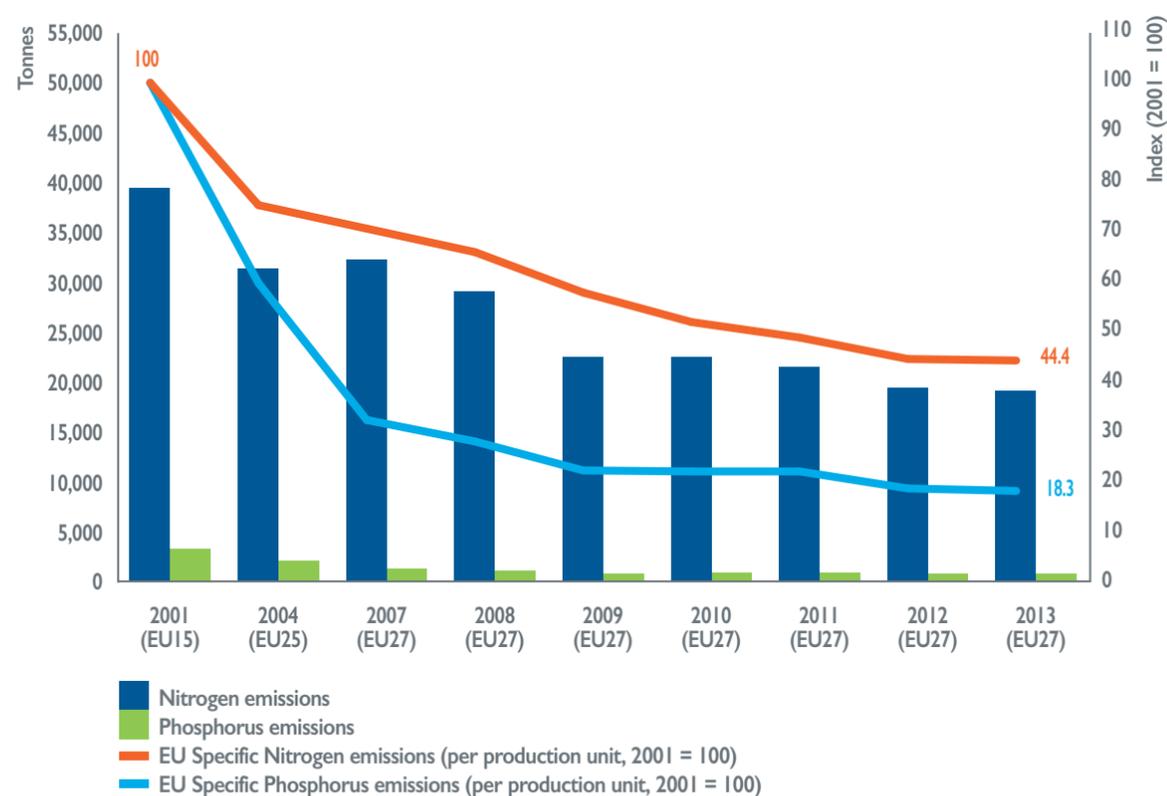


Sources: EPER, E-PRTR, Eurostat and Cefic analysis

Unless specified, chemical industry excludes pharmaceuticals
Unless specified, EU refers to EU 28

Total greenhouse gas emissions in the EU chemical industry	Total emissions by gas in the EU chemical industry	Greenhouse gas emissions and production	Greenhouse gas emissions per unit of energy consumption and per unit of production	Acidifying emissions	Non-methane volatile organic compounds emissions to air	Emissions to water	Water quality-nitrogen and phosphorous emissions
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Water quality-nitrogen and phosphorous emissions



Sources: EPER, E-PRTR, Eurostat and Cefic analysis

Unless specified, chemical industry excludes pharmaceuticals
Unless specified, EU refers to EU 28

Control measures for nitrogen and phosphorus continue to be effective

With the widespread implementation of Best Available Technologies, significant reductions in the chemical industry's emissions of nitrogen (N) and phosphorus (P) are achieved. The past few years specific nitrogen and phosphorous discharges continue to decrease slowly and are close to an asymptotic minimum.

Both nitrogen and phosphorus occur naturally and are essential nutrients for healthy ecosystems. But too high levels can lead to eutrophication of lakes, streams, rivers, estuaries and oceans. As well as successfully reducing its releases of N and P to water through end-of-pipe controls, the industry is also working on stewardship approaches with its partners down the value chain.

The chemicals sector saw a fall of 55.3 per cent in nitrogen emissions to water (per production unit) between 2001 and 2013. During the same period, phosphorous emissions to water (per production unit) also decreased by 81.2 per cent in the chemicals sector.

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Chemistry making a world of difference



Cefic, the European Chemical Industry Council, founded in 1972, is the voice of 29,000 large, medium and small chemical companies in Europe, which provide 1.2 million jobs and account for 17% of world chemicals production.

Cefic members form one of the most active networks of the business community, complemented by partnerships with industry associations representing various sectors in the value chain. A full list of our members is available on the Cefic website: www.cefic.org/about-us/our-members

Cefic is an active member of the International Council of Chemical Associations (ICCA), which represents chemical manufacturers and producers all over the world and seeks to strengthen existing cooperation with global organisations such as UNEP and the OECD to improve chemicals management worldwide.