1. Profile - key figures
Europe is the second-largest chemicals producer in the world
China dominates chemical sales globally

Chemical sales by country: top 10

<table>
<thead>
<tr>
<th>Country</th>
<th>Chemical sales 2021 (€ billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>1,729</td>
</tr>
<tr>
<td>EU27</td>
<td>594</td>
</tr>
<tr>
<td>USA</td>
<td>437</td>
</tr>
<tr>
<td>Japan</td>
<td>190</td>
</tr>
<tr>
<td>South Korea</td>
<td>133</td>
</tr>
<tr>
<td>India</td>
<td>104</td>
</tr>
<tr>
<td>Brazil</td>
<td>77</td>
</tr>
<tr>
<td>Taiwan</td>
<td>76</td>
</tr>
<tr>
<td>Russia</td>
<td>58</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>58</td>
</tr>
</tbody>
</table>

Source: Cefic Chemdata International
EU27 market share dropped significantly

World chemical sales by country: top 10

Source: Cefic Chemdata International
World market share of EU27 chemical sales drops substantially
Petrochemicals account for more than $\frac{1}{4}$ of EU27 chemicals sales.

EU27 chemical sales 2021 (€594 billion)

- Petrochemicals 26%
- Specialty chemicals 28%
- Polymers 20%
- Basic inorganics 13%
- Other inorganics 5%
- Industrial gases 3%
- Fertilizers 5%
- Consumer chemicals 14%
- Auxiliary for industry 16%
- Paints & inks 8%
- Crop protection 2%
- Dyes & pigments 2%
- Plastics 18%
- Synthetic rubber 1%
- Man-made fibres 1%

Source: Cefic Chemdata International
Two thirds of EU27 chemical sales generated in four Member States

EU27 chemical sales broken down by country (2021)

Source: Cefic Chemdata International
EU27 chemicals sales increased significantly in 2021

**EU27 chemical sales structure (€ billion)**

<table>
<thead>
<tr>
<th>Year</th>
<th>EU27 Home Sales</th>
<th>Intra-EU27 Sales</th>
<th>EU27 Foreign Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>132</td>
<td>230</td>
<td>506</td>
</tr>
<tr>
<td>2012</td>
<td>133</td>
<td>232</td>
<td>518</td>
</tr>
<tr>
<td>2013</td>
<td>127</td>
<td>233</td>
<td>510</td>
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<tr>
<td>2014</td>
<td>111</td>
<td>237</td>
<td>498</td>
</tr>
<tr>
<td>2015</td>
<td>98</td>
<td>241</td>
<td>494</td>
</tr>
<tr>
<td>2016</td>
<td>79</td>
<td>242</td>
<td>478</td>
</tr>
<tr>
<td>2017</td>
<td>89</td>
<td>264</td>
<td>521</td>
</tr>
<tr>
<td>2018</td>
<td>80</td>
<td>287</td>
<td>541</td>
</tr>
<tr>
<td>2019</td>
<td>86</td>
<td>285</td>
<td>547</td>
</tr>
<tr>
<td>2020</td>
<td>50</td>
<td>267</td>
<td>487</td>
</tr>
<tr>
<td>2021</td>
<td>48</td>
<td>347</td>
<td>594</td>
</tr>
</tbody>
</table>

Source: Cefic Chemdata International
One third of EU27 chemicals sales is generated from exports

**EU27 chemical sales structure (%)**

- **2011**
  - EU27 home sales: 29%
  - Intra-EU27 sales: 26%
  - EU27 foreign sales: 45%
  - Total: €506 billion

- **2021**
  - EU27 home sales: 34%
  - Intra-EU27 sales: 8%
  - EU27 foreign sales: 58%
  - Total: €594 billion

Source: Cefic Chemdata International
More than half of EU chemicals are supplied to the industry
2. Trade Development
EU27 chemicals trade surplus reaches a lower level in 2021

Extra-EU27 chemicals trade balance

Source: Cefic Chemdata International
Specialty chemicals contributes most to EU27 chemicals trade

**Extra-EU27 chemicals trade flows by sector (2021)**

- **Exports 2021**
  - Specialties: 31%
  - Petrochemicals: 24%
  - Consumer chemicals: 17%
  - Polymers: 19%
  - Basic inorganics: 9%
  - Total: €199 billion

- **Imports 2021**
  - Specialties: 37%
  - Petrochemicals: 27%
  - Consumer chemicals: 12%
  - Polymers: 19%
  - Basic inorganics: 5%
  - Total: €163 billion

Source: Cefic Chemdata International
Top 10 EU27 partners account for 2/3 of EU27 chemicals trade*

EU27 chemicals trade* flows with top 10 partners (2021)

Source: Cefic Chendata International
*Trade = exports + imports (in value terms)
EU27 holds trade surplus with top competing regions

EU27 chemicals trade flows with major geographic blocs (2021)

Source: Cefic Chemdata International
*Rest of Europe covers UK, Switzerland, Norway, Turkey, Russia and Ukraine
**North American Free Trade Agreement
***Asia excluding China and Japan
Consumer chemicals contribute most to EU27 trade surplus
3. Growth and Competitiveness
EU27 chemicals output, far below the previous year’s level

**EU27 chemical industry production**

- Production index (2015=100), Left Hand Side (LHS)
- Production % change (y-o-y), Right Hand Side (RHS)

Source: Cefic Chemdata International
EU27 capacity utilisation below its long-term average

![EU27 chemical capacity utilisation rate](image)

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)?"
Europe at a competitive disadvantage compared to North America and Middle East

**Ethylene cash cost of regional steam crackers**

Source: ICIS
Key emerging economies grow faster than the EU27 and the USA

Average chemicals production growth per annum (2011-2021)

Source: Cefic Chemdata International
4. Our contribution to EU industry
Top 10 sectors account for 70% of total EU27 manufacturing enterprises.
Consumer chemicals has the highest number of chemicals enterprises.
Chemicals is the fourth-largest producer in EU27 manufacturing sector

Top 10 sectors: turnover (€ billion, 2018)

Source: Eurostat
Chemicals* is the leading sector in terms of added value
Petrochemicals has the highest added value in EU27 chemicals sector

Added value in the EU27 chemicals industry (2020): top 10

Source: Eurostat
Chemicals* contributes 12% of EU27 manufacturing employment

Top 10 sectors: EU27 number of employees (millions of employees, 2020)

- Food products: 4.0
- Chemicals*: 3.4
- Fabricated metal: 3.2
- Machinery n.e.c.: 2.9
- Automotive: 2.5
- Electrical equipments: 1.4
- Other non-metallic mineral products: 1.1
- Computer & electronics: 1.0
- Basic metals: 0.9
- Furniture: 0.8

Source: Eurostat
*Pharmaceuticals and rubber & plastics included
Consumer chemicals is the largest employer in the EU27 chemicals sector.
EU27 Labour productivity grows at 1.5% (CAGR)

Labour productivity in the EU27 chemical industry

Average growth p.a 2011-2021
- Added value (+3.0%)
- Employment (+1.5%)
- Labour productivity (+1.5%)

Source: Eurostat
Chemicals* is the largest investor in EU27 manufacturing sector.

Top 10 sectors: EU27 investment (€ billion, 2018)

- Chemicals*: 50
- Automotive: 40
- Food products: 33
- Fabricated metal: 24
- Machinery & equipment n.e.c.: 22
- Other non-metallic mineral products: 13
- Basic metals: 12
- Electrical equipment: 11
- Refined petroleum products: 10
- Paper: 9

Source: Eurostat
*Pharmaceuticals and rubber & plastics included
Petrochemicals is the largest investor in the EU27 chemicals sector

Capital spending in the EU27 chemicals industry (2020): top 10

€23.3 billion

Source: Eurostat
Chemicals* generates the largest surplus in the European Economy

**EU27 trade surplus in the European Economy (2020-2021): top 10**

- Chemicals*: 161 billion in 2021, 137 billion in 2020
- Machinery & equipment: 123 billion in 2021, 145 billion in 2020
- Food products: 44 billion in 2021, 43 billion in 2020
- Beverages: 29 billion in 2021, 25 billion in 2020
- Other transport equipment: 19 billion in 2021, 17 billion in 2020
- Paper: 10 billion in 2021, 6 billion in 2020
- Coke & refined petroleum: 9 billion in 2021, 7 billion in 2020
- Wood: 9 billion in 2021, 10 billion in 2020
- Other non-metallic mineral: 9 billion in 2021, 9 billion in 2020

*Source: Eurostat
*Pharmaceuticals included
5. Energy Consumption
EU27 gas and electricity account for 2/3 of total energy consumption
EU27 energy consumption falls 22% since 1990

Energy consumption in the EU27 chemical industry

Source: Eurostat
EU27 gas consumption falls 25% since 1990

Gas consumption in the EU27 chemical industry

Source: Eurostat
EU27 electrical energy consumption falls 15% since 1990

Electrical energy consumption in the EU27 chemical industry

Source: Eurostat
EU27 Total petroleum consumption falls 22% since 1990

Total petroleum products consumption in the EU27 chemical industry

Source: Eurostat
EU27 solid fuels consumption falls 68% since 1990

Solid fuels consumption in the EU27 chemical industry

Source: Eurostat
EU27 Renewable energies consumption more than doubled

Renewable energies consumption in the EU27 chemical industry

Source: Eurostat
EU27 specific energy consumption* dropped by 45%

Source: Eurostat
*Specific energy consumption index is calculated as (energy consumption index/production index), (1990=100)
EU27 chemicals performance* is slightly higher than overall industry

EU27 specific energy consumption*: Chemicals vs total industry

Source: Eurostat

*Specific energy consumption index is calculated as (energy consumption index/production index), (1990=100)
6. Capital and R&I Spending
EU27 capital spending increased significantly in 2021

Capital spending in the EU27 chemical industry

![Graph showing capital spending in the EU27 chemical industry from 2003 to 2021. The spending increased significantly in 2021.]

Source: Cefic Chemcata International
China leads the global chemicals investment

Capital spending in the chemicals industry by region (2021 vs 2011)

Source: Cefic Chemdata International
* Rest of Europe covers UK, Switzerland, Norway, Turkey, Russia and Ukraine
** North American Free Trade Agreement
*** Asia excluding China, India, Japan and South Korea
Hight capital intensity in the EU27 chemical sector

Capital intensity in the EU27 chemical industry

Investment (% of added value)

- Industrial gases: 39
- Fertilizers: 37
- Synthetic rubber: 28
- Other inorganic chemicals: 26
- Petrochemicals: 23
- Plastics: 23
- Man-made fibres: 201
- Dyes and pigments: 19
- Other chemicals: 13
- Consumer chemicals: 13

Investment rate: Chemicals 19%

Source: Eurostat
EU27 capital intensity below China and India economies

Capital spending (% of added value, 2021 vs 2011)

Source: Celfic Chemdata International
* Rest of Europe covers UK, Switzerland, Norway, Turkey, Russia and Ukraine
** North American Free Trade Agreement
*** Asia excluding China, India, Japan and South Korea
EU27 loses more than 50% of its original market share
Decreasing share of chemicals capital spending for the EU27
EU27 R&I spending reaches the highest level in 2021
EU27 is the second largest R&I investor in the world

R&I spending in the chemicals industry by region (2011 vs 2021)

Source: Cetic Chemdata International
Decreasing share of R&I spending for the EU27, USA and Japan
7. Environmental Performance
EU27 scope 1 GHG emissions fall 55% since 1990

Total scope 1 GHG emissions by the EU27 chemical industry

Source: European Environment Agency (EEA)
*Germany and Malta did not separately report GHG emissions from combustion of fuels in the chemical sector.
EU27 scope 1 GHG emissions* fall by 149 million tonnes (CO2) since 1990

Total scope 1 GHG emissions* per type of GHG by the EU27 chemical industry

Source: European Environment Agency (EEA)
*Germany and Malta did not separately report GHG emissions from combustion of fuels in the chemical sector.
EU27 chemical production and greenhouse gas emissions decouple

![Graph showing total GHG emissions and production in the EU27 chemical industry]

- **EU27 chemicals production**
- **EU27 greenhouse gas emissions**

Source: European Environment Agency (EEA) and Cefic Chemdata International
EU27 greenhouse gas intensity plummets significantly since 1990

Total EU27 GHG emissions and energy consumption in the EU27 chemical industry

Source: European Environment Agency (EEA)
EU27 chemical waste fall by nearly one third since 2007

Total hazardous and non-hazardous waste in the EU27 chemicals industry

Source: European Pollutant Release and Transfer Register (E-PRTR)
* Slovakia did not report data under the EU Registry. Data for Germany, Latvia, Lithuania, Liechtenstein, Luxembourg, and Portugal are incomplete for 2018 and 2019. Data for Italy, Malta and Switzerland are incomplete for the year 2019.
Number of accidents dropped by 22% in the EU27 chemical industry
Accidental pollutant releases by the EU27 chemicals industry

Accidental pollutant release in the EU27 chemical industry

Source: European Pollutant Release and Transfer Register (E-PRTR)
Slovakia did not report data under the EU Registry.
Data for 2018 and 2019 are incomplete for Germany, Lithuania and Liechtenstein.
Data for 2020 is incomplete for Germany, Italy, Lithuania and Malta.
EU27 acidifying emissions fall by more than 60% since 2007

Acidifying emissions by the EU27 chemical industry

Source: European Pollutant Release and Transfer Register (E-PRTR)
Slovakia did not report data under the EU Registry.
Data for 2018 and 2019 are incomplete for Germany, Lithuania and Liechtenstein.
Data for 2020 is incomplete for Germany, Italy, Lithuania and Malta.
EU27 Methane & NMVOC Emissions to air fall by 70% since 2007

Methane & NMVOC emissions by the EU27 chemical industry

Source: European Pollutant Release and Transfer Register (E-PRTR)
*Slovakia did not report data under the EU Registry.
Data for 2018 and 2019 are incomplete for Germany, Lithuania and Liechtenstein.
Data for 2020 is incomplete for Germany, Italy, Lithuania and Malta.
EU27 Emission of water pollutants dropped significantly since 2007

**Total organic carbon emissions by the EU27 chemical industry**

![Bar chart showing total organic carbon emissions from 2007 to 2020.](chart)

- **2007:** 23.5 tons
- **2008:** 21.7 tons
- **2009:** 17.0 tons
- **2010:** 20.1 tons
- **2011:** 20.2 tons
- **2012:** 14.1 tons
- **2013:** 15.5 tons
- **2014:** 16.2 tons
- **2015:** 16.3 tons
- **2016:** 18.1 tons
- **2017:** 17.1 tons
- **2018:** 12.6 tons
- **2019:** 14.2 tons
- **2020:** 4.3 tons

**Source:** European Pollutant Release and Transfer Register (E-PRTR)

*Slovakia did not report data under the EU Registry.

Data for 2018 and 2019 are incomplete for Germany, Lithuania and Liechtenstein.

Data for 2020 is incomplete for Germany, Italy, Lithuania and Malta.
EU27 total Nitrogen & Phosphorous emissions dropped significantly
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About Cefic
Cefic, the European Chemical Industry Council, founded in 1972, is the voice of large, medium and small chemical companies across Europe, which provide 1.1 million jobs and account for 15% 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.

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.