Deloitte.



Chemicals Insights Current market trends and economic outlook of the chemical industry

In this summer's 2023 Chemicals Insights, we have explored the emerging technology of chemical recycling and other possible pathways for chemical companies to reduce their carbon footprint and become more sustainable. Additionally, we have assessed the most recent company valuations and notable transactions in the market. Looking at the current and future economic developments of the Eurozone aims to provide further insights on potential market developments.



Hot topics in the market – chemical recycling

In 2019, plastic generated 1.8 billion tons of Greenhouse Gas (GHG) emissions (incl. combination of plastics production and end-of-life treatment) thereby contributing more than 3% of total global GHG emissions.¹ When looking at Europe, roughly 50% of European plastic waste was incinerated for energy production while only 14% was recycled, the rest is released into landfills.² The European objective to transition from a linear economy towards a sustainable circular economy calls for an array of complementary recycling options and business models besides the traditional mechanical recycling technology. In this context chemical recycling can play its part in valorizing end-of-life plastic waste streams to reach future recycling ambitions set by the European government and consumer industries.

Mechanical recycling

Mechanical recycling is a sequence of physical process steps such as grinding, washing, separating, drying, and re-granulating. With 730 active companies and 30,000 employees across Europe, the sector accounts for a yearly capacity of 11.3 million tons of recyclates.^{3,4}

It is heavily dependent from an efficient sorting into clean, mono-material plastic fractions that can easily be further processed. It can only digest mono-polymer plastics as each polymer has its own production parameters and melting temperature. It also becomes less effective in case of contamination. Besides solutions like near-infrared sensors in waste collection or machine learning in waste separation, there remains a large fraction of plastic waste lacking purity to be mechanically recycled. Another constraint of this recycling technique is related to polymer degradation - polymers suffer from thermicmechanical degradation due to the combination of heat and shear. This leads to lower quality recyclates after a certain number of loops.

Mechanical recycling is currently the only operational technology, whereas chemical recycling is still in development stage and expected to become a valuable complement.



¹ OECD, "Plastic leakage and greenhouse gas emissions are increasing", accessed on June 10, 2023.

⁴ Plastic recyclers, "<u>Who we are</u>", accessed on June 10, 2023.

² Plastics Europe, "Global plastics treaty", accessed on June 10, 2023.

³ Delva, Laurens; Van Kets, Karen; Kuzmanović, Maja; Demets, Ruben; Hubo, Sara; Mys, Nicolas; De Meester, Steven; Ragaert, Kim (2019), <u>An Introductory Review – Mechanical Recycling of Polymeres for Dummies</u>, accessed on June 10, 2023.

Chemical recycling

Chemical recycling is the process of chemically degrading plastic waste into its monomers or hydrocarbons, that can be processed re-polymerized into new plastics equivalent to those made from fossil resources. It addresses the main challenges of mechanical recycling, as it can cope with mixed, contaminated waste and has the flexibility to be up- or downcycled to other plastic applications. Nonetheless, there is the drawback of being more energy intensive and requiring large volumes of input waste to ensure economic attractiveness. (including pyrolysis to synthesis gas, soft pyrolysis to monomer, solvent-based technologies) has passed the development stage and companies are starting to invest into the new recycling technology (e.g., Eastman with a 1 bn \$ investment for 200 kt annual molecular recycling of polyester in France)⁵ or establishing technology partnerships (e.g., BASF with Quantafuels, Neste with Ravago, Yokogawa with Jeplan).^{6,7,8} Nonetheless, due to its low maturity, there are currently no comprehensive and fully independent life-cycle assessments (LCAs) on chemical recycling to provide a complete understanding of the environmental impacts. Critics are concerned about the lack of transparency in regards to the nature, quantity and toxicity of the solvents, chemical reagents and catalysts used, as well as the nature and fate of the waste materials and by-products formed and separated during the process.

Within the past few years, chemical recycling





Plastic production stage
 Intermediate/final waste form
 Waste conversion method

⁵ Eastman, "Eastman to invest up to 1 billion to accelerate circular economy through building world's largest molecular plastics recycling facility in France", accessed on June 10, 2023.

- ⁶ BASF, "BASF, Quantafuel und REMONDIS wollen beim chemischen Recycling von Kunststoffabfällen zusammenarbeiten", press release, April 21, 2021.
- ⁷ Neste, "Neste und Ravago beabsichtigen Gründung eines Joint Ventures für chemisches Recycling von Kunststoffabfällen", press release, October 20, 2021.
- ⁸ Yokogawa, "Yokogawa trifft Abkommen mit Spezialisten für Recyclingtechnologie JEPLAN", press release, accessed on June 16, 2020.

Mechanical recycling

Chemical recycling

Outlook

Currently, members of the Plastic Europe initiative claim to invest more than 8 bn € in chemical recycling to produce 2.8 mt of recycled plastics by 2030.9 To further increase its applicability and efficiency, multiple chemical companies request more enabling conditions to realize the full potential of chemical recycling including innovation, policy frameworks, a level playing field, recycling chains and clear pathways to "valorize" post-use plastics that would otherwise be exported, incinerated, landfilled or wasted. EU rules to support chemical recycling as a complementary solution to mechanical recycling could facilitate investment into these technologies and help the EU meet targets for more recycled content.

Diverse and tailored recycling strategies are needed for both existing and new emerging plastics. However, commercial-scale chemical recycling operations are underway. In the future, it is expected that chemical recycling will complement its mechanical counterpart, especially for difficult to recycle materials such as multi-layer films. By 2027, it is expected that the emerging technology will increase its share in the total polymer recycling market by six percentage points. Considering the technology's expected growth rates of 18 to 20% CAGR between 2023 and 2028 compared to 6 to 7% CAGR for mechanical recycling, companies that focus on further developing chemical recycling remain a promising growth target towards sustainable solutions in the plastic market.



Fig. 2 – Total polymer recycling market

Source: Deloitte Research.

Recent multiple developments – Resilience in times of crisis

Private equity firms and strategic buyers have made significant investments in the chemicals industry over the past years, including the logistics supply chain for chemical distribution. Company valuation then becomes crucial to determine the value of the deals. Comparable metrics of publicly traded chemical companies can provide a guide for both strategic buyers and private equity firms when considering an acquisition.

Valuations vary widely across segments

Table 1 provides trading multiples including, e.g., Enterprise Value (EV)/EBITDA multiples and Price-to-Earnings (P/E) ratios of 28 listed chemical companies that span various sub-sectors and geographic areas. The multiples are based on the latest reported financial data and stock prices. Worldwide, the chemicals industry is in a strong financial position, the average value of EV/EBITDA in the chemical sectors as of 2022 was a multiple of approximately 10.1x. There is a particular emphasis on highly attractive, growth-oriented segments. Companies operating in the consumer chemicals sector saw the highest valuation multiple with EV/EBITDA valued at 18.3x, followed by the industrial gases sector with 15.8x. Companies operating in the fertilizers sector saw the lowest valuation multiple with EV/ EBITDA valued at 2.8x.

Strategic buyers see higher multiples

Despite 2021 as historic for chemical M&A activities, 2022 saw challenging conditions with the combination of high interest rates, supply chain bottlenecks and geopolitical instability. Table 2 gives an overview of the transaction multiples in the chemicals industry since the beginning of 2022.

Strategic acquisition activity in the chemicals market continues to be healthy. Up until 2022, valuations multiples for financial transactions had been generally higher than those for strategic transactions. Since 2022, however, this tendency has been ebbing and beginning to turn around. Strategic buyers now generally experience higher multiples.

Outlook

The second half of 2023 could be a turning point where chemical companies are expected to continue to review their portfolio and business strategies in light of the current environment and evolving sustainability requirements. Given the uncertainty around feedstock prices, energy demand, supply chain, and end-market demand, strategic buyers will try to create resilience within their own supply chain and look for deals which can bolster their core competencies.

Com- pany	Country	Share price	Market Cap	E	V/Re	venu	e		EV/E	BITDA			EV/	EBIT			P	/E			P/	BV	
		_		LTM	22	23E	24E	LTM	22	23E	24E	LTM	22	23E	24E	LMT	22	23E	24E	LTM	22	23E	24E
				(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(X)	(x)	(X)	(X)	(X)	(x)	(x)	(X)	(X)	(X)	(x)	(X)
Consume	er Chemica	ls																					
Croda Interna- tional	UK	65.7	9,106	3.9	3.9	4.4	4.2	15.3	15.3	16.0	14.5	18.1	18.1	19.7	17.6	30.0	30.0	26.8	23.9	3.3	3.3	3.1	2.9
Givaudan	CH	3,076.2	28,384	4.5	4.5	4.5	4.3	22.5	22.5	21.3	19.4	29.1	29.1	27.9	24.6	47.8	47.8	30.4	27.2	6.5	6.5	6.2	5.8
Novo- zymes	DK	43.1	11,931	5.4	5.5	5.3	5.1	16.4	16.5	16.0	14.7	21.3	21.6	21.4	19.4	36.1	36.3	26.3	23.4	6.9	6.4	5.9	5.5
Symrise	DE	94.7	13,239	3.4	3.4	3.2	3.0	18.9	18.9	16.1	14.5	30.8	30.8	23.0	20.4	50.5	50.5	31.9	26.8	3.7	3.7	3.4	3.2
			Median	4.2	4.2	4.4	4.2	17.7	17.7	16.1	14.6	25.2	25.3	22.2	19.9	42.0	42.1	28.6	25.3	5.1	5.1	4.7	4.3
			Average	4.3	4.3	4.3	4.1	18.3	18.3	17.3	15.8	24.8	24.9	23.0	20.5	41.1	41.2	28.8	25.3	5.1	5.0	4.7	4.3
Fertilizer	s																						
Grupa Azoty	PL	6.1	609	0.6	0.5	0.7	0.6	16.2	5.0	11.9	7.0	n.a.	7.1	18.0	19.5	n.a.	2.7	34.0	8.5	0.3	0.3	0.3	0.3
K+S	DE	16.3	3,112	0.5	0.5	0.7	0.7	1.1	1.1	2.9	3.5	1.4	1.3	5.5	7.5	2.4	2.3	9.0	12.1	0.5	0.5	0.4	0.4
OCI	NL	22.1	4,662	1.0	0.9	1.5	1.4	3.0	2.4	4.7	4.4	3.8	2.8	5.8	6.1	20.5	8.6	16.7	12.4	2.2	2.1	2.7	2.8
Yara Interna- tional	NO	33.2	8,457	0.6	0.6	0.7	0.7	3.2	2.8	4.7	4.5	4.3	3.5	7.9	7.8	6.1	4.5	8.3	8.2	1.1	1.2	1.1	1.1
			Median	0.6	0.5	0.7	0.7	3.1	2.6	4.7	4.5	3.8	3.2	6.9	7.7	6.1	3.6	12.9	10.3	0.8	0.8	0.8	0.8
			Average	0.7	0.6	0.9	0.9	5.9	2.8	6.1	4.9	3.2	3.7	9.3	10.2	9.7	4.5	17.0	10.3	1.0	1.0	1.1	1.2

Tab. 1 – Public Company Valuation Statistics

Sources: S&P Capital IQ, Deloitte analysis; priced as of July 4, 2023.

Tab. 1 – Public Company Valuation Statistics

pany pin0 Ca V V V V <th>Com-</th> <th>Country</th> <th>Share</th> <th>Market</th> <th>E</th> <th>V/Re</th> <th>venu</th> <th>e</th> <th></th> <th>EV/E</th> <th>BITDA</th> <th></th> <th></th> <th>EV/</th> <th>EBIT</th> <th></th> <th></th> <th>P</th> <th>/E</th> <th></th> <th></th> <th>P/</th> <th>BV</th> <th></th>	Com-	Country	Share	Market	E	V/Re	venu	e		EV/E	BITDA			EV/	EBIT			P	/E			P/	BV	
Image: biole into into into into into into into into	pany		price	Сар			225	2.45			225	2.45			225	2.45			205	2.45		2.2	225	
Specially Chemicals Sectially Chemicals Sectially Chemicals Sectially Chemicals Sectially Chemicals Sectially Chemicals Sectial S					LIM	22	23E	24E	LIM	22	23E	24E	LIM	22	23E	24E	LMI	22	23E	24E	LIM	22	23E	24E
Ariena R 87 676 67 <th< td=""><td>Specialty</td><td>Chemicals</td><td></td><td></td><td>(^)</td><td>(\)</td><td>(^)</td><td>(\)</td><td>(^)</td><td>(^)</td><td>(^)</td><td>(^)</td><td>(×)</td><td>(^)</td><td>(^)</td><td>(^)</td><td>(^)</td><td>(^)</td><td>(^)</td><td>(^)</td><td>(^)</td><td>(^)</td><td>(^)</td><td>(^)</td></th<>	Specialty	Chemicals			(^)	(\)	(^)	(\)	(^)	(^)	(^)	(^)	(×)	(^)	(^)	(^)	(^)	(^)	(^)	(^)	(^)	(^)	(^)	(^)
Claiment CH 13.3 4,367 10 10 10 5 5 6 6 8 8 10 8 11 10 10 10 57 57 6 5 8 10 86 13 10 <t< td=""><td>Arkema</td><td>FR</td><td>87.8</td><td>6,566</td><td>0.7</td><td>0.7</td><td>0.8</td><td>0.8</td><td>4.5</td><td>4.0</td><td>5.4</td><td>4.8</td><td>7.1</td><td>5.9</td><td>8.7</td><td>7.5</td><td>9.7</td><td>7.8</td><td>9.8</td><td>8.3</td><td>1.0</td><td>1.0</td><td>0.9</td><td>0.8</td></t<>	Arkema	FR	87.8	6,566	0.7	0.7	0.8	0.8	4.5	4.0	5.4	4.8	7.1	5.9	8.7	7.5	9.7	7.8	9.8	8.3	1.0	1.0	0.9	0.8
Evonk Indus DE 175 8.171 0.6 0.6 0.7 0.7 5.2 4.5 6.1 5.1 10.9 8.0 13.9 10.4 13.3 9.7 13.8 10.5 0.8 0.7 0.8 0.7 Furths Pertonus DE 36.1 4.556 1.3 1	Clariant	CH	13.3	4,367	1.0	1.0	1.1	1.0	5.7	5.7	6.6	5.9	8.2	8.2	10.1	8.6	13.1	13.1	13.7	11.6	1.8	1.8	1.7	1.6
Percham DE 3.61 4.556 1.3 1.3 1.3 1.7 9.7 7	Evonik Indus- tries	DE	17.5	8,171	0.6	0.6	0.7	0.7	5.2	4.5	6.1	5.1	10.9	8.0	13.9	10.4	13.3	9.7	13.8	10.5	0.8	0.7	0.8	0.7
Introduction MatterUKUKUS	Fuchs Petrolub	DE	36.1	4,556	1.3	1.3	1.3	1.3	9.7	9.9	9.3	8.7	12.0	12.3	11.3	10.3	0.0	22.4	17.2	15.8	0.0	2.7	2.5	2.3
LANXESS DE QE	Johnson Matthey	UK	20.6	3,550	0.3	0.3	1.0	1.0	6.4	6.4	6.5	6.3	8.6	8.6	9.1	8.9	12.5	12.5	10.8	10.2	1.2	1.2	0.0	1.2
Sika CH 2597 39.99 3.9 3.9 3.0 2.0 2.0 1.2 <th1.2< th=""> 1.2 1.2 <th< td=""><td>LANXESS</td><td>DE</td><td>28.2</td><td>2,431</td><td>0.8</td><td>0.8</td><td>0.8</td><td>0.8</td><td>7.4</td><td>6.8</td><td>9.1</td><td>6.9</td><td>21.2</td><td>16.5</td><td>32.4</td><td>15.8</td><td>13.7</td><td>10.6</td><td>13.7</td><td>7.7</td><td>0.6</td><td>0.5</td><td>0.5</td><td>0.5</td></th<></th1.2<>	LANXESS	DE	28.2	2,431	0.8	0.8	0.8	0.8	7.4	6.8	9.1	6.9	21.2	16.5	32.4	15.8	13.7	10.6	13.7	7.7	0.6	0.5	0.5	0.5
Unicore BE 26.5 6.35 0.3 0.1 0.1 0.7 0.1 0.	Sika	CH	259.7	39,993	3.9	3.9	3.4	3.0	22.0	22.0	18.4	15.3	27.6	27.6	23.4	19.1	46.1	46.1	31.1	25.5	7.8	7.8	6.7	5.7
Wacker Chemic DE 1286 6.389 6.38 6.3 7.3	Umicore	BE	26.5	6,356	0.3	0.3	1.8	1.7	6.7	6.7	7.3	7.2	8.8	8.8	10.4	10.7	14.1	14.1	13.9	14.2	1.8	1.8	1.7	1.6
Median 0.8 0.8 1.1 1.0 6.6 6.6 7.0 6.6 9.9 8.7 10.9 10.3 12.3 12.8 13.8 1.9 1.2 1.6 1.5 1.4 Polymers 11 11 1.3 1.8 8.8 8.5 8.6 7.0 12.3 14.4 11.3 1.4 1.3 1.2 1.2 1.3 1.3 1.2 1.2 1.3 1.3 1.2 1.2 1.3 1.3 1.2 1.2 1.3 1.3 1.2 1.2 1.3 1.3 1.2 1.2 1.3 1.3 1.3 1.2 1.2 1.3 1.3 1.3 1.2 1.3 1.3 1.2 1.3 1.3 1.2 1.2 1.3 1.3 1.2 1.2 1.3 1.3 1.2 1.2 1.3 1.3 1.2 1.3 1.3 1.3 1.2 1.3 1.3 1.3 1.2 1.3 1.3 1.3	Wacker Chemie	DE	128.6	6,389	0.8	0.8	0.9	0.9	3.7	3.1	5.3	5.1	4.9	3.8	8.6	8.1	8.6	6.6	12.9	12.2	1.3	1.3	1.3	1.3
Image: stype s				Median	0.8	0.8	1.1	1.0	6.6	6.6	7.0	6.6	9.9	8.7	10.9	10.3	13.2	12.8	13.8	11.9	1.2	1.6	1.5	1.4
Polymers Covestro DE 47.0 8,931 0.7 0.7 0.7 1.4 7.6 8.8 6.6 91.7 17.3 26.5 13.3 n.a 24.0 54.6 15.7 1.3 1.3 1.2 1.2 Ems- Chemie CH 6963 16.287 6.3 6.3 6.6 3 2.3 2.3 2.5<				Average	1.1	1.1	1.3	1.3	8.8	8.5	8.6	7.6	13.4	12.3	14.4	11.3	17.4	18.0	15.6	13.1	1.9	2.2	1.9	1.8
Covestro DE 47.0 8,93 0.7 0.7 0.7 1.4 7.6 8.8 6.6 91.7 17.3 12.6 13.3 n.a. 24.2 54.6 15.7 1.3 1.3 1.2 1.2 Erns- Chemie CH 696.3 16,287 6.3 6.3 6.6 6.3 24.2 24.2 25.5 25.5 25.5 26.5 24.5 24.3 24.2<	Polymers	5																						
Erns- Chemie CH 6963 16,287 6.3 6.3 6.3 2.3 2.4 2.5 2.4 2.5	Covestro	DE	47.0	8,931	0.7	0.7	0.7	0.7	11.4	7.6	8.8	6.6	91.7	17.3	26.5	13.3	n.a.	24.2	54.6	15.7	1.3	1.3	1.2	1.2
Lyondell- Basell US 8.5 27.641 0.9 0.8 1.0 1.0 6.7 6.1 7.4 6.8 9.3 8.0 1.0. 9.9 9.9 8.5 2.4 2.4 2.5 2.5 Victrex UK 1.67 1.455 3.7 3.7 3.9 3.6 10.6 1.15 10.0 12.5 12.6 12.6 12.0 2.0 17.0 15.0 2.5 2.4 15.5 2.5 <t< td=""><td>Ems- Chemie</td><td>CH</td><td>696.3</td><td>16,287</td><td>6.3</td><td>6.3</td><td>6.6</td><td>6.3</td><td>23.6</td><td>23.6</td><td>24.2</td><td>22.3</td><td>25.5</td><td>25.5</td><td>26.5</td><td>24.5</td><td>42.3</td><td>42.3</td><td>31.2</td><td>29.2</td><td>8.8</td><td>8.8</td><td>8.5</td><td>8.3</td></t<>	Ems- Chemie	CH	696.3	16,287	6.3	6.3	6.6	6.3	23.6	23.6	24.2	22.3	25.5	25.5	26.5	24.5	42.3	42.3	31.2	29.2	8.8	8.8	8.5	8.3
VictoreUK16.71.4.53.73.73.93.63.03.01.0.1.0.1.0.1.2.1.2.1.0. </td <td>Lyondell- Basell Industries</td> <td>US</td> <td>85.0</td> <td>27,641</td> <td>0.9</td> <td>0.8</td> <td>1.0</td> <td>1.0</td> <td>6.7</td> <td>6.1</td> <td>7.4</td> <td>6.8</td> <td>9.3</td> <td>8.0</td> <td>10.4</td> <td>9.2</td> <td>11.6</td> <td>9.9</td> <td>9.9</td> <td>8.5</td> <td>2.4</td> <td>2.4</td> <td>2.2</td> <td>2.0</td>	Lyondell- Basell Industries	US	85.0	27,641	0.9	0.8	1.0	1.0	6.7	6.1	7.4	6.8	9.3	8.0	10.4	9.2	11.6	9.9	9.9	8.5	2.4	2.4	2.2	2.0
Median 2.3 2.4 2.3 1.0 9.1 10.1 8.5 19.0 15.1 20.0 21.0 22.0 24.4 15.5 2.5 3.5	Victrex	UK	16.7	1,455	3.7	3.7	3.9	3.6	10.6	10.7	11.5	10.3	12.5	12.8	14.6	12.9	22.0	20.7	17.6	15.3	2.6	2.5	2.5	2.3
Average 2.9 2.9 2.9 3.1 1.2 1.3 1.5 3.4. 1.5. 1.5. 1.5. 1.5. 2.3 2.3 1.7. 3.7 3.6 3.4 Industrial Gases Air Air 163.3 85.239 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.4 3.4 1.5.9 1.6. 1.5.9 1.5.9 3.3.3 3.3.3 3.4.9 2.8.9 3.6.9 3.3.3 3.4 3.4 3.4 3.4 3.4 3.5.9 2.5.9 3.4.9 3.5.9 3.4.9 3.5.9 3.4.9 3.5.9 3.4.9 3.5.9 3.4.9 3.5.9 3.4.9 3.5.9 <th></th> <th></th> <th></th> <th>Median</th> <th>2.3</th> <th>2.3</th> <th>2.4</th> <th>2.3</th> <th>11.0</th> <th>9.1</th> <th>10.1</th> <th>8.5</th> <th>19.0</th> <th>15.1</th> <th>20.5</th> <th>13.1</th> <th>22.0</th> <th>22.5</th> <th>24.4</th> <th>15.5</th> <th>2.5</th> <th>2.5</th> <th>2.3</th> <th>2.2</th>				Median	2.3	2.3	2.4	2.3	11.0	9.1	10.1	8.5	19.0	15.1	20.5	13.1	22.0	22.5	24.4	15.5	2.5	2.5	2.3	2.2
Industrial Gases Air Liquide FR 163.3 85,239 3.3 3.3 3.3 3.4 3.9 13.9 13.9 13.9 13.9 13.9 13.9 13.9 13.9 13.9 13.9 21.2 18.9 17.5 33.3 3.3.3 24.9 22.8 3.6 3.6 3.7 Linde UK 347.0 169,890 6.0 6.0 5.6 17.2 17.7 16.8 15.9 21.4 23.2 21.4 43.4 46.5 27.4 21.0 4.1 4.1 4.1 3.9 3.8 Median 4.6 4.6 4.6 4.6 15.8 14.7 13.8 24.3 25.2 10.8 13.9 24.8 39.9 26.1 24.0 4.1 4.9 3.8 Diversified Median 0.7 0.7 0.7 0.7 9.5 9.6 6.7 5.9 24.5 25.1 12.2 10.0 38.3 42.1 10.4 8.9 10.1 10.0 10.1 10.0 10.1 10.0 10.1				Average	2.9	2.9	3.1	2.9	13.1	12.0	13.0	11.5	34.8	15.9	19.5	15.0	25.3	24.3	28.3	17.2	3.7	3.7	3.6	3.4
Air Liquide FR 163.3 85,239 3.3 3.3 3.2 3.3 1.3 1.3 1.3 1.3 1.2 1.1 1.2 1.2 1.2 1.2 1.2 1.2 1.3 <th1.3< th=""> 1.3 1.3<!--</td--><td>Industria</td><td>l Gases</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th1.3<>	Industria	l Gases																						
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Median 4.6<	Linde	UK	347.0	169,890	6.0	6.0	5.9	5.6	17.2	17.7	16.8	15.9	27.4	29.3	22.8	21.4	43.4	46.5	27.4	25.2	4.6	4.7	4.5	4.4
Average 4.6 4.6 4.6 4.4 15.6 15.8 14.7 13.8 24.3 25.2 20.8 19.5 38.3 39.9 26.1 24.0 4.1 4.1 3.9 3.8 Diversified BASF DE 44.7 39.942 0.7 0.7 0.7 0.7 9.5 9.6 6.7 5.9 24.5 25.1 12.2 10.0 38.3 42.1 10.4 8.9 1.0 1.0 1.0 1.0 Solvay ¹⁰ BE 101.5 10.527 0.8 0.8 0.9 3.5 3.7 4.1 4.2 4.8 5.0 6.0 6.1 6.9 7.3 7.4 7.9 1.2 1.2 1.0 0.9 Solvay ¹⁰ BE 101.5 10.577 0.8 0.8 6.5 6.6 5.4 5.0 14.6 15.0 9.1 8.1 2.6 24.7 8.9 8.4 1.1 1.1 1.0 0.9 Chemical Distribution Bernntag DE 7.08 10.7 7.7				Median	4.6	4.6	4.6	4.4	15.6	15.8	14.7	13.8	24.3	25.2	20.8	19.5	38.3	39.9	26.1	24.0	4.1	4.1	3.9	3.8
BASF DE 44.7 39,942 0.7 0.7 0.7 0.7 9.5 9.6 6.7 5.9 24.5 25.1 12.2 10.0 38.3 42.1 10.4 8.9 1.0 1.0 1.0 1.0 Solvay ¹⁰ BE 101.5 10,527 0.8 0.8 0.9 0.9 3.5 3.7 4.1 4.2 4.8 5.0 6.0 6.1 6.9 7.3 7.4 7.9 1.2 1.2 1.0 0.9 Median 0.7 0.7 0.8 0.8 6.5 6.6 5.4 5.0 14.6 15.0 9.1 8.1 22.6 24.7 8.9 8.4 1.1 1.1 1.0 0.9 Chemical Distribution Median 0.7 0.7 0.8 6.6 5.4 5.0 14.6 15.0 9.1 8.1 2.6 24.7 8.9 8.4 1.1 1.1 1.0 0.9 Chemical Distribution Median 10.7 0.7 0.7 7.8 7.7 8.0 7.6 9.	Diversifi	ed		Average	4.6	4.6	4.6	4.4	15.6	15.8	14.7	13.8	24.3	25.2	20.8	19.5	38.3	39.9	26.1	24.0	4.1	4.1	3.9	3.8
Solvay ¹⁰ BE 101.5 10,527 0.8 0.8 0.9 0.9 3.5 3.7 4.1 4.2 4.8 5.0 6.0 6.1 6.9 7.3 7.4 7.9 1.2 1.2 1.0 0.9 Solvay ¹⁰ BE 101.5 10,527 0.8 0.8 0.9 0.9 3.5 3.7 4.1 4.2 4.8 5.0 6.0 6.1 6.9 7.3 7.4 7.9 1.2 1.2 1.0 0.9 Median 0.7 0.7 0.8 0.8 6.5 6.6 5.4 5.0 14.6 15.0 9.1 8.1 22.6 24.7 8.9 8.4 1.1 1.1 1.0 0.9 Chemical Distribution Median 0.7 0.7 0.8 6.6 5.4 5.0 14.6 15.0 9.1 8.1 2.16 2.3 2.5 2.3 2.2 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 <th2.1< th=""> 2.0 2.1<td>BASE</td><td>DF</td><td>44.7</td><td>39.942</td><td>0.7</td><td>0.7</td><td>0.7</td><td>0.7</td><td>9.5</td><td>9.6</td><td>6.7</td><td>5.9</td><td>24.5</td><td>25.1</td><td>12.2</td><td>10.0</td><td>38.3</td><td>42.1</td><td>10.4</td><td>8.9</td><td>1.0</td><td>1.0</td><td>1.0</td><td>1.0</td></th2.1<>	BASE	DF	44.7	39.942	0.7	0.7	0.7	0.7	9.5	9.6	6.7	5.9	24.5	25.1	12.2	10.0	38.3	42.1	10.4	8.9	1.0	1.0	1.0	1.0
Median 0.7 0.7 0.8 0.8 0.5 0.6 5.6 5.4 5.0 14.6 15.0 9.1 8.1 22.6 24.7 8.9 8.4 1.1 1.1 1.0 0.9 Average 0.7 0.7 0.8 0.8 6.5 6.6 5.4 5.0 14.6 15.0 9.1 8.1 22.6 24.7 8.9 8.4 1.1 1.1 1.0 0.9 Chemical Distribution DE 70.8 10.914 0.7 0.7 0.8 0.8 6.5 6.6 5.4 5.0 14.6 15.0 9.1 8.1 22.6 24.7 8.9 8.4 1.1 1.1 1.0 0.9 Chemical Distribution DE 70.8 0.7 0.7 7.8 7.7 8.0 7.6 9.9 9.6 10.2 9.8 15.1 14.6 12.8 11.9 2.5 2.3 2.2 2.0 10.9 10.1 11.9 12.5 12.6 10.2 9.8 15.1 14.6 12.8 11.9 2.5<	Solvav ¹⁰	BE	101 5	10.527	0.8	0.8	0.9	0.9	3.5	3.7	41	4.2	4.8	5.0	6.0	61	6.9	73	74	79	1.2	1.2	1.0	0.9
Average 0.7 0.7 0.8 0.8 6.6 5.4 5.0 14.6 15.0 9.1 8.1 22.6 24.7 8.9 8.4 1.1 1.1 1.0 0.9 Chemical Distribution DE 70.8 10,914 0.7 0.7 0.7 0.7 7.8 7.7 8.0 7.6 9.9 9.6 10.2 9.8 15.1 14.6 12.8 11.9 2.5 2.3 2.2 2.0 IMCD NL 130.9 7,444 1.8 1.8 1.7 14.5 14.5 14.5 13.9 17.7 16.6 16.3 26.7 26.7 20.1 19.1 4.5 4.5 4.1 3.6 IMCD NL 130.9 7,444 1.8 1.8 1.7 14.5 14.5 14.5 13.9 17.7 17.7 16.6 16.3 26.7 20.1 19.1 4.5 4.5 4.1 3.6 Median 1.3 1.3 1.2 1.2 11.1 11.2 10.8 13.8 13.7 13.4<				Median	0.7	0.7	0.8	0.8	6.5	6.6	5.4	5.0	14.6	15.0	9.1	8.1	22.6	24.7	8.9	8.4	1.1	1.1	1.0	0.9
Chemical Distribution Brenntag DE 70.8 10,914 0.7 0.7 0.7 0.7 7.8 7.7 8.0 7.6 9.9 9.6 10.2 9.8 15.1 14.6 12.8 11.9 2.5 2.3 2.2 2.0 IMCD NL 130.9 7.444 1.8 1.8 1.7 14.5 14.5 13.9 17.7 17.7 16.6 16.3 26.7 20.1 19.1 4.5 4.5 4.6 13.6 MCD NL 130.9 7.444 1.8 1.8 1.7 14.5 14.5 14.5 13.9 17.7 17.7 16.6 16.3 26.7 20.1 19.1 4.5 4.1 3.6 MCD NL 130.9 7.444 1.8 1.8 1.7 14.5 14.5 14.5 13.8 13.7 13.4 13.0 20.9 20.6 16.4 15.5 3.5 3.4 3.1 2.8 2.8 2.6 2.1 2.9 5.6 7.6 9.0 7.1 12.5				Average	0.7	0.7	0.8	0.8	6.5	6.6	5.4	5.0	14.6	15.0	9.1	8.1	22.6	24.7	8.9	8.4	1.1	1.1	1.0	0.9
Brenntag DE 70.8 10,914 0.7 0.7 0.7 0.7 7.8 7.7 8.0 7.6 9.9 9.6 10.2 9.8 15.1 14.6 12.8 11.9 2.5 2.3 2.2 2.0 IMCD NL 130.9 7.444 1.8 1.8 1.7 14.5 14.5 14.5 13.9 17.7 17.7 16.6 16.3 26.7 20.1 19.1 4.5 4.5 4.1 3.6 Median 1.3 1.3 1.2 1.2 11.2 11.4 11.2 10.8 13.8 13.7 13.4 13.0 20.9 20.6 16.4 15.5 3.5 3.4 3.1 2.8 Median 1.3 1.3 1.2 1.2 11.1 11.2 10.8 13.8 13.7 13.4 13.0 20.9 20.6 16.4 15.5 3.5 3.4 3.1 2.8 Metian 0.9 0.8 1.2 1.2 10.1 11.2 10.8 13.8 13.7 13.4 13.0	Chemica	l Distributio	on																					
IMCD NL 130.9 7,444 1.8 1.8 1.8 1.7 14.5 14.5 14.5 13.9 17.7 17.7 16.6 16.3 26.7 20.1 19.1 4.5 4.1 3.6 Median 1.3 1.3 1.2 1.2 11.1 11.2 10.8 13.8 13.7 13.4 13.0 20.9 20.6 16.4 15.5 3.5 3.4 3.1 2.8 Median 0.9 0.8 1.2 1.2 11.1 11.2 10.8 13.8 13.7 13.4 13.0 20.9 20.6 16.4 15.5 3.5 3.4 3.1 2.8 Memory 1.3 1.3 1.2 1.2 11.1 11.2 10.8 13.8 13.7 13.4 13.0 20.9 20.6 16.4 15.5 3.5 3.4 3.1 2.8 Chemical Sector Median 0.9 0.8 1.2 1.2 9.0 7.6 9.0 7.1 12.5 12.6 14.2 11.8 17.8 17.6 <th< td=""><td>Brenntag</td><td>DE</td><td>70.8</td><td>10,914</td><td>0.7</td><td>0.7</td><td>0.7</td><td>0.7</td><td>7.8</td><td>7.7</td><td>8.0</td><td>7.6</td><td>9.9</td><td>9.6</td><td>10.2</td><td>9.8</td><td>15.1</td><td>14.6</td><td>12.8</td><td>11.9</td><td>2.5</td><td>2.3</td><td>2.2</td><td>2.0</td></th<>	Brenntag	DE	70.8	10,914	0.7	0.7	0.7	0.7	7.8	7.7	8.0	7.6	9.9	9.6	10.2	9.8	15.1	14.6	12.8	11.9	2.5	2.3	2.2	2.0
Median 1.3 1.3 1.2 1.2 1.1 11.2 10.8 13.8 13.7 13.4 13.0 20.9 20.6 16.4 15.5 3.5 3.4 3.1 2.8 Average 1.3 1.3 1.2 1.2 11.2 11.1 11.2 10.8 13.8 13.7 13.4 13.0 20.9 20.6 16.4 15.5 3.5 3.4 3.1 2.8 Median 0.9 0.8 1.2 1.2 11.2 11.1 11.2 10.8 13.8 13.7 13.4 13.0 20.9 20.6 16.4 15.5 3.5 3.4 3.1 2.8 Chemical Sector Median 0.9 0.8 1.2 1.2 9.0 7.6 9.0 7.1 12.5 12.6 14.2 11.8 17.6 17.0 13.3 2.0 2.2 2.0 Average 2.0 2.0 2.1 2.0 10.8 10.1 10.5 </td <td>IMCD</td> <td>NL</td> <td>130.9</td> <td>7,444</td> <td>1.8</td> <td>1.8</td> <td>1.8</td> <td>1.7</td> <td>14.5</td> <td>14.5</td> <td>14.5</td> <td>13.9</td> <td>17.7</td> <td>17.7</td> <td>16.6</td> <td>16.3</td> <td>26.7</td> <td>26.7</td> <td>20.1</td> <td>19.1</td> <td>4.5</td> <td>4.5</td> <td>4.1</td> <td>3.6</td>	IMCD	NL	130.9	7,444	1.8	1.8	1.8	1.7	14.5	14.5	14.5	13.9	17.7	17.7	16.6	16.3	26.7	26.7	20.1	19.1	4.5	4.5	4.1	3.6
Average 1.3 1.3 1.2 1.2 1.1 11.2 10.8 13.8 13.7 13.4 13.0 20.9 20.6 16.4 15.5 3.5 3.4 3.1 2.8 Chemical Sector Median 0.9 0.8 1.2 1.2 1.0 10.5 9.0 7.1 12.5 12.6 14.2 11.8 17.6 17.0 13.3 2.0 2.2 2.0 Average 2.0 2.0 2.1 2.0 10.8 10.1 10.5 9.4 18.0 14.6 15.6 13.5 23.3 22.5 19.8 15.6 2.7 2.8 2.6 2.5				Median	1.3	1.3	1.2	1.2	11.2	11.1	11.2	10.8	13.8	13.7	13.4	13.0	20.9	20.6	16.4	15.5	3.5	3.4	3.1	2.8
Chemical Sector Average 2.0 2.0 2.1 2.0 10.8 10.1 10.5 9.4 18.0 14.6 15.6 13.5 23.3 22.5 19.8 15.6 2.7 2.8 2.6 2.5				Average	1.3	1.3	1.2	1.2	11.2	11.1	11.2	10.8	13.8	13.7	13.4	13.0	20.9	20.6	16.4	15.5	3.5	3.4	3.1	2.8
	Chemica	l Sector		Average	2.0	2.0	2.1	2.0	9.6	7.6	9.0	7.1 9.4	12.5	14.6	14.2	13.5	23.3	22.5	17.0	15.6	2.0	2.2	2.2	2.0

Sources: S&P Capital IQ, Deloitte analysis; priced as of July 4, 2023.



Fig. 3 – EV/EBITDA, 2023e



Fig. 4 - P/E, 2023e

Sources: S&P Capital IQ, Deloitte analysis.

Tab. 2 – Chemicals M&A Activity (Selected Transactions)

Strategic Buyer Median Strategic Buyer 13.1x 📕 Financial Buyer Median Financial Buyer 7.0x

	Date	EV (\$m)	Target Company	Country	Bidder Company		EV/EBITD	A (rep <u>or</u> te <u>d</u>)
2023	Jun-23	6,926	JSR Corp		JIC Capital Ltd			28.9x
	Jun-23	766	Flex Composite Group SA		Compagnie Gene- rale des Etablisse- ments Michelin SA	3.5x		
	Jun-23	14,159	Braskem SA	6	Unipar Carbocloro SA	4.5x		
	May-23	2,936	RHI Magnesita NV (29.99% Stake)		Rhone Capital LLC	5.7x		
	Apr-23	3,014	Vilmorin & Cie SA		Groupe Limagrain		21.8x	
	Apr-23	1,209	Blackmores Limited	۲	Kirin Holdings Company, Ltd.		22.8	• • • • • • • • • • • • • • • • • • •
	Mar-23 54,431		Rongsheng Petro Chemical Co., Ltd.	۲	Saudi Arabian Oil Co; Aramco Overseas Company B.V.	.5x	edian: 14 ledian: 5.	
	Mar-23 8,170		Univar Solutions Inc	١	Apollo Global Management Inc; Abu Dhabi Invest- ment Authority	7.8x		<u></u> ≥ ≥
	Feb-23	957	Ciech Group SA	$\overline{}$	Kulczyk Investments SA	5.9x		
	Feb-23	975	Fuso Chemical Co Ltd.		Kunpusha Co Ltd	5.7x		
	Feb-23	545	Thai Central Chemical Pub- lic Company Limited	•	Sojitz Corporation; ISTS (Thailand) Co Ltd		14.4x	
	Feb-23	1,812	Halcyon Agri Corporation Limited		China Hainan Rubber Industry Group Co., Ltd.			29.5x
	Dec-22	11,180	OMV AG	•	Abu Dhabi National Oil Company	0.7x		TT
	Dec-22	13,264	Chr. Hansen Holding A/S		Novozymes A/S			30.1x
	Nov-22	1,905	Anhui Jiangnan Chemical Industry Co., Ltd.	۲	Zijin Mining Zinan (Xiamen) Investment Partnership	6.3x		
	Nov-22	3,530	Zibo Qixiang Tengda Chemical Co., Ltd.	*	Shandong Energy Group New Material Company Limited	8.9x		
	Oct-22	1,348	Qurain Petrochemicals Industries Company	C	Al Futtooh Holding Company KSC	9.9x		×0.
22	Sep-22	9,873	Polski Koncern Naftowy Orlen SA-PKN	$\overline{}$	PKO Bank Polski SA	1.8x		an: 11 . ian: 9.
20	Sep-22	1,075	Central Glass Co. Ltd.		Central Glass Co. Ltd.		17.1x	Medi Med
	Sep-22	713	SK Chemicals Co., Ltd.		SK Discovery Co Ltd	1.5x		
	Jul-22	1,542	Meridian Bioscience Inc		SJL Partners; SD Biosensor, Inc.		15.1x	
	Jun-22	2,142	Robertet SA		Robertet SA		16.2x	
	Jun-22	1,858	PI Advanced Materials Co Ltd		BPEA EQT Ltd		24.	3x
	Jun-22	3,899	Grupa LOTOS SA	$\overline{}$	Polski Koncern Naf- towy Orlen SA-PKN	2.4x		
	Apr-22	1,485	Royal DSM N.V (Protective Materials business)		Avient Corp	13	3.1x	

Note: Selected transactions with target company's enterprise value over \$500 million. Sources: Mergermarket, Deloitte analysis.

Sustainability update – Pathways to decarbonization

The chemical industry involves a variety of production processes that emit carbon dioxide and other GHGs. Some of the most common sources of carbon emissions are the use of fossil fuels and feedstocks. Others include process-related carbon emissions and end-of-life emissions from downstream products. In contrast to other hard-to-abate (HTA) sectors, there is no straightforward, uniform set-up in place to diminish these emissions. Instead, chemical companies must apply different sets of technological measures depending on their region and type of chemical activity.

Pathways to decarbonization for the chemical sector

The following perspectives on decarbonization aim to provide a starting point towards net-zero in the chemical industry:

- Increasing overall operational efficiency is a long-standing endeavor and should continue to contribute to GHG reduction.
- Switching to low-carbon electricity is one option for replacing high-carbon electric consumption, subject to the availability of sufficient green electricity supply.
- Bio-based feedstocks and the use of hydrogen are not new to the industry.

However, scale, application alignment, and penetration may reach new levels, and resource availability may therefore be the critical issue.

- Carbon capture, utilization, and storage (CCS) technology is being implemented at varying speeds, depending on the region and the level of discussions on suitable storage locations and costs. CCS is also being considered as a bridging technology to help reduce CO₂ output in the near- to mid-term, while carbon capture and utilization (CCU) and other technologies advance.
- Advanced electrification still faces limitations due to a lack of technological maturity, but is nevertheless the subject of major ongoing effort (e.g., electrification of team crackers).
- Circularity has a pronounced impact on end-of-life emissions and is being strongly pushed by many customers and legislators alike. Ongoing progress in collection and advanced recycling is beginning to help drive its expansion.

Key drivers of transformation for the chemical sector

The availability of green electricity and green hydrogen may be crucial for the sector, but supplies could be limited until 2040, and there could be competing demand for green electricity from other sectors. Sustainable supply may remain a critical issue for years to come, potentially impacting the industry. Supplies of renewable and bio-based feedstocks are also limited and, at this stage, cannot entirely replace raw materials. To close this gap, the chemical industry would be well-served to find ways to share development costs, foster more coordinated and sustained investment flows, and advocate for supportive policy moves that can catalyze early-stage technology development or create the regulatory or market incentives needed to accelerate progress.

As the industry moves forward, chemical companies should take strides to create frameworks for proper CO₂ footprint reporting, develop a clear net-zero strategy, and forge relationships that allow for co-innovation. These steps, and others, should allow companies to increase their ESG ratings, which may positively impact company value and ease access to capital markets.

Watch out for our dedicated study on E&C pathways to decarbonization that will be published in fall 2023.

The chemical industry is uniquely positioned to play a key role in driving knowledge, innovation, and demand related to sustainability across all industries, and to offer new sustainabilityenabling processes, products, and services to its customers.

Economy update – Modest but fragile recovery

According to the Organization for Economic Cooperation and Development (OECD), the Eurozone's GDP grew by 0.1% in the first quarter of 2023 compared to the previous quarter. Among the major Eurozone economies, Spain (preliminary) and Italy both expanded by 0.5%, France by 0.2%, while Germany stagnated.¹⁰ All in all, it would be safe to say that the Eurozone economy stagnated.

Corporate sentiment shows signs of recovery

The industrial sector suffers from weak orders and abating international demand. For example, new orders from the German manufacturing sector collapsed by more than 10% in March,¹¹ the highest drop since the first months of the COVID-19 pandemic. This is especially worrying as the high backlog witnessed during the peak of COVID-19 has largely disappeared. As a result, the purchasing manager index (PMI) for the industrial sector in the Eurozone contracted. The PMI for the services sector, on the other hand, is in solidly expansionary territory, indicating an acceleration of the sector at a strong pace.¹²

Inflation and monetary policy: Game not over yet

The rate-hike cycle in the Eurozone started last July 2022, and since then, the European Central Bank (ECB) has raised interest rates nine times – the last time in August to 4.25% for its main refinancing operations.¹³ Headline inflation has been receding from its peak of 10.6% in October and stood at 7% in April.¹⁴ The highest inflation, even if it is receding, is still to be found in the Baltic states (rates of 15% and higher), with wage costs being one key driver. Countries such as Belgium and Spain have inflation rates between 3% and 4%. Inflation in other big Eurozone economies is hovering in between these two extremes – 6.9% for France, 7.6% for Germany, and 8.8% for Italy.

The rate-hike cycle is unlikely to be over, as underlying inflation dynamics are still strong. Core inflation (that is, headline inflation without food and energy), which is the key indicator of the spread of inflation across the economy, hardly shows signs of ebbing. In fact, it has been rising constantly. At 5.6% in April, it is only marginally lower than its peak the month before. As long as core inflation is not under control, the ECB's fight against inflation is not over. With inflationary pressures not showing signs of abating, European companies expect inflation to remain at a high level for the near future. According to the recent Deloitte European CFO Survey, chief financial officers (CFOs) predict an inflation rate of 6.3% for the Euro area over the next 12 months. Inflation is also driving up the financing costs of companies: 70% of CFOs rate the present cost of credit as either fairly costly (55%) or very costly (15%).15

Outlook

The latest and relatively optimistic forecasts from the European Commission for the Eurozone assume a growth rate of 1% for 2023 and an inflation rate of almost 6%, with wide differences between countries.¹⁶ This tenuous growth prospects confirm that the postpandemic recovery was derailed by a series of new crises in 2022 and 2023. Whether or not the recovery continues hinges crucially on three factors: The first is foreign demand, which will depend particularly on the economic growth in the United States and China. The second factor is the trajectory of inflation from this point onward and its effects on real income. The third factor is how rising interest rates impact corporates. Should the fight against inflation, especially core inflation, bear fruit in the near term, we could see rising real incomes and an expansion of private consumption and the economy. It would also make lower interest rates and, therefore, lower credit costs in the medium term much more likely, which will have positive effects on corporate investments. However, if the fight against inflation continues, the predicted current growth forecasts seem to represent the highest level of economic growth achievable in 2023.

Regular economic updates are provided at Deloitte Insights.

¹¹ ECB, "Key ECB interest rates", accessed on August 24, 2023.

¹⁰ Organization for Economic Cooperation and Development (OECD), "GDP growth—First quarter of 2023, OECD", May 23, 2023.

¹² Destatis, "Index of new orders in manufacturing", accessed on June 10, 2023.

¹³ S&P Global Eurozone Composite PMI®, "Eurozone economy expands at strongest pace since May 2022", press release, April 5, 2023.

¹⁴ Eurostat, "Euro area annual inflation up to 7.0%", May 2, 2023.

¹⁵ Carravilla, Jose M. D.; Epstein, Rolf; Muschamp, Richard; Sandqvist, Pauliina, "Room to breathe, room to think; Europe's CFOs seem to have overcome the crisis mode", Deloitte Insights, May 23, 2023.

¹⁶ European Commission, "Spring 2023 economic forecast: An improved outlook amid persistent challenges," press release, May 15, 2023.

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