

# Germany's chemical spring

The country is having its own chemical renaissance with new production capacities ready to come on line. Basic chemicals are leading the way

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After a challenging 2009, the financial results of German chemical companies are putting people in a party mood once again, even though the fall of Europe's share in the global chemical market is still cause for concern.

Plant investment in Germany is on the upswing, signalling an increase in global competitiveness, with basic chemicals leading the way.

From the nuclear catastrophe in Fukushima, Japan, on 11 March 2011, to the Arab Spring in north Africa and the Arabian Peninsula, or the ongoing sovereign debt crisis in the eurozone, these events and the subsequent

imbalances present huge challenges for the globally active chemical industry.

Only because of their historical export strength and high productivity have chemical companies in Germany been able to recover from the 2009 crash. The 17% fall in sales from 2008 to 2009 was almost balanced out within one year, with a 16% rise in 2010, according to the German Chemical Industry Association (VCI). A mere three years after the crisis, nearly all chemical companies are showing sales growth and operating margins in the double digits.

Aside from these positive developments in Germany's chemical sector, the balance of power in the global industry has changed. After double-figure growth rates in the past decade,

the chemical industry in China – with revenue of €735bn (\$954bn) – was the biggest global market in 2011, followed by the US at €409bn, Japan at €175bn and Germany at €156bn.

The European Chemical Industry Council (Cefic) reported that Germany accounted for 29% of the €539bn in sales in the total European market in 2011, maintaining the lion's share. But Europe's share of the global market has dropped from 36% to 20% in the past two decades. Similar decreases have been registered from other chemical market determining industrial countries such as US and Japan, which are primarily down to the increased production capacities in the developing markets.

**THE DRAGON'S SHARE**

China produces almost half of the world's chemicals. The growing prosperity of the middle class in China and India – two countries that constitute a third of the world's population – has driven dramatically increased demand. In spite of climbing labour costs and political influence, especially in China, even Western companies were unable to resist this attractive market and invested heavily in modern production facilities in the hope of achieving high profits.

Along with new production capacities in growing markets, new large-scale plants are being built in regions with high proven reserves of oil and gas, especially the Arabian peninsula. An estimated cost advantage of \$350/tonne shows why these regions are also becoming main producers of basic organic chemicals such as polyethylene (PE), polypropylene (PP) and ethylene glycol (EG).

**STEADY BASICS**

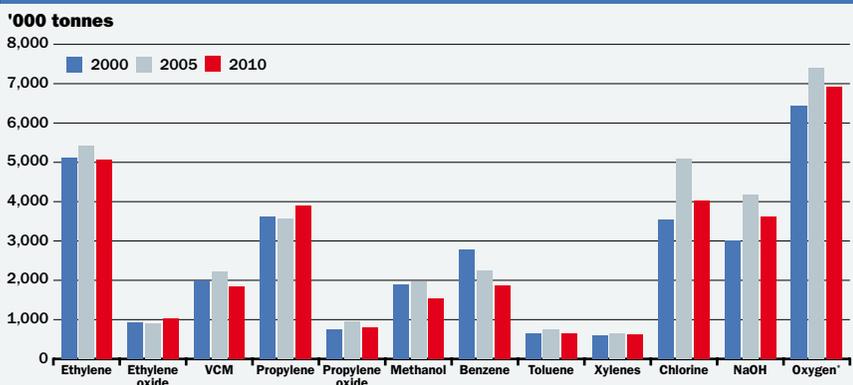
The VCI said that Germany handled some 19m tonnes of fossil fuels, 2.7m tonnes of renewable feedstocks and around 20m tonnes of minerals in 2011. Production volumes of basic chemicals from 2000–2010 remained steady, and slightly declined for some chemicals. Meanwhile, the newly built facilities in the emerging regions came on a huge scale and also supplied some of the developed

**GERMAN CHEMICAL COMPANY FIGURES 2012**

	Sales, €m	Change	Op margin, %	Net profit, €m	Change
<b>BASF</b>	78,729	7%	11	5,222	-21%
<b>Bayer</b>	39,760	9%	10	2,446	-1%
<b>Henkel</b>	16,510	6%	14	1,510	30%
<b>Evonik</b>	13,629	-6%	14	1,164	15%
<b>Merck</b>	11,173	9%	9	567	-8%
<b>LANXESS</b>	9,094	23%	9	515	2%
<b>Wacker</b>	4,635	-6%	6	107	-70%
<b>Altana</b>	1,705	6%	13	155	5%

SOURCE: Companies, Germany Trade & Invest

**PRODUCTION VOLUMES OF BASIC CHEMICALS IN GERMANY**



SOURCE: Germany's Federal Department of Statistics

NOTE: \*Millions of cubic metres under normal conditions

economies. Thus, we can deduce why in 2010 more basic chemicals were consumed in Germany than produced.

**PRODUCTION CATALYST**

However, since 2009 in Germany, companies have planned to increase capacities in the basic chemicals segment just as much as in the high performance plastics, specialty chemicals and final product segments.

Around a third of the investments are in basic chemicals, and mainly in new plants. Alongside the 220,000 tonne/year increase in capacity at the Brunsbüttel site toluene-2,4-diisocyanate plants in Dormagen and Ludwigshafen with capacities of 300,000 tonnes/year are being built.

Plus, a series of investments were made in much needed precursors. In Dormagen, a new steam reformer is being built at a cost of €100m. In Ludwigshafen, there is an increase in production of nitric acid, chlorine, syngas and hydrogen, and the construction of a new hydrochloric acid recycling plant.

There are also two significant investments in chloro-alkali electrolysis. Thus the existing plant in Hoechst is being changed over to the most modern membrane technology and seeing its capacity increase by 50% at the same time.

In Leuna, a new facility with production of 15,000 tonnes/year of chlorine started up in July 2012. Further noteworthy investments include the new 150,000 tonne/year formaldehyde plant in Krefeld-Uerdingen and the 320,000 tonne/year high density PE (HDPE) plant in Munchmunster.

Expansions are taking priority in specialty chemicals where the investment volume per tonne of production capacity is relatively high on account of the technologically advanced and challenging processes. The capacity increase of

the 1-Butene facility in Marl and the vinylformamide (VFA) activities in Ludwigshafen both require over €100m of capital. The polyvinyl alcohol (PVA) plant in Hoechst will cost around €60m, and the solution styrene butadiene rubber (S-SBR) facility in Schkopau around €90m.

The niche segment of high performance plastics constitutes the smallest group, and expansion is also the main theme here. The polyamide 6 activities in Leuna and Ludwigshafen are noteworthy, as is the investment tied into polyvinylidene fluoride plastics of over €60m in Gendorf.

Most investments in the final product sector are in the form of capacity increases. From a chemical point of view, these products are at the end of the chemical value chain, generally are sold to industrial consumers and are branded.

In this sector you find many functionalised C4 molecules, flame retardant materials, or catalysts such as methane sulfonic acid. On top of those there are also investments in new and innovative products such as carbon nanotubes, special membranes for water treatment, and biodegradable plastics.

**STEELED FOR COMPETITION**

The figures provided here are concerned only with investments already made public. They clearly show that the economic resurgence since 2009 has led to rapidly increasing investment activity in several chemical industry segments in Germany. Much of the investment is taking place in basic chemicals, against popular opinion. The main drive for these investments is ensuring the global competitiveness of the respective facilities, which is why so many of the investments involve bringing the technology up to date. Equally, the attractiveness of the market

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defies the supposedly high energy costs, which can be deduced from the not insignificant amounts invested in chloro-alkali electrolysis.

The investment in the other three sectors has common features, in that it is usually for a complicated process which requires highly-qualified workers from a variety of specialist areas. These are also often processes which hold potential for increase of process yield and increased efficiency, or are of a more innovative and commercially sensitive nature.

Due to the competitive global environment, there will also be further movement of production capacities with sensitive cost structures away from industrial regions. Because of its specific strengths, particularly in innovation, productivity and resource efficiency, Germany, alongside the US and Japan, will remain an attractive production location for the chemical industry. ■



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Investments in sites such as Ludwigshafen include new plants, as well as capacity expansions to existing facilities

GERMANY CHEMICAL INVESTMENTS, CAPACITY IN TONNES/YEAR					
Start-up	Company	Location	Chemical	New capacity or expansion (+)	Investment
2015	Evonik	Marl	1- butene	+ 75,000 up to global capacity of 310,000	€100m+
End 2014	BASF	Ludwigshafen	Toluene di-isocyanate (TDI)	300,000	€1bn
End 2014	BASF	Ludwigshafen	Vinylformamide (VFA)	Capacity expansion	€100m+
Mid 2014	Bayer MaterialScience	Dormagen	Toluene di-isocyanate (TDI)	300,000	€150m
2014	Bayer MaterialScience	Brunsbüttel	methyl di-p-phenylene isocyanate (MDI)	+ 220,000 to 420,000	€120m
2014	Air Liquide	Dormagen	Steamreformer to produce crack gas from natural gas	120,000 CO and 22,000 H2	€100m
2014	Hi-Bis	Bitterfeld	1,1-Bis-(4-hydroxyphenyl)-3,3,5-trimethylcyclohexane, Bisphenol-TMC, Raw material for Apec from Bayer MaterialScience	+ 5,000 to 10,000	€50m
End 2013	AkzoNobel	Höchst	Chlor-alkali electrolysis	+ 165,000 to 250,000 chlorine and 275,000 sodium hydroxide	€140m
Autumn 2013	Bayer MaterialScience	Leverkusen	1,6-Hexamethylene diisocyanate (HDI) and isophorone diisocyanate (IPDI)	Capacity expansion	€35m
H2 2013	Evonik	Marl	Diisononyl cyclohexane-1,2-dicarboxylate	40,000	€10m+
Oct 2013	BASF	Ludwigshafen	Neopor expandable polystyrene (EPS)	+ 60,000 to 150,000	NA
Mid 2013	LANXESS	Leverkusen	Cresols	+ 20%	€20m
Mid 2013	Evonik	Marl	Liquid hydroxyl terminated polybutadiene (HTBP)	+ 10,000 to 22,000	€50m+
May 2013	Radici	Zeitz	Hexanedioic acid	+ 16,000 to 107,000	€18m
2013	LyondellBasell	Wesseling	Butadiene (BD)	+ 40% to 240,000	NA
2013	LANXESS	Dormagen	Ethylene vinyl acetate (EVA) copolymers	+ 30% to 15,000	NA
2013	DOMO	Leuna	Polyamide 6	50,000	€30m
2013	Kuraray	Höchst	Polyvinyl alcohol (PVA)	+ 24,000 to 94,000	€58m
Dec 2012	BASF	Ludwigshafen	Polyamide 6	+ 21,000	NA
Dec 2012	BASF	Ludwigshafen	Crystalline salt of hexanedioic acid and hexane-1,6-diamine	24,000	NA
Dec 2012	Styron	Schkopau	Solution styrene butadiene rubber (S-SBR)	+ 50,000 to 160,000	€91m
Oct 2012	Clariant	Hürth	Diethyl phosphinic acid aluminate salts (DEPAL)	Doubling of capacity	Swiss francs, tens of millions
Oct 2012	Vinnolit	Burghausen	PVC paste	+ 9,000 to 100,000	€9m
Sep 2012	BASF	Ludwigshafen	Methane sulfonic acid	+ 10,000 to 30,000	NA
Aug 2012	Clariant	Straubing	Cellulosic ethanol	1,000	€28m
Jul 2012	LEUNA-Harze	Leuna	Chlor-alkali, epichlorohydrin (ECH)	15,000 chlorine	€70m
Jul 2012	Sasol	Brunsbüttel	Triethylaluminium (TEA)	6,000	NA
Apr 2012	LANXESS	Krefeld-Uerdingen	Formalin	150,000	€18m
Apr 2012	Wacker	Nünchritz	Polycrystalline silica	15,000	NA
Mar 2012	Dyneon Fluoropolymers	Gendorf	Fluoropolymers	NA	€60m
Sep 2011	IAB	Bitterfeld	Water treatment membranes	NA	€30m
Mid 2011	OXEA	Oberhausen	Neopentyl glycol	Expansion to 45,000	NA
Feb 2011	BASF	Ludwigshafen	Ecoflex and Ecovio biopolymers	Ecoflex + 14,000 to 74,000	NA
Aug 2010	LyondellBasell	Münchmünster	High density polyethylene (HDPE)	320,000	NA
Jun 2010	BASF	Ludwigshafen	Low molecular weight polyisobutene (PIB)	+ 25,000 to 40,000	NA
Jan 2010	BASF	Ludwigshafen	Syngas	Expansion to around 1.4bn m3	Slightly < €100m
Jan 2010	Bayer MaterialScience	Leverkusen	Pilot project for carbon nanotubes	200	€22m
Oct 2009	Evonik	Marl	2-Propylheptan-1-ol (2-HP)	60,000	Slightly < €100m

SOURCE: Germany Trade &amp; Invest