

Chemical Parks: Industry Landscaping à la Germany

Chemical parks are synergistic environments for the companies located there — thanks to integration of infrastructure and shared resources and distribution networks. In Europe, Germany's central location and unique geography have contributed to the success of the chemical park concept.

An offshoot of globalization and the subsequent company and industry restructuring has been the emergence of chemical parks — a business model that brings together raw material suppliers, chemical manufacturers, intermediates and specialty-chemicals producers, infrastructure and service providers, and other companies at a single site.

The advent of chemical parks coincided with the restructuring of the German chemical industry, which continues to this day. Within this restructuring, many companies merged, spun off corporate divisions, or sold business units. Over the past two decades, large conglomerates became numerous smaller businesses that now focus on their core competencies.

Alongside established German specialty-chemicals manufacturers, companies spun off from the conglomerates entered the market. Old and new businesses combined forces and know-how. In the shadow of global players, high-performing specialty-chemicals enterprises thus emerged in Germany.

In parallel, the chemical park model of Germany's chemical industry gave birth to new types of service providers. Traditionally self-contained sites with internally connected structures (*verbundstandorte*) opened up and site operator companies formed. These local players, often leveraging many decades of experience in the operation of chemical sites, were able to meet the needs of chemical businesses at a common location — such as product transport and distribution, maintenance, training, utilities, waste disposal, wastewater treatment, emergency response, fire brigade, and liaison with authorities — efficiently and effectively. Site operator companies and their subsidiaries provide the infrastructures needed for chemical production. From the wide range of services offered by the operators of chemical parks, chemical companies can choose what suits them best. This enables chemical businesses to focus on what is essential to the manufacturing of chemicals: research, development, and production.

A diversity of structures and infrastructures

The roots of the modern chemical park date back only to the early 1990s and the restructuring of East Germany. The first chemical parks were established in the new federal states that formerly constituted East Germany. An overall

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chemical industry privatization attempt by the trust agency Treuhand, the organization charged with privatizing the former East Germany's enterprises, had proved to be unrealistic. As a result, large chemical sites were split up and individual operations were sold to private investors.

The first chemical parks in the former federal states of West Germany were formed only in the late 1990s. Production segments and niche products in all chemical fields were taken out of the former single-owner sites and were split off or purchased by other companies with a view toward strengthening individual business sectors. In 1998, the former Hüls AG converted its premises into the Chemiepark Marl, which is operated today by Infracor GmbH. In the same year, the former Hoechst AG formed Industriepark Höchst with the operator Infracor.

Today, Germany is home to approximately 60 chemical parks that occupy more than 2,000 hectares of available space. The layouts of these parks are quite diverse: some parks appear to be one large plant, whereas others have more-open structures. The number of companies inside chemical parks varies considerably, from two to more than 60 independent businesses.

Around 240,000 people work in German chemical parks (based on the membership of VCI Sector Group of Chemical Parks and Sites), and about 55% of the employees work for chemical manufacturers and their research departments. Just under 40% of staff are employed by nonmanufacturing enterprises. Other manufacturing firms and independent research facilities account for the remaining approximately 5% of staff.

Since the year 2000, German chemical parks and companies located there have invested roughly €28 billion (approximately U.S.\$40 billion) on upgrading existing plants and building new ones. In recent years, 60% of investments went into expansion. Within the manufacturing sector, chemical producers are major investors: more than 80% of the investment is attributable to chemical companies.

Chemical parks are open to all companies along the entire chemical value chain — from raw material producers, processors, and finishers, to manufacturers of end products — as well as to chemistry-related industries, such as petroleum, pulp and paper, metal finishing, and automotive suppliers. Chemical parks are also attractive to manufacturers with activities based on renewable raw materials or biotechnology — with products such as biofuels, bio-intermediates, and bioplastics. By outsourcing subsidiary business processes to service providers in their home parks, companies are able to redevelop their business models to focus on their core competencies.



▲ The Marl Chemical Park — Germany's first (and third largest) chemical park — covers more than 1,600 acres (650 hectares). Some 30 companies operate plants at this site.

The success of chemical parks

Chemical park operators enable the smooth running of production facilities, as they assume responsibility for all tasks that support production activities. This includes the provision of primary chemicals via internal piping networks (e.g., pipe racks); road systems and waterways; centralized or specialized shops for all types of repair work; and water, electricity, and steam.

Chemical parks supply reliable energy based on a wide energy mix and judicious energy management. Companies in chemical parks can cut energy costs, for example, by optimizing peak loads. This is an important factor in chemical production.

Companies at chemical parks do not need to make their own arrangements for site safety and security. Typically, park operators are responsible for emergency and security management and in-house fire brigades. This cuts costs without compromising competence and safety, and ensures the integrity and availability of the production plants.

Environmental protection is another function performed by park operators. Most chemical parks have wastewater treatment plants and waste disposal systems. Operators also offer further support in the areas of environmental protection, occupational health and safety, and plant and process safety. For instance, collaboration between chemical park operators and government authorities can facilitate plant licensing and ensure compliance with the relevant environmental laws.

The range of services offered by chemical parks can also extend to vocational and advanced training, public relations activities, event management, and onsite employee conveniences such as restaurants and retail outlets.

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Logistics — a further plus

The centralization of logistics and product transport is another strong point of Germany's chemical parks — for both raw material supplies and exports of chemical products. Germany is in the heart of Europe, and the short distance to Central and Eastern European accession countries of the European Union opens up many sales prospects. German chemical parks are located along major trans-Europe and international transportation routes that connect companies in Germany and other European countries by roads, rail, and inland waterway networks. (Some of these networks are described below in the section about the chemical regions.)

Nearly all German chemical parks have rail connections, and one-third are accessible by water. About half of the raw materials processed at chemical sites arrive by road, one-third by rail, 15% by pipelines, and 10% by water.

More than 40% of Germany's chemical parks are connected through a network of pipelines that supply German chemical sites with raw materials and intermediates such as crude oil, ethylene, and propylene. Pipelines between parks provide natural gas, naphtha, hydrogen, carbon monoxide, and industrial gases, enabling integrated production (*produktionsverbund*). Unique value chains can be integrated with each other through the large choice and good availability of chemical substances at minimal logistical effort. Such synergies result in lower production costs at chemical parks.

Specialty providers of chemical logistics usually have representatives onsite to ensure quality and safety in filling, packing, and interim storage, and in the smooth transport of chemical products.

Productive partnerships

Another major advantage of chemical parks is that companies can make changes to their product portfolios more easily than at individual (conventional) sites. For example, a firm that no longer needs a production unit might be able to find a buyer at its home chemical park location. Conversely, companies wishing to expand their product range might be able to purchase a plant from another company at the same site. This reduces the costs of dismantling, rebuilding, and modifying plants.

German chemical park sites also provide close contact with universities, technical colleges, and other research institutes where companies can find partners for innovation. The parks attract not only manufacturing companies and industry service providers, but scientific institutes as well, with half of all German chemical parks directly affiliated with research networks. Many research organizations seek the type of neighborhood provided by chemical parks, which inspires the flow and exchange of research. Additionally, chemical parks often provide education and training facilities for staff.

Chemical regions: parks and connections

Many chemical parks in Germany are organized into five “chemical regions” that are roughly distributed around the nation's perimeter. The regions are less distinguished by their industrial specializations or the chemical parks' occupancy than by their unique geographic settings and proximity to major distribution networks.

CeChemNet. The network of the Central German chemical sites — the Central European Chemical Network (CeChemNet) — incorporates six sites in the towns of Bitterfeld, Leuna, Schkopau, Böhlen, Zeitz, and Schwarzeheide. The CeChemNet partners are InfraLeuna, P-D ChemiePark Bitterfeld-Wolfen, Dow Olefinverbund, Infra-Zeitz Servicegesellschaft, and BASF Schwarzeheide.

The region's parks include 600 companies, employing about 27,000 people. The chemical companies and chemical park operators in the CeChemNet network benefit from the shared strengths of the individual chemical parks — creating synergies with feedstock integration in the Central German chemical triangle, and facilitating the transfer of knowledge among its six chemical sites in the three federal states of Saxony-Anhalt, Saxony, and Brandenburg. Moreover, the CeChemNet initiative coordinates information exchange among industry, scientific research organizations, and policy-makers, and supports the marketing efforts of the chemical parks in collaboration with investment and marketing agencies at the national and federal state levels.

ChemCoast. Located directly on the seacoast, ChemCoast e.V. is an interstate initiative — supported by the governments of Lower Saxony and Schleswig-Holstein — for strengthening the sustainability and economic power of the Northern German chemical locations of Brunsbüttel, Seelze, Stade, Walsrode, and Wilhelmshaven.

Brunsbüttel, Stade, and Wilhelmshaven have direct access to international maritime transport routes. The direct shipping route via Brunsbüttel leads through the Kiel Canal to Scandinavia and the Baltic states. In the last few years, Stade harbor has expanded into one of the largest ethylene transshipment ports of Europe. A new ethylene pipeline between Stade and Brunsbüttel was opened in 2007; today, the ChemCoast region is connected to a pipeline system that runs from Heide to Böhlen, via Brunsbüttel and Stade.

The ChemCoast locations of Seelze and Walsrode are situated at a motorway hub with east-west and north-south road access, while the ChemCoast locations of Maschen and Seelze benefit from some of Europe's most-advanced and efficient railway facilities for freight transport. The regional distribution network also includes the international airports of Hannover, Hamburg, and Bremen.

New power plants are scheduled to be built along the coast in the near future.

ChemCologne. This region, which includes the ABCD-cities of Aachen, Bonn, Cologne, and Düsseldorf, lies in the heart of Europe. The ChemCologne region borders the Netherlands and Belgium and is located along the Rhine River, which connects the region's parks to Europe's largest seaports of Rotterdam and Antwerp. The Rhine is equipped with modern docks that are specially tailored to the needs of the chemical parks along its route. The ChemCologne region is also home to two major air traffic hubs, at Cologne/Bonn and Düsseldorf, and close to Europe's largest inland port in Duisburg. Frankfurt Airport, as Germany's busiest airport for both passenger and cargo traffic, can be reached within an hour from the region's sites.

The ChemCologne region's 10 chemical and industrial parks include about 230 companies of all sizes and from virtually all chemical industry sectors, and employ about 75,000 people. A few of Germany's largest chemical companies operate multiple plants in the area, including Bayer (CHEMPARK), LANXESS, and Evonik. With its three sites in Leverkusen, Dormagen, and Krefeld, the CHEMPARK is Germany's largest chemical park. Also in this region, Shell operates Germany's largest refinery in the south of Cologne.

ChemSite. Situated in the German state of North Rhine-Westphalia near the nation's northwestern border with the Netherlands and Belgium, ChemSite is the chemical and plastics cluster in the Ruhr region, Europe's largest industrial area. The chemical parks in the region have access to Europe's largest inland port in Duisburg. ChemSite locations include chemical parks in Marl (Marl Chemical Park), Gelsenkirchen (BP RP/Ruhrloel), Castrop-Rauxel (Rütgers Germany), and Dortmund (Deutsche Gasraufwerke) — with the region's companies producing more than 4,000 products.

The Marl Chemical Park — the first chemical park and Germany's third largest park overall — houses Evonik's largest production site. Other firms producing chemicals at the Marl Chemical Park include INEOS Styrenics, International Specialty Products, LANXESS Buna, Rohm and Haas, Sasol, and VESTOLIT.

ChemDelta Bavaria. The Bavarian Chemical Triangle region occupies a high-tech area in southeast Germany, along the border with Austria and in the vicinity of Munich. Its location allows access to the markets of southern Europe and the rapidly growing states of central and eastern Europe, enabling it to serve as a center for east-west and north-south trade within Europe.

Roughly 30 companies, employing more than 25,000 people, are partners in the region's half-dozen chemical parks. The parks will be connected to southern Germany's Ethylene Pipeline South, which is currently under construction and will soon provide access to the north-west Euro-

pean ethylene network as a hub for a pan-European pipeline system. BASF Construction Chemicals is among the region's companies, occupying a plant at the Trostberg park.

Summing up

Chemical parks are an offshoot of the structural changes brought on by globalization. In German chemical parks, chemical manufacturers can focus on their core competency — the manufacture of chemical products — without spending on their own infrastructures. Individually tailored offerings from service providers help save costs and time. Synergies arise from having many companies at one location: companies can jointly obtain energy, raw materials, and intermediates, and they can share plants and facilities, leading to further savings. Given the diverse nature of companies at one site linked through sophisticated pipelines, many chemicals can be manufactured at the same location — from basic commodity chemicals to high-value specialty chemical products. For small chemical enterprises and start-ups as well, chemical parks are ideal locations for prospering fields of business. The chemical park concept is a success story with a future.

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