



Huge investments have flowed into China's chemical parks during the last few years. These investments have sparked off a high-performance chemical industry producing not only basic chemicals, but increasingly fine and special chemicals. In many cases the con-

cepts have been inspired by European or American sites. The theme of chemical parks, featuring all aspects of park operator models, equipment, infrastructure and logistics, will be an important topic at the 7th AchemAsia from 14-18 May 2007 in Beijing.

Picture: Emerson Process Management

Chemical industrial parks *in China*

— Hermann G. Hauthal and Tiina Salonen —

In China along side the multi-functional development zones, the chemical industrial parks (CIPs) are special zones which focus on one industry, namely chemicals. Chemical industry parks were set up as satellite sites at Economic and Technological Development Zones (ETDZ) or as separate, independently operated industrial parks. The main goals include restructuring and improvement of technological standards in the Chinese chemical industry and promotion of regional economic development by making investment more attractive to foreign and domestic companies. Production plants which do not comply with new environmental protection standards are also sometimes relocated to areas outside the cities.

In spite of the more specific focus, the general development goals and the administrative setup are similar to the other types of industrial parks. A study conducted by the China Petroleum and Chemical Industry Association (CPCIA) in 2004 listed 17 chemical industry parks in China. The locations Shanghai (Caojing), Nanjing und Tianjin (TEDA) are national level parks, and the others are managed at the provincial level. Most chemical industry parks are in the eastern coastal regions.

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The Tianjin Economic and Technological Development Area (TEDA)

As one of the first national development zones the Tianjin Economic and Technological Development Area (TEDA) was founded in 1984. It is located 40 km from Tianjin and 120 km from Peking. 33 km² were originally reserved for the site, and most of this space is now being utilized. Permission was granted to TEDA in 2005 to develop an additional zone, TEDA West (48 km²). The principal industries in the zone are telecommunications (61%), machinery manufacturing and car production (25%), biopharmaceuticals (5%) and food (6%). The TEDA administration committee has also set up three specialized industrial parks: the Microelectronics Industrial Park (4.6 km²), the Yat-sen Scientific and Industrial Park (10 km²) and the Chemical Industrial Park (27 km²). It is also responsible for the Tianjin Export Processing Zone (2.5 km²) and Tianjin University Scientific and Technological Park.

TEDA's GDP grew by 25% between 2004 and 2006 to 64.2 billion RMB. Value-added increased in the secondary manufacturing industry by 29% to 54.1 billion RMB and by 4.1% in the service sector to 10.1 billion RMB. The population in this area was 105,000 at the end of 2005. Total investment by 4,190 for-

eign companies was around \$30 billion as of the end of May 2006. By the end of 2005, 9,185 domestic companies had invested about 42 billion RMB. The high-tech sector and the service industry are the priorities in the site development strategy.

The Tianjin Economic and Technological Development Area has excellent regional, national and international transportation links. Tianjin is one of the major rail centers in China, and it also has an international airport. TEDA has a direct link to the national superhighway network and is only 5 km from the international seaport in Tianjin.

TEDA uses the "autonomous administration committee and development company model". TEDA Investment Holding Co., Ltd. has responsibility for development. The company's activities include real estate and infrastructure development and operation of public utilities (water, waste water, electricity, steam and gas). The TEDA administration committee has achieved ISO 14001 certification, and the TEDA eco plan for special water and solid waste recycling was approved by the State Environmental Protection Administration (SEPA) in 2003.

The Chemical Industry Park was established as a TEDA satellite zone in 1996. Of the 27 km² which have been earmarked for development, 2.5 km² have been developed as of April 2006. TEDA CIP Co, a public company, has

Chinese (national level) chemical industrial parks

Chemical region Industrial zone	State(s)/ Province	Total industrial surface area [ha]	Available space [ha]	No. of sites	Highlights/specialties
TEDA/TEDA West	Tianjin	12,260	2,700	five	fine chemicals
Nanjing (two sites)	Jiangsu	4,500	Changlu: 2,600 Yudai: 1,900	one	basic and fine chemicals, polymers, pharmaceuticals petrochemicals, logistics
Shanghai (Caojing)	Shanghai	2,940	2,940	three (sites)	petrochemicals, polymers

responsibility of park development. It takes care of investment incentives, provision of the environmental infrastructure and organization of the safety management program, and it also carries out environmental and safety audits.

A favorable political framework provides support for investment incentives at three levels. TEDA CIP participates in the national "circular economy" initiative and has a program to attract recycling companies. The general tax benefits at TEDA also apply to the chemical industry park, and favorable land use rights are offered to attractive investment projects. TEDA CIP does not currently have its own infrastructure network. Instead, the park is connected to the public utilities networks (electricity, water and steam). A water treatment plan for industrial users is currently under construction, and planning is underway for a dedicated district heating station. Waste disposal companies collect waste from industrial companies on the site.

Each company currently operates its own emergency services, but that is likely to change in the future.

Development of the fine chemical industry is the priority at TEDA CIP. There were 20 investors at the site in April 2006. Five have already started production, and the other plants are still under construction. The list of domestic investors includes Tianjin Zhongwei Pharmaceutical Co., Ltd. (Vitamin B1), Tianjin DEK Chemical Co., Ltd. (dyes and pigments), Suanhuan Lucky New Materials Inc. (sintered magnets) and Cenway Technologies, Ltd. (herbal extracts and special chemicals).

The Japanese and Americans are the major foreign investors. They are engaged in joint ventures (JV) as well as direct investment (FDI). The list of American investors includes JV Cabot Chemical (Tianjin) Co., Ltd. which produces carbon black and has invested a total of \$60 million, and the FDI PQ (Tianjin) Silicates Technology Co., Ltd., which makes silicates. The Japanese are involved in the JVs Tokai Carbon Tianjin Co., Ltd. (\$50 million), Tianjin Toho Lead Recycling Co. Ltd. (\$4.75 million) and Tianjin Cosmo Polyurethane Co., Ltd. (258 million RMB). Tokai Carbon has a production capacity of 40,000 t/a of carbon black. Tianjin Toho can produce 12,000 tons of secondary lead mixtures a year and und Tianjin Cosmo specializes in polyether and polyurethane resins. Tianjin Sekisui Plastics Co. (\$5.6 million) which makes Pielcelan (a resin composite made of polyethylene and polystyrene) is a Japanese FDI. Taiding (Tianjin) Environment Technology Co., Ltd. is one of the recycling companies at the site. It can recycle 30,000 t/a of electrical and electronic waste.

Industrial production at TEDA CIP increased to 263 million RMB in 2005. As of April 2006, there was little inter-company value-added at the site. TEDA CIP will target downstream producers in the future to increase the level of on-site vertical integration.

Shanghai Chemical Industry Park (SCIP)

Construction of the Shanghai Chemical Industry Park (SCIP), which focuses on petrochemicals, got underway in 2001. It is situated on Hangzhou Bay about 50 km from Shanghai. A total of 29.4 km² are available at the site. Development will take place in three phases. Because the Shanghai area is very crowded, land for the areas in phases 1 and 3 has to be reclaimed from the sea. Development has proceeded most quickly at the phase 1 site. Most of the plots are being leased by foreign investors, above all from Germany.

Phase 1 direct investments include BASF production facilities for 80,000 t/a of THF, 60,000 t/a of poly-THF and 8,000 t/a of polyisocyanate (total investment \$335 million), Degussa production facilities for 9,000 t/a of polyester and 8,500 t/a of colorants (total investment \$36 million), a future complex for 100,000 t/a of methylmethacrylate and special Plexiglas products and the British LUCITE facility for 90,000 t/a of MMA at a total cost of \$110 million.

Bayer is planning to invest a total of \$1.8 billion at the integrated site. Bayer now has or is currently building production capacity for 10,000 t/a of polyisocyanate, 200,000 t/a of polycarbonate, 200,000 t/a of bisphenol A, 172,000 t/a of diphenyl carbonate, 230,000 t/a of methylenediisocyanate and 150,000 t/a of TDI. Construction of most of these production facilities

got underway in 2003/04, and completion took place in 2005/06. Production is planned to start at the Degussa methylmethacrylate facility in 2009. Production at Bayer's MDI and TDI facilities will commence in 2008.

The list of Phase 1 joint ventures includes Shanghai SECCO Petrochemical Co. cracker (joint venture between SINOPEC, SINOPEC Shanghai Petrochemical Co. Ltd. (SPC) and BP, capacity 900,000 t/a of ethylene) at a cost of \$2.73 billion, the Shanghai Lianheng Isocyanates Co., Ltd. isocyanate facility (Shanghai Gaoqiao Petrochemical Corporation (GPC), a subsidiary of SINOPEC, Shanghai HuaYi (Group) Co., Ltd (SHYG), Shanghai Chlor-Alkali Chemical Co., Ltd. (SCACC), BASF and Huntsman joint venture, \$1.12 billion), the Shanghai SINOPEC Mitsui Chemicals Co. (JV between SINOPEC and Mitsubishi Gas Chemical Co., Ltd. (MGC)) bisphenol A facility (120,000 t/a) and the Shanghai Shenxing Chemical Industrial Co., Ltd. formaldehyde facility (80,000 t/a). Alongside the foreign investors, the domestic producers SCACC, GPC and SHYG have built their own plants for the production of PVC, acetone, ABS, SBR, PVDF and HFA.

The 13.4 km² Phase 2 sector will be mainly used by downstream customers of the Phase 1 companies (fine chemicals and derivatives). Currently the sector is virtually empty, and SCIP Development Co. is searching for potential investors

to increase the level of vertical integration at the site. The reagents plant built by TCI (Shanghai) Development Co. Ltd. of Japan at a cost of \$70 million has now gone into operation. The land reclamation work for Phase 3 was completed in 2004, and the plots are already reserved for specific large investors. The list of facilities which will be constructed includes a cracker, a refinery, a gas-based power station and a port.

As is the case at TEDA, the management structure of the Shanghai Chemical Industry Park (SCIP) is based on the "autonomous administration committee and development company model". The Administration Committee (SCIPAC) has responsibility for the project approval process and business coordination between the city government, SCIP and SCIP Development Co. Ltd. (SCIPDC) in matters relating to development and construction of infrastructure, utility services, waste disposal, investor acquisition and land leases. SCIPDC is a public company, and the companies at the site are the major shareholders.

SCIPDC has established joint ventures with large foreign companies to construct and operate utility and waste disposal services. The list of projects includes a waterworks (340 million RMB) and a waste water treatment plant (398 million RMB) with Sino-French Water Development Co., Ltd, a subsidiary of the Suez group which is based in Hong Kong, and a waste incinerator (510 million HKD) with Swire SITA Waste Services Ltd. working for the Suez Group and the New World Group of Hong Kong. A heating and power station with cogeneration was constructed as a 70:30 JV with Singapore SembCorp Utilities for 2.81 billion RMB, and the dock and tank storage facilities (\$210 million) were built in collaboration with Vopak of Holland. Sinopal, a JV between Air Liquide and Praxair, supplies industrial gases to producers at SCIP (\$120 million investment). All of these facilities went into operation between 2004 and 2006. An impressive infrastructure is being put in place at SCIP. Future goals include integration of environmental protection programs and further implementation of the "circular economy" strategies. ■



BASF PolyTHF (polytetrahydrofuran) plant at the integrated production site at the Shanghai Chemical Industrial Park (SCIP) in Caojing, Shanghai

Picture: BASF