

China's Quest for Eco-industrial Parks, Part I

History and Distinctiveness

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When it comes to development of industrial symbiosis (IS) and eco-industrial parks (EIPs), China should certainly be put at the center of the ongoing discussion and exploration. This is not only because China has at least 1,568 national and provincial-level industrial parks,¹ which account for an increasing proportion of China's gross industrial outputs, but also because China has developed the largest national EIP network, involving 15 national demonstration EIPs and 45 national trial EIPs, since its commencement in 2001.

This column focuses on reviewing the historical development and distinctive features of the China National Demonstration Eco-industrial Park Program. China's decade-long exploration of EIP development may very likely offer insightful and special perspectives for the theoretical development of IS in general and the practical implementation of EIPs in rapidly industrializing countries. A follow-up column will further explore the insights from and future challenges to China's quest for EIPs.

Evolution of the China National Demonstration Eco-Industrial Park Program

The adoption of export-oriented industrialization and the development of industrial parks and export processing zones have been hallmarks of China's success in economic reform. As part of China's strategy in opening-up to the outside world, the State Council (China's cabinet) decided to establish economic and technological development areas in each of the 14 coastal cities, including Tianjin, Shanghai, and Dalian, in May 1984. An economic and technological development area is a specially delimited urban zone where high-quality infrastructure is built and a favorable, efficient investment climate is created; this

is done in order to promote foreign investment in the manufacturing sector, to develop high-technology industry and an export-oriented economy, and to become an engine of local economic growth and social advancement.

The quantity and diversity of the industrial parks pursuing the voluntary [eco-industrial park] program and healthy competition and mutual learning among parks offers the best opportunity for various policy experimentations and down-to-earth demonstrations of numerous practical symbiotic synergies.

In addition to the 54 National Economic and Technological Development Areas, China had also established 55 National High-Technology Development Zones between 1991 and 1997. Given the crucial role in attracting foreign investments, local governments rushed to set up their own industrial parks. As of 2003, the number of industrial development zones in China reached 6,866, with a total planned area of 38,600 square kilometers (km²). In 2004, the central government reevaluated

the status of the recognized industrial development zones and reduced the total number to 1,568 with a total area of about 13,600 km². Because of the fierce competition for foreign investment, many industrial parks had reduced local taxes, lessened land prices, and undercut environmental regulations for swift project approvals to woo external investors.

Until the late 1990s, there was no special environmental regulation targeting the industrial parks at the park level. Some common problems associated with environmental management in Chinese industrial parks include speedy approval of investment projects that gives short shrift to required environmental scrutiny (such as environmental impact assessment) for the investment projects, and the management of industrial parks serving as buffer zones or so-called protection umbrellas regarding environmental enforcement against polluting enterprises.

China was first exposed to the EIP concept when the United Nations Environmental Programme (UNEP) *Industry and Environment* publication Chinese special edition on EIPs was published in 1997. Given the economic and environmental conflicts at the industrial park level, the State Environmental Protection Administration (SEPA; the predecessor of the Ministry of Environmental Protection) began to promote the development of EIPs with an emphasis on IS and park-wide

environmental service capacity, as an alternative to the prevailing end-of-pipe pollution control approach, which had proven to be both costly and ineffective in China. SEPA regarded promotion of the EIP as a win-win approach that could encounter fewer objections from industry as a means of reigning in soaring industrial pollution (Shi et al. 2003). One of the original purposes for China's national environmental regulator, SEPA, was to tackle the issue of industrial development zones as pollution havens and enhance the environmental management of industrial parks.

To initiate the new industrial park program, SEPA approved the Guangxi Guigang Sugar-making Complex as the first National Trial EIP in August 2001 (Zhu et al. 2007). At this stage, the awareness of and interest in EIP development remained low among the managers of China's vast number of industrial parks. After the first two National Trial EIPs² were designated in 2001, SEPA did not approve any more trial EIPs until April 2003. It was also recognized that formal, transparent procedures for application, appraisal, and designation of EIPs are essential to the healthy development of the National Demonstration EIP Program. As a result, SEPA promulgated two key policies on December 31, 2003: (1) *Provisional Method on the Application, Designation and Management of National Demonstration Eco-Industrial Parks*,³ and (2) *Provisional Guideline for Planning National Demonstration Eco-Industrial Parks*.⁴ This policy development has been a solid groundwork for the continual increase of National Trial EIPs since 2004.

It is worthwhile mentioning that the China National Demonstration EIP Program is of an entirely voluntary, bottom-up nature. Each industrial park interested in being recognized as a National Trial EIP had to take its own initiative in creating an EIP development plan and submitting its application to SEPA. Only upon receiving the required application did SEPA review and decide whether to approve the applicant as a National Trial EIP.

A very big hurdle for evaluating the progress of National Trial EIPs is the lack of a practical quantitative standard system that can be used to more consistently and objectively accredit EIPs. After much research and consultation, SEPA promulgated three provisional standards for eco-industrial parks to steer the development of single industry, multi-industrial, and venous industry-based EIPs in China.⁵ These standards took effect on a trial basis on September 1, 2006 (Geng et al. 2009). China introduced the concept of venous industry from Japan to characterize cooperation around resource recovery.

In April 2007, SEPA joined hands with the Ministry of Commerce (supervising the development of National Economic and Technological Development Zones) and the Ministry of Science and Technology (overseeing the development of National High-Technology Development Zones) in developing procedures and criteria for EIP planning and management in China. This cooperation reflects recognition of the need for better interdepartmental coordination and integration of EIP work into the overall development of industrial parks.

Furthermore, the Ministries of Environmental Protection (the successor to SEPA), of Commerce, and of Science and

Technology amended the quantitative accreditation standards for mixed eco-industrial parks and issued a policy decree called *Notice on Promoting the Development of a Low Carbon Economy in National Demonstration Eco-industrial Parks*⁶ in 2009.

In summary, the China National Demonstration EIP Program divides the development process of an EIP into three stages: (1) EIP planning, (2) EIP implementation, and (3) accreditation of a National Demonstration EIP. According to current practices, the first planning stage tends to last for two to three years for those parks that have already conducted some eco-industrial development practice and obtained an ISO 14001-certified environmental management system for the entire industrial park. The second stage—EIP implementation—tends to last for three to six years.

As of November 2011, the three ministries have jointly assessed and approved a total of 60 National Trial EIPs. Among them, 48 are mixed industrial parks and 11 are sectoral industrial parks, such as sugar-making, metallurgical, mining, coal-based chemical, and petrochemical industries. Only one National Trial EIP is a resource recovery park (or so-called venous industrial park).

Among the 60 National Trial EIPs, the three ministries have thoroughly assessed the implementation progress of 15 National Trial EIPs, including the Tianjin Economic-Technological Development Area and the Suzhou Industrial Park, and conferred the title of National Demonstration EIPs to the 15 industrial parks as of November 2011.

Distinctive Characteristics of China's National Demonstration Eco-Industrial Park Program

China's National Demonstration EIP Program has several distinctive characteristics. First, the program has passed its 10-year anniversary. Since the proclamation of China's first National Trial EIP in 2001, the program has kept growing and accelerating in terms of new members. The number of accredited national demonstration EIPs has continued to increase and the thresholds for enrolling in the program have become more and more stringent. The multistage, progressive EIP accreditation procedure is practically designed to deter the industrial parks that are mostly interested in promoting their public images, but lack genuine environmental commitment to actually implementing EIP development plans.

Second, the leadership for the program was expanded from a single environmental regulator—SEPA (predecessor of the Ministry of Environmental Protection)—toward a joint leadership by the Ministries of Environmental Protection, of Commerce, and of Science and Technology. An Office of the National Coordination Leading Group for Eco-industrial Park Development was jointly established by the three ministries. The institutional cooperation is evident recognition of the necessity for better interministerial coordination and mainstreaming of EIP work into the overall development of industrial parks in China. This interministerial collaboration has greatly enhanced the indispensable interdepartmental cooperation and

coordination on EIP development at the local government and industrial park levels.

Third, China has cultivated hundreds of researchers and professionals working in the field of EIP planning and consultancy. Environmental research institutes (e.g., the Chinese Academy of Sciences and the Chinese Research Academy of Environmental Sciences), environment departments, and schools of prestigious Chinese universities such as Tsinghua University and Nanjing University, and increasingly environmental consulting firms, have been actively involved in offering advisory and consulting services for the planning and implementation of EIPs across the country. For the first decade of EIP development in China, technical expertise and capacity have been principally sought from outside the respective industrial parks and sometimes from international knowledge hubs such as the National Industrial Symbiosis Programme of the United Kingdom. Slowly but steadily, indigenous technical capacity is beginning to emerge within EIPs. The Suzhou Circular Economy Extension Center, established by the Suzhou New District, and the Tianjin Economic-Technological Development Area Eco-Center are just two prominent examples.

Fourth, in addition to the large number of self-initiated EIPs, the quantity and diversity of the industrial parks pursuing the voluntary program and the healthy competition and mutual learning among parks offers the best opportunity for various policy experimentations and down-to-earth demonstrations of numerous practical symbiotic synergies. China's National Demonstration EIP Program not only stresses the greening of industrial production capacity in the mixed industry EIPs and sector-specific EIPs (such as metallurgical industrial parks, chemical industrial parks), but also includes development of the resource recovery industry through the construction of venous industrial parks. Thanks to the preferential policy, streamlined government apparatus, better development planning, and more advanced infrastructure, most of the 60 National Trial EIPs have also brought about rapid real estate development and become sustainable new towns. A number of EIPs such as the Suzhou Industrial Park and Tianjin Economic-Technological Development Area also serve as incubators of the green building, mobility, and service industries. As a result, EIPs in China can become vital catalysts for sustainable production and consumption.

As illustrated above, China's National Demonstration EIP Program has manifested its distinctive development trajectory and associated characteristics. A follow-up column will reflect on the invaluable perspectives that China's quest for EIPs may contribute to the theoretical development of IS in general and practical implementation of EIPs in rapidly industrializing countries, as well as offering an outlook on the challenge to

the long-term success of China's National Demonstration EIP Program.

Notes

1. According to the Directory of China's Validated Development Zones (2006) published by the National Development and Reform Commission, Ministry of Land and Resources, and Ministry of Construction, there are 222 national industrial parks and 1,346 provincial industrial parks, in addition to several thousand municipal and county-level industrial parks.
2. The second national pilot EIP was the Nanhai National Trial EIP, which specializes in the development of the environmental industry.
3. The policy guideline stipulates the requirements, as well as the procedure of application, appraisal, and designation for a National Trial EIP.
4. The policy guideline describes the requirements for any EIP development plan.
5. The three standards are the Standard for Industry-specific Eco-industrial Parks (Provisional) (HJ/T 273-2006), the Standard for Integrated (Mixed) Industry Eco-industrial Parks (Provisional) (HJ/T 274-2006), and the Standard for Venous Industry Based Eco-industrial Parks (Provisional) (HJ/T 275-2006).
6. www.mep.gov.cn/gkml/hbb/bgth/200912/t20091229_183603.htm. Accessed 2 December, 2011.

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