

## Chapter 24

# Eco-Industrial Parks and Application of Corporate Environmental Management Information System in China

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### ABSTRACT

*The history, current situation, policy system and three typical cases for eco-industrial parks in China have been described and analyzed systematically. On the basis of this, application of CEMIS to EIPs has been discussed. A CEMIS framework for EIPs has been proposed according to the Chinese policy system. Furthermore, a schematic control diagram for EIPs has been suggested using box model.*

### INTRODUCTION

The EIP definition proposed by the Indigo Development Team in 1993 has been widely accepted, which is “An eco-industrial park or estate is a community of manufacturing and service businesses located together on a common property” (Lowe, 2001). Cote & Hall (1995) suggested that an eco-industrial park, an industrial system could conserve natural and economic resources, reduce costs and debts incurred by production, materials, energy, insurance and handling, promote operation efficiency and quality, improve workers’ health

and public image, and provide people with opportunities of making profit through utilization and sales of wastes. The President’s Council on Sustainable Development of USA (1996) identified an EIP as combination of the market community for effective cooperation and resources sharing (information, raw materials, water, energy, infrastructure and natural environment) and the industrial system for exchange of raw materials and energy. In the *Guideline for Planning of Demonstration Eco-industrial Parks (on trial)* promulgated by the former State Environmental Protection Administration (SEPA) of China in 2003, an EIP is defined as a new type of industrial

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park designed and established in accordance with the concept of circular economy, the principles of industrial ecology and the requirements of cleaner production. Lowe & Warren (2008) pointed out that EIPs were characterized as the interaction between enterprises and the nature, and among themselves. In a study in Kalunborg Industrial Symbiosis System located to the west of Copenhagen, the characteristics were described as optimized utilization of resources with the cooperation between various enterprises, particularly through waste recycling (Erkman, 1999).

In addition to economic profits, an EIP also pursues a beautiful, attractive and heavenly work and life style, ideal and benign ecological circulation, and sustainable development of community. Comparing to a traditional industrial park, an EIP is characterized as:

- a. An EIP has an obvious core enterprise or a theme, and the whole park is established and operated on the basis of one or more such core enterprises;
- b. An EIP pays attention to harmonious development with community;
- c. An EIP has a cleaner production and by-products/wastes exchange network based on supply and demand relationships in order to reduce environmental pollution, instead of simple conglomeration of environmental technology corporations or corporations producing green products;
- d. An EIP maximizes energy efficiency through symbiosis and superposition, and realizes sustainable utilization of materials through recovery, regeneration and recycling;
- e. An EIP is established based on the theories of circular economy, regional cleaner production and industrial ecology;
- f. An EIP has efficient and concentrated environmental infrastructure or facilities, and the environment of enterprise, industrial park and the whole community can be improved continuously;

- g. The investment for the enterprises within the ecological chain have priority for an EIP;
- h. An EIP has a standardized ecological management and evaluation system.

The main factors for an EIP include system, cooperation, interaction, efficiency, resources and environment. CEMIS is an extensive environmental-protection-oriented information system including systematic collecting, recording and processing of environmentally relevant information. Therefore, corporate environmental management information system (CEMIS) is obviously an information platform to integrate such information of each factor for an EIP. Although information technologies have been widely used in environmental management (e.g., Xin et al., 1999), the application of CEMIS is rare for an EIP. In recent years, the application of CEMIS is increasing with the requirement of corporate environmental management. Lang (2007) proposed a CEMIS framework for production process. However, the studies on CEMIS for EIPs are still relatively rare. The objectives of this chapter are: a) to clarify the development of EIPs in China; and b) to establish a CEMIS framework for EIPs.

## **EIPS IN CHINA**

### **History: EDA, HIP and EIP**

In China, industrial parks have boomed after the nation's reform and opening to the outside world. The development history of China's industrial park can be classified into three phases: economic and technological development area (EDA), high-tech industrial park (HIP), and eco-industrial park (EIP).

The EDA, the first generation of industrial park, is a comprehensive economic development zone located in a designated area, and mainly engaged in manufacturing and business with the aim of importing foreign capitals, increasing export and

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