Development of eco-industrial estates in Thailand: initiatives in the northern region community-based eco-industrial estate

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A B S T R A C T

The concept of the Eco-Industrial Estate (EIE) was introduced in Thailand in the year 2000. However, various factors have impeded such development. This study reviewed and discussed the development of EIEs in Thailand, and examined EIE strategies. The results of surveys of the surrounding communities at the Northern Region Industrial Estate (NRIE) revealed many challenges, especially in building effective stakeholder collaborations. Representatives of industry and government agencies were introduced to, and discussed, the Community-Based Eco-Industrial Estate (CBEIE) framework at the dedicated eco-forum. The aim of the CBEIE framework is to gain stakeholders’ willingness to contribute to EIE development and to encourage the exchange of knowledge, as well as to build trust among stakeholders and to identify mutual benefits for the respective parties. The adoption of an iterative review process and mandatory scheduling of activities and initiatives would enable issues in the environment–community–industry realm to be addressed. Furthermore, the outcomes of the discussion at the eco-forum would feed into the master plan and contribute to the strategic development of EIEs in the NRIE.

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1. Introduction

The recent deterioration of the natural environment has forced firms and organizations worldwide to manage and improve their business processes in order to react to global trade rules and regulations. Innovative ideas for dealing with the environmental impact of human activities have emerged from the study and appreciation of natural ecosystem functioning, as natural systems demonstrate efficient recycling of resources (Liwarska-Bizukojc et al., 2009). Likewise, industrial systems are perceived as being most effective when raw materials are converted into goods with zero waste production (Liwarska-Bizukojc et al., 2009). The concept of Industrial Ecology (IE) describes a closed-loop system similar to that in nature, which is both complex and self-organized. IE has been developed and implemented throughout industrialized countries to help achieve a level of sustainable growth. An important application of the IE concept is the Eco-Industrial Estate (or Park) (EIE), which is defined as “...a community of manufacturing and service businesses seeking enhanced environmental and economic performance through collaboration in managing environmental and resource issues including energy, water and materials” (Lowe and Evans, 1995). This requires firms to work together and to seek a collective benefit that is greater than that which an individual firm can achieve alone (Cote and Cohen-Rosenthal, 1998).

In efforts to develop EIEs, the physical exchange of materials, energy, water, and by-product is an important consideration (Chertow, 2007). By the principles of industrial ecology, the activity to develop EIE has recently expanded to cover intangible exchanges of knowledge and human or technical resources (Mirata and Emtairah, 2005). The EIE scheme based on By-Product Exchange (BPE) emphasizes industrial metabolism and resource utility maximization (Park et al., 2008). This is similar to an approach used in central Europe, where the Kalundborg model has been adopted and a symbiosis network developed, proving to be financially successful and a crucial incentive in bringing together several industrial sectors to participate in the symbiosis program (Liwarska-Bizukojc et al., 2009; Adamides and Mouzakitis, 2009; Mirata and Emtairah, 2004). Creating a synergistic industrial cluster has become a critical part of many successful projects. Community

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