

Key concepts

Definition of Eco industrial park (EIP)

An EIP is a community of manufacturing and service businesses seeking enhanced environmental and economic performance through collaborating in the management of environmental and resource issues. By working together, the community of businesses seeks a collective benefit that is greater than the sum of the individual benefits each company would realize if it optimized its individual performance only.

The goal of an EIP is to improve the economic performance of the participating companies through a systems approach to improved environmental performance. Using the principles of IE, the community of companies collaborates to become an “industrial ecosystem.”

Features of an eco industrial park

An EIP may include any of following features.

- a single byproduct exchange pattern or network of exchanges;
- a recycling business cluster (e.g., resource recovery, recycling companies);
- a collection of environmental technology companies;
- a collection of companies making “green” products;
- an industrial park designed around a single environmental theme (i.e., a solar energy driven park);
- a park with environmentally friendly infrastructure or construction; and
- a mixed use development (i.e., industrial, commercial, and residential).

The critical element in defining an EIP is the interactions among its member businesses and between them and their natural environment.

Design principles of an eco industrial park

1. Define the community of interests and involve that community in the design of the park.
2. Reduce environmental impact or ecological footprint through substitution of toxic materials, absorption of carbon dioxide, material exchanges and integrated treatment of wastes.
3. Maximize energy efficiency through facility design and construction, co-generation, and cascading.
4. Conserve materials through facility design and construction, reuse, recovery and recycling.
5. Link or network companies with suppliers and customers in the wider community in which the ecoindustrial park is situated.
6. Continuously improve the environmental performance of the individual businesses and the community as a whole.
7. Have a regulatory system that permits some flexibility while encouraging companies to meet performance goals.
8. Use economic instruments that discourage waste and pollution.
9. Employ an information management system that facilitates the flow of energy and materials within a more or less closed loop.
10. Create a mechanism, which seeks to train and educate managers and workers in new strategies, tools and technologies to improve the system.
11. Orient its marketing to attract companies which fill niches and complement other businesses.

Succes factor an Eco industrial park

- close proximity of companies
- matching exchanges of materials and energy
- diversity of actors
- continuity of flows
- economic viability
- low economic risks

- economic gains are shared equally
- direct expenses payable by the firms remain low
- clear economic benefits to all actors
- existing institutional platforms
- environmental awareness in the firms
- balanced interdependence relationships between partners
- balance of power between partners
- similar organisational cultures of firms
- enough information and knowledge
- realistic expectations of firms
- active participation
- commitment
- continuing interest
- trust
- vision of the eco-industrial park's future and goals
- driver/coordination agent
- anchor tenant
- contracts / informal control mechanism
- legal support
- political support

The existing EIP in Kalundborg, Denmark, is the first example of the EIPs in the world. and other examples of IE throughout the world have evolved primarily through developing complementary bilateral relationships between companies.

Case studies in the world

There are few studies of eco-industrial parks in the world. There are probably numerous self-evolved parks that have not been identified and studied yet. However, some research on self-evolved systems has been conducted and in many cases synergies have been developed further. New eco-industrial parks have been designed and engineered by researchers, companies and developers in different parts of the world, e.g. in the Netherlands, Austria, Spain, Costa Rica, Namibia, South Africa, Australia and several Asian countries, on the inspiration provided by the research. Some eco-industrial parks are listed and some internet-addresses for further information are given in Appendix 1.

Eco-Industrial Park Case-studies

There are many eco-industrial park projects going on in the world. Eco-industrial parks in Europe are listed below. See Gibbs et al. 2004 for further information. The names **in bold** are operational Eco-industrial parks and the rest are “green” industrial parks, eco-industrial parks under construction, eco-industrial parks being planned or attempted parks.

References

Gibbs, D. & Deutz, P. 2004. Implementing industrial ecology? Planning for eco-industrial parks in the USA. *Geoforum* 36 (4), 452–464.

Appendix 1

Eco-industrial parks in the Europe

Closed Project, Tuscany, Italy

Crewe Green Business Park, UK

Dagenham Sustainable Industrial Park, UK

Dyfi Eco-Park, UK

Ecopark Oulu, Finland

Ecosite du Pays de Thau, France

Ecotech, Swaffham, UK

Emscher Park, Germany

Green Park, Cornwall, UK

Hartberg Ökopark, Austria

Herning-Ikast Industrial Park, Denmark

Kalundborg, Denmark

London Remade eco-industrial sites, UK

Montagna-Energia Valle di Non, Italy

Parc Industriel Plaine de l'Ain (PIPA), Lyon

Righead Sustainable Industrial Estate, UK

Rotterdam Harbour Industrial Ecosystems Programme

Selkirk Eco-Industrial Project, UK

Sphere EcoIndustrie d'Alsace, France

Stockholm, Environmental Science Park, Sweden

Styrian recycling network, Austria

Sustainable Growth Park, Yorkshire, UK

Turin Environment Park, Italy

ValuePark_, Schkopau, Germany

Vreten, Sweden