



# Eco-industrial parks

## Background

With natural resources declining in both quantity and quality, the time has come to practice resource recovery. The materials, water and energy regarded as unproductive by one company can be turned into a business opportunity by another operating nearby, transforming industrial parks into industrial ecosystems. The first evidence of the concept of eco-industrial parks surfaced in 1989 in Kalundborg, Denmark. Since then, other examples have demonstrated at least equally impressive benefits using different but highly comparable terms, such as eco-towns in Kawasaki, Japan and regional resource synergies in Kwinana, Australia.

Industrial parks are the drivers of industrialization and prosperity and can foster rapid economic development, the transfer and adaptation of technologies and the creation of knowledge and skills. When industrial parks are matched with higher standards of environmental and social responsibility, the application of resource efficient production methods and the reuse of waste energy and waste materials, they can evolve into eco-industrial parks.

The United Nations Industrial Development Organization (UNIDO) promotes the achievement of inclusive and sustainable industrial development by fostering industrialization models that deliver shared prosperity whilst safeguarding the environment and climate. Given the potential of eco-industrial parks for unleashing inclusive and sustainable industrial development,

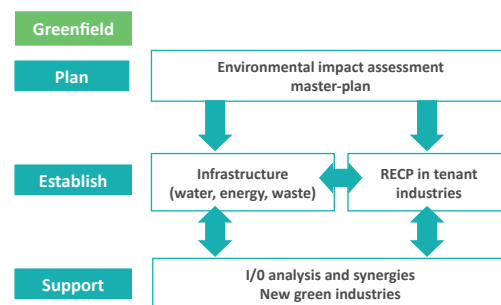
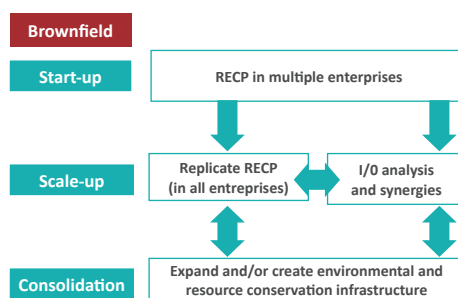
UNIDO supports the mainstreaming and upscaling of eco-industrial parks in developing and emerging economies.

## Approach

Eco-industrial parks is a community of manufacturing and service businesses located together on a common property that benefit from economic and environmental savings from the application of resource efficient and cleaner production (RECP) at the individual company level and from industrial symbiosis with closed material, energy and/or water cycles within clusters of co-located industries. In eco-industrial parks, industrial production is organized in a synergistic manner that mimics natural systems so that 'waste' from one company becomes a resource for another company. Business relations change in an eco-industrial parks where waste is sold as a by-product, instilling proactivity and environmental stewardship.

The term eco-industrial park has become an umbrella term for industrial parks that take into account environmental aspects in their design, construction, operation and management. The main elements of achieving/implementing eco-industrial parks are: RECP application at the enterprise level; collective RECP application at the park level; environmental and energy services companies; spatial planning and zoning of industries and infrastructures; and management and operations of the industrial park.





In sites with existing industrial activity, known as brownfield locations, the United Nations Industrial Development Organization proposes a three step approach to redevelop into a sustainability park: start-up, scale-up and consolidation. During the start-up stage RECP improves the environmental and social performance from enterprises. It is also important at this stage to strengthen business membership organizations and facilitate collaboration and joint activities between companies. The next stage involves scale-up and replication based on an input/output (I/O) analysis. In the final consolidation stage, UNIDO proposes the creation of environmental and resource conservation infrastructure.

For new or planned industrial parks, known as green field sites, UNIDO proposes a different approach, taking advantage of the fact that sustainability issues can be considered from the outset. During the planning phase, UNIDO assists in conducting a social and environmental impact assessment and producing a master plan. After planning, the next stage is to establish the infrastructure (water, energy and effluent waste) and introduce RECP in tenant industries. The final stage is to provide support for further development, such as input/output analyses and synergies with new environmental industries.

## Activities

In 2013, the United Nations Industrial Development Organization and the Global Network for Resource Efficient and Cleaner Production (RECPnet) reviewed the achievements, good practices, policy frameworks and lessons learned of 33 eco-industrial parks or similar parks in 12 countries.

UNIDO has also undertaken specific pilot initiatives to implement eco-industrial parks in selected countries and industrial zones. For example:

- With the support of Switzerland, UNIDO has started pilot projects focusing on resource efficient and cleaner production and eco-industrial parks in Makassar, Indonesia and Zhenjiang, China. Moreover, a master plan for a new industrial estate in Pucallpa, Peru has been developed and promoted
- UNIDO is currently implementing a project on eco-industrial parks in Viet Nam with the financial support of the Global Environment Facility. The project aims to mitigate greenhouse gas emissions, conserve energy and reduce wastewater and chemical waste from three established industrial parks in the country

## Overview of results

The findings of the UNIDO-RECPnet review confirm that eco-industrial parks are beneficial to developing countries and emerging economies. While data on the benefits of eco-industrial parks is still scarce — as a result of the relatively recent introduction of eco-industrial parks — reports show that best practices typically include the treatment of common effluent and waste management.

- At an industrial park in Cartago, Costa Rica, seven key enterprises have started to exchange best practices in illumination, compressed air systems and the harvesting of rain water to reduce their carbon emissions by 100 tons and save 17 million cubic meters of water, which contributed to achieve around USD 280,000 of annual savings
- At the Shanghai Chemical Industry Park, a cluster of petrochemical complexes, utility islands and piping corridors have been created to allow waste heat from power station to be used for raising steam and producing distilled water for tenant industries. Collective systems for effluent treatment and hazardous waste incineration have also been set up

## Outlook

The summary report of the global assessment of eco-industrial parks in 12 developing countries with the full set of case studies in 33 industrial parks will be finalized in 2015. This will serve as the basis for the development of a good practices primer, to be developed in 2015-2016.

The United Nations Industrial Development Organization will also cooperate with development partners — such as the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the United Nations Environment Programme (UNEP) — and standardization bodies — such as the British Standards Institution (BSI) and the International Organization for Standardization (ISO) — to develop a review of standards on eco-industrial parks.

Moreover, additional initiatives on eco-industrial parks development in India, Thailand, Peru, Cuba, etc. will be developed, supported and launched in 2015.