Eco-Industrial Parks Toolbox Manual

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Defining EIPs

DEFINITION

EIPs can be defined as managed industrial areas that promote cross-industry and community collaboration for common benefits related to economic, social and environmental performance.

The EIP concept has evolved to address additional, interrelated aspects, including, for example: resource efficient and cleaner production, industrial symbiosis, circular economy, climate change, pollution, social standards, shared infrastructure, improved management of risks and shared resources, including land and ecosystem services. An interdisciplinary approach is required to optimally realise the EIP concept.

Compliance with national and local regulations is the baseline for all industrial parks, whatever the geographical location and specific characteristics of the park.

In short, eco-industrial parks are about creating more resource-efficient and cost-effective industrial parks which are more competitive, attractive for investment and risk resilient.

INTERNATIONAL FRAMEWORK

UNIDO, World Bank Group and GIZ have collaborated to develop an international framework which provides guidance on what constitutes an eco-industrial park (EIP) and how an industrial park can work towards becoming an EIP.

The framework is based on "prerequisites" and "performance indicators" in four key categories: Park management; Environmental performance; Social performance; and Economic performance. The prerequisites highlight the basic requirements for EIPs, and the performance indicators describe expected performance levels that an EIP must meet.

The International EIP Framework is not a certification or audit scheme. The framework is a practical means to (a) understand the current status and intentions of an industrial park with regards to their EIP transformation and (b) identify a set of practical promising opportunities for the park through a process of continuous improvement.

Weblink to download the International EIP Framework
BENEFITS OF ECO-INDUSTRIAL PARKS

EIPs reduce:

> Environmental, economic and social risks
> Procurement costs
> Use of materials, water, energy
> Waste
> Greenhouse gases
> Pollutants

EIPs increase:

> Competitiveness, profitability and investment
> Security of resources
> Good-quality and local jobs
> Workers’ welfare
> Innovations and apply new technologies
> Access to finance
> Quality of life for communities
About eco-industrial parks

- Ecoplus' extended park management services to 17 industrial parks in Austria
  e.g. Investor service/hub, Industry network creation, research and innovation centres

- Community development initiatives in the Kwinana Industrial Area, Australia

- RECP assessments with companies in many countries since 1980s

- EIP concept planning of Parque Industrial Malambo, Colombia

- Industrial synergies Kalundborg, Denmark

- Use of waste plastics by Clariter in the East London Industrial Development Zone (ELIDZ) to produce solvents, oils and waxes
OVERVIEW OF EIP TOOLS

Planning tools Park level
- EIP Concept Planning Tool
  Assist in sustainable design of an industrial park
- Master Plan EIP Review Tool
  Guide sustainability review of existing Master Plan

Implementation support tools Park level
- EIP Assessment Tool
  Assess park against International EIP Framework and identify EIP opportunities
- EIP Management Services Tool
  Strengthen and advance services provided by park management to tenant companies
- Access to Finance Tool
  Identify, review and access available financing options for feasible EIP initiatives
- Industrial Symbiosis Identification Tool
  Support the identification of waste exchanges between companies

Implementation support tools Country level
- EIP Selection Tool
  Select parks with high potential for EIP development and successful EIP projects
- EIP Policy Support Tool
  Support EIP policy development and implementation processes

Monitoring tools Park level
- RECP Monitoring Tool
  Monitor and report results of RECP assessments in industrial parks
- EIP Opportunities Monitoring Tool
  Monitor and report impacts from EIP opportunities in industrial parks

UNIDO’s EIP Toolbox is available online: https://hub.unido.org/eco-industrial-parks-tools

You can click on any of the tools to navigate directly to detailed instructions on each tool.
OBJECTIVES OF TOOLBOX
The objectives of the UNIDO EIP Toolbox are to:

• Provide a practical set of customised and flexible tools to assist practitioners with the development and implementation of eco-industrial parks and related initiatives;

• Support the EIP implementation and decision making processes in relation to both new and existing industrial parks.

TARGET USERS OF THE TOOLBOX
Target users of the EIP tools are management entities of industrial parks as well as development organizations and service providers working on eco-industrial park projects.

The toolbox is applicable to:

• Industrial parks in various international contexts with a core focus on transition and developing countries;

• All development stages of industrial parks (e.g. scoping and concept planning, (pre-)feasibility studies, investment decisions, design and construction, operation, redesign and optimization);

• Industrial parks with different characteristics (e.g. types of industry sectors in park, park size, level of technology development, park management model).
CONTRIBUTION OF TOOLS TO EIP TRANSFORMATION PROCESSES

You can click on any of the tools to navigate directly to detailed instructions on each tool.

Top-down approaches: Governmental agencies as entry-point

Construction & development

Operation & continuous improvement

Scoping, feasibility & planning

Lifecycle stages of industrial parks

Bottom-up approaches: Industrial parks as entry-point

Entry points for EIP tools

EIP toolbox

Overview of tools Overall objective & target audience Entry points for EIP tools

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EIP Selection Tool

EIP Concept Planning Tool

Master Plan EIP Review Tool

EIP Opportunities Monitoring Tool

RECP Monitoring Tool

EIP Opportunities Monitoring Tool

EIP Management Services Tool

Industrial Symbiosis Identification Tool

Access to Finance Tool

EIP Assessment Tool

EIP planning tools

EIP implementation support tools

EIP monitoring tools

About eco-industrial parks

Park level

Country level

INSTRUCTIONS

ABOUT GEIPP

ACKNOWLEDGEMENTS

ACRONYMS

FURTHER READING

QUESTIONS AND CONTACT
EIP planning tools

Tool objectives
- Assist in the sustainable and integrated design and operation of greenfield and brownfield parks.

Results and added value of the tool
- The EIP concept planning supports the design of more resource-efficient and cost-effective industrial parks assisting with attracting/maintaining tenant companies, synergy development and industry clustering, risk mitigation, optimisation of transportation.

Target users of tool
- National service providers, international development agencies as well as management entities of industrial parks. This tool is applicable to industrial parks in different development stages.

Steps in the tool
1. Review existing and future situation
2. Review against International EIP Framework
3. Review industry interest to locate to park
4. Review existing and potential anchor tenants
5. Review synergy opportunities
6. Define industry clusters and precincts
7. Develop EIP concept plan
8. Market and promote added value features

How to complete the tool
- The EIP Concept Planning Tool is usually completed for the first time by a national service provider in a very close collaboration and through interactive workshop sessions with park management team.
- Subsequent periodic updates to the EIP Concept Plan can be undertaken by industrial park management themselves, without extensive support from a service provider.

Data required for completing tool
- Existing master plan and/or other planning documents of industrial park
- Sufficient information about the current and desired situation of the industrial park (e.g., management and governance, infrastructure & utilities, land zoning, economic / environmental / social conditions)
- Insights into industry and market demands for industrial land

Practical example of tool application
- An EIP concept plan was developed for Parque Industrial Malambo (PIMSA) to assist park management with the sustainable development of the industrial park and its infrastructure, utilities and available industrial land. PIMSA has around 60% of land available for greenfield development, which can accommodate up to 80 new companies.

Further details on the practical example are included in the tool and following pages.
EIP CONCEPT PLANNING TOOL

Example: Parque Industrial Malambo (PIMSA), Colombia

This is one of the multiple EIP concept plans produced for PIMSA. Further detailed examples are included in the EIP Concept Planning Tool itself.
EIP CONCEPT PLANNING TOOL

Example: Parque Industrial Malambo (PIMSA), Colombia

This is one of the multiple EIP concept plans produced for PIMSA. Further detailed examples are included in the EIP Concept Planning Tool itself.
Master Plan EIP Review Tool

**Tool objectives**
Guide the sustainability review of existing Master Plans of industrial parks and thereby provide concrete suggestions for strengthening Master Plans.

**Steps in the tool**
1. Gap analysis: Review existing master plan
   1a. Review on basic contents of master plan
   1b. Review against International EIP Framework and Master Plan
2. EIP Concept Planning (optional)
3. Identify and prioritize master plan improvements
4. Action planning of prioritized master plan improvements

**How to complete the tool**
The Master Plan EIP Review Tool is usually completed for the first time by a national service provider in very close collaboration and through interactive workshop sessions with the park management team. Subsequent periodic updates to the Master Plan EIP Review Tool can be undertaken by industrial park management themselves, without extensive support from service provider.

**Results and added value of the tool**
Master plans for industrial parks are often out of date or developed based on conventional and business-as-usual planning processes. The EIP review provides an opportunity to strengthen the existing Master Plan from a EIP and sustainability perspective.

**Target users of tool**
- Management entities of industrial parks who have an outdated master plan or a “conventional” Master Plan without sufficient sustainability consideration.
- National and international service providers assisting industrial parks with updating their Master Plans

**Data required for completing tool**
- Existing master plan and/or other planning documents of industrial park
- Evidence on the performance of industrial park against the benchmarks of the International EIP Framework

**Practical example of tool application**
The review of the Ancon Industrial Park Master Plan was undertaken in 2016 for the Programme for Country Partnership for Peru. The objective of this work was to provide a detailed analysis of the economic, environmental, and social sustainability of the Ancon Master Plan, and outline practical inputs for the sustainable development of the Ancon Industrial Park.
MASTER PLAN EIP REVIEW TOOL

Convert identified gaps into master plan improvements

Purpose of this step is to review the completeness of the current documentation of the Master Plan.

Other topics included in the tool are:
- Park overview, zoning, infrastructure, compliance, visualisation and plans.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Basic Information Questions</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land use and development</td>
<td>What are likely and potential future developments of the sectors, sizes and locations of existing and new companies in the park in the future?</td>
<td>Industry 4.0 for manufacturing companies, changes in automotive supply chain as a result of increasing electric vehicle production</td>
</tr>
<tr>
<td></td>
<td>What are development opportunities for the industrial park?</td>
<td>Increasing demand from tenants companies to have their energy supplied by renewable energy sources</td>
</tr>
<tr>
<td></td>
<td>What are (potential) challenges for the development of the industrial park? (economic, technical, environmental, social)</td>
<td>Industrial park struggles to attract new companies. There is increasing competition amongst industrial parks, and major industrial land has slowed down. There is increasing scarcity of water in the region. Park faces increasing pressure from local municipality to reduce its potable water use.</td>
</tr>
</tbody>
</table>

### BASIC REVIEW OF CURRENT MASTER PLAN

<table>
<thead>
<tr>
<th>Basic contents of a Master Plan for industrial park</th>
<th>Does Master Plan include basic contents?</th>
<th>Note any gaps in current Master Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land use break-up of the site, specified by type of land use, for example:</td>
<td>Yes</td>
<td>Buffer zone between industrial/activities and community are not defined in Master Plan</td>
</tr>
<tr>
<td>- Industrial land</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Commercial land</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Land allocated to infrastructure and utilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Service corridor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Land allocated to transportation nodes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Buffer zone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control and arrangements to regulate the use and development of land within industrial park:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Conditions and restrictions on land use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Required open space</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>- Max percentage of land development per lot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Locations, number, size, height, number of storages and character of buildings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Density of built up area allowed in specified areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Etc.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This is a screenshot to illustrate type of questions. Full set of questions and topics are included in the Master Plan EIP Review Tool.
The purpose of this step is to convert the gaps identified in previous steps into concrete and practical improvements for the industrial park’s Master Plan.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Identified gap (extract from previous steps)</th>
<th>MASTER PLAN IMPROVEMENTS</th>
<th>PRIORITIZE MASTER PLAN IMPROVEMENTS</th>
<th>SELECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Improvement opportunity</td>
<td>Part of LEGAL COMPLIANCE?</td>
<td>Part of BASIC MASTER PLANNING?</td>
</tr>
<tr>
<td>Park overview</td>
<td>No description of unique value proposition of Park X Master Plan</td>
<td>Expand “Project overview” section in Master Plan wth the unique value proposition and details on targeted industry sectors, sized and number of companies</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Risk management</td>
<td>Park X does not have risk management framework in place, and risk management has not been addressed yet in Master Plan</td>
<td>Identify and review the following into Master Plan: • Critical risks for the industrial park and its companies on likelihood and impact. • Cluster companies based on their risk profile (e.g., adhesives, milite, engagement, fire, sea, air emissions, water pollution). • Industry co-location risks.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Waste</td>
<td>Master Plan of Park X does not include suitable location of park-level and common waste collection areas</td>
<td>Identify most suitable location of park-level and common waste collection areas, based on review of industry demands</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Selection decision is based on consideration of scores of legal compliance, achievable benefits, risk management, and stakeholder interest. If improvement is part of legal compliance, it has to be selected for implementation in Master Plan.
EIP Assessment Tool

**Tool objectives**
Assess an industrial park against benchmarks of the International Framework for Eco-Industrial Parks (UNIDO, WBG, GIZ) and subsequently identify, prioritize, plan, and implement promising initiatives.

**Steps in the tool**
2. Identify and select EIP opportunities which are most achievable and beneficial.
3. Plan, manage and monitor progress on prioritized EIP opportunities.

**Results and added value of the tool**
The EIP Assessment Tool helps industrial parks to understand their current and intended performance on international EIP benchmarks, and subsequently operationalise the process to identify, prioritize and implement promising initiatives.

**How to complete the tool**
The EIP Assessment Tool is usually completed for the first time by a national service provider in a very close collaboration and through interactive workshop sessions with park management team. Subsequent periodic updates to the tool can be undertaken by industrial park management themselves, without extensive support from service provider.

**Target users of tool**
The main user of the EIP Assessment Tool is the management entity of an industrial park, supported by their stakeholders (e.g., tenants, government agencies).

**Data required for completing tool**
Evidence on the performance of industrial park against the qualitative and quantitative benchmarks of the International EIP Framework, covering:
- Park management (e.g., existing Master Plan, reporting, surveys)
- Environmental performance (e.g., existing environmental management system, energy efficiency programme, circular economy)
- Social performance (e.g., existing programmes on skills development, grievance management system, gender equality)
- Economic performance (e.g., employment targets, local procurement)

**Practical example of tool application**
As of 2021, a total of 56 industrial parks in eight countries (Colombia, Egypt, Indonesia, Nigeria, Peru, South Africa, Ukraine and Viet Nam) have been assessed to date on their performance against the prerequisites and performance indicators outlined in the International EIP Framework. The results and comparative analysis of these EIP assessment are included in GEIPP Lessons Learnt Report. Click here to download the report.
EIP ASSESSMENT TOOL

Overall current and intended performance of industrial park

Low baseline on “Park monitoring and risk management” and “Planning and zoning”

High intended improvement for “Waste and material use”

Baseline compliance on economic performance is highest overall, compared to other categories

High improvement potential for “Economic value creation”

Overall improvement potential for industrial park is 24% for all benchmarks of International EIP Framework

Overall intended performance against International EIP Framework of all four assessed parks at end of GEIPP is 64%
Recognising that park management may have already systems in place to monitor and manage their activities, it is envisaged that the action planning of prioritized EIP opportunities is adapted to suit the specific requirements of park management.

Following the gap analysis against the International EIP Framework, EIP opportunities are identified and prioritized with the tool, and subsequent action planned.
EIP Management Services Tool

Tool objectives

Strengthen and advance services provided by park management to tenant companies, and thereby increase "value for money" provided by park management to tenant companies and secure/expand revenues of park management entity.

Results and added value of the tool

The tool assists park management entities with reviewing, prioritizing, scoping, and action planning of fit-for-purpose and added-value services (including Industry 4.0 services) to their park and tenant companies.

Target users of tool

The main user of the EIP Management Services Tool is the management entity of an industrial park.

Steps in the tool

1. Summarize key challenges, opportunities, and strategic issues facing industrial park
2. Review and prioritize potential added-value services of park management
   - Optional: Review Industry 4.0 services
3. Scope prioritized added-value services of park management
   - Optional: Scope Industry 4.0 services
4. Action planning for prioritized added-value services of park management

How to complete the tool

The EIP Management Services Tool is usually completed for the first time by a national service provider in a very close collaboration and through interactive workshop sessions with park management team.

Subsequent periodic updates to the tool can be undertaken by industrial park management themselves, without extensive support from service provider.

Data required for completing tool

- Existing services provided by park management entity to tenant companies
- Insights into key challenges, opportunities and strategic issues facing industrial park
- Insights into service needs of tenant companies

Practical example of tool application

The EIP Management Services Tool was applied with the team at the East London Industrial Development Zone (ELIDZ) in South Africa. The work identified and scoped a range of added value services to further strengthen the competitiveness of the ELIDZ and its tenants. Illustrative examples of scoped services for the ELIDZ are an Enterprise Supplier Development Programme, coordination for a support program to improve the energy efficiency of tenant companies, and collaborations on trainings on topics of common interest of tenant companies.
# EIP MANAGEMENT SERVICES TOOL

Review and prioritize added-value park management services

<table>
<thead>
<tr>
<th>ADDED VALUE SERVICES INCLUDED IN THIS TOOL</th>
<th>REVIEW EXISTING SERVICES</th>
<th>NEW SERVICES</th>
<th>PRIORITIZATION OF DEFINED ADDED-VALUE SERVICES</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main service category</strong></td>
<td><strong>Potential added-value services of park management</strong></td>
<td><strong>Value proposition for tenant companies and industrial park</strong></td>
<td><strong>Is this service already provided in your park?</strong></td>
<td><strong>Is this a possible new service for your park?</strong></td>
</tr>
<tr>
<td>Business support</td>
<td>Support tenant companies in identifying and accessing funding and subsidies</td>
<td>• Tenant companies have easier access to and better understanding of available funding and subsidies</td>
<td>Please select</td>
<td>Please select</td>
</tr>
<tr>
<td>Collaboration</td>
<td>Facilitate community engagement on behalf of tenant companies</td>
<td>• Park management provides “the common voice” on behalf of tenant companies, resulting in consistent community messages and streamlined community engagement approach; • Reduced pressure on tenant companies to engage with communities on their own</td>
<td>Please select</td>
<td>Please select</td>
</tr>
<tr>
<td>Environment</td>
<td>Coordinate support program to improve the energy efficiency of tenant companies, especially for the top 50 percent of major energy-consuming businesses in the park</td>
<td>• Reduced energy use and thereby lower operational costs to tenant companies; • Tenant companies have easier access to technical advice, resource materials, and professional network with experts on energy efficiency</td>
<td>Please select</td>
<td>Please select</td>
</tr>
</tbody>
</table>

Based on prioritisation column on left: High=3; Medium=2; Low=1; To be confirmed=1.5
# EIP MANAGEMENT SERVICES TOOL

## Scope prioritized added value services of park management

<table>
<thead>
<tr>
<th>Topic</th>
<th>Priority added-value park management services selected for short-term action</th>
<th>SPECIFICATION OF THE ADDED-VALUE SERVICE</th>
<th>COST AND REVENUE SHARING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste management committee</td>
<td>Set up and facilitate regular tenant company meetings addressing and finding solutions for waste management challenges in industrial park</td>
<td>Rather than each company trying to solve their own waste management challenges, there is opportunity for collaboration of tenant companies to share experiences, find solutions together, and replicate good practices already implemented by some companies.</td>
<td>Recycling of waste pallets, organic waste, plastics, metals, paper and cardboard, proper storage, collection and disposal of hazardous waste.</td>
</tr>
<tr>
<td>Child day care</td>
<td>Set up and provide day care facility to support employees of tenant companies in the industrial park</td>
<td>Support workers of tenant companies with their child care needs during working hours and easy access to drop off and pick up children before/after work.</td>
<td>Child care facility to be located close to main entry into industrial park. Child care facility located sufficient distance to higher risk companies. First priority of child care centre to accommodate children from workers at tenant companies.</td>
</tr>
</tbody>
</table>

To assist with their further development, this step in the tool assists park management and tenant companies to scope prioritized added-value services including options for cost / revenue sharing and potential implementation of selected services.
To date, the Access-to-Finance Tool has been developed for South Africa and Colombia.

As part of the Global Eco-Industrial Parks Programme in South Africa, the Access to Finance Tool has been used to support feasibility assessments on company-level and park-level opportunities in the East London Industrial Development Zone (ELIDZ) and Phuthaditjhaba Industrial Park. Identified financing options were included in the pre-feasibility assessment reports, which are used to further progress and work towards implementation of promising opportunities.
In the Access to Finance Tool you are navigate to each selected step of the tool.
In the Access to Finance Tool, you can filter the data by simply clicking on an item on each of the filter table(s).

A total of 231 financing options are included in the Access to Finance Tool for South Africa.
## ACCESS-TO-FINANCE TOOL

**Illustrative search results in Access-to-Finance Tool for South Africa**

<table>
<thead>
<tr>
<th>#</th>
<th>Name financing organisation</th>
<th>Fund name</th>
<th>Specific focus of funding</th>
<th>EIP initiatives result</th>
<th>Finance threshold</th>
<th>Eligibility criteria</th>
<th>Weblink</th>
<th>Investment opportunity information</th>
</tr>
</thead>
<tbody>
<tr>
<td>63</td>
<td>PROPARCO</td>
<td>[1] Venture capital funds [2] Development Capital funds</td>
<td>Agriculture, Agro-processing, Climate action, Energy, Infrastructure, Community Development</td>
<td>Sustainable land management, (sustainable agriculture, forestry, park green areas, water catchment management)</td>
<td>Venture capital funds ranges between approximately $3 million and $7 million. Development Capital funds ranges between $3 million and $20 million</td>
<td>The technical and commercial viability of the plan.</td>
<td><a href="https://choose-africa.com/en/fffriends/investment-fund/">https://choose-africa.com/en/fffriends/investment-fund/</a></td>
<td>Proparco is the private sector arm of the AFD and finances debt and equity for private firms in developing countries. The company invests in private equity funds and venture capital (VC) funds that support SMEs and start-ups with strong development impacts such as infrastructure and agriculture</td>
</tr>
<tr>
<td>72</td>
<td>Enablis Financial Corporation SA (Pty) Ltd/Khula Enterprise Finance Limited</td>
<td>The Enablis Acceleration Fund</td>
<td>Agriculture</td>
<td>Sustainable land management, (sustainable agriculture, forestry, park green areas, water catchment management)</td>
<td>R25 000 to R2,5 million</td>
<td>To qualify for the fund one must meet the following requirements: be a South African SME that is accredited by the Enablis Entrepreneurial Network; are black and women entrepreneurs for startups and for the expansion of a business; SMEs involved in all sectors, specifically ICT, transport, tourism, agriculture and services industry and SMEs that need working capital and/or asset finance.</td>
<td><a href="http://www.enablis.org/">http://www.enablis.org/</a></td>
<td>The Enablis Acceleration Fund is a partnership between Enablis Financial Corporation SA (Pty) Ltd and Khula Enterprise Finance Limited. It is currently capitalised at R80m. Its purpose is to improve access to early-stage funding to SMEs, reach out to SMEs in remote/rural provinces and create new sustainable jobs. SMEs that need working capital and/or asset finance.</td>
</tr>
</tbody>
</table>
Industrial Symbiosis Identification Tool

**Tool objectives**
Support the identification of industrial symbiosis opportunities (by-product and waste exchanges) between companies.

**Results and added value of the tool**
Generates an indicative list of industrial symbiosis opportunities for an industrial park without a significant time investment.

**Target users of tool**
The main user of the Industrial Symbiosis Identification Tool are management entities of industrial parks and companies as well as (inter)national service providers assisting industrial parks.

**Steps in the tool**
1. Search by-products
2. Search by industry sector type

**How to complete the tool**
The Industrial Symbiosis Identification Tool can be easily used by industrial park management entities and companies, without extensive support from service providers.

**Data required for completing tool**
- List of existing and potential tenant companies
- Insight into existing and potential by-products and wastes generated in the industrial park

**Practical example of tool application**
Training on the development and implementation of eco-industrial parks was provided by UNIDO to park management and governmental officials in Viet Nam (July 2019). The Industrial Symbiosis Identification Tool was used as an interactive exercise to identify symbiosis opportunities in the three pilot industrial zones of the UNIDO GEF project on eco-industrial parks (e.g. Khanh Phu IZ, Hoa Khanh IZ, and Tra Noc 1&2 IZ). The exercise helped to identify concrete industrial symbiosis opportunities for the three industrial zones.
The worksheet “Search by-product” is used to identify potential industrial symbiosis opportunities based on the selection of a specific by-product or waste. For example, the worksheet can inform you what industry can be interested to utilize wood residues.

The worksheet includes the following steps:

1. **First, make your selection here!**
2. **This box lists similar by-products, or alternative names that are sometimes used.**
3. **Who would sell or buy this by-product?** Here you can find companies potentially interested in your by-product.
4. **More information?** Please consult “References” for further details and academic articles.

### By-product / Waste
- **Wood residues**
  - Lignin residues
  - Starch scrap
  - Pellets
  - Waste paper shreds/pulps
  - Bark

### Similar by-product(s)

<table>
<thead>
<tr>
<th>Possible providers</th>
<th>Possible users</th>
<th>Practical examples</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lignin residues</td>
<td>Coal power plant</td>
<td>Kolundborg</td>
<td></td>
</tr>
<tr>
<td>Starch scrap</td>
<td>Biomass power plant</td>
<td>Tianjin</td>
<td></td>
</tr>
<tr>
<td>Pellets</td>
<td>Briquette factory</td>
<td>Guangpi Guizang</td>
<td></td>
</tr>
<tr>
<td>Waste paper shreds/pulps</td>
<td>Pressboard/plywood plant</td>
<td>Shinko</td>
<td></td>
</tr>
<tr>
<td>Wood residues</td>
<td>Cement factory &amp; construction</td>
<td>Kawasaki</td>
<td></td>
</tr>
</tbody>
</table>
The worksheet “Search by company” is used to identify potential industrial symbiosis options based on the selection of a specific company type. For example, the worksheet can inform you about alternative raw materials and potential reuses of the by-products/wastes of the chemical industry.

### Identify Industrial Symbiosis Options: Search by Company Type

#### Possible inputs
- Methane hydrate
- Carbon dioxide
- Hydrogen

#### Possible providers
- Inorganic plant
- Ethanol plant
- Chemical industry

#### Practical example(s)
- Methane hydrate: Chemical industry (coal ash)
- Carbon dioxide: Inorganic plant
- Hydrogen: Ethanol plant

#### Comment(s)
- Methane hydrate: Chemical industry (coal ash)
- Carbon dioxide: Inorganic plant
- Hydrogen: Ethanol plant

---

### Instructions

1. Select a company.
2. Which inputs could you purchase from a neighboring company?
3. Which outputs could you sell to a neighboring company?
4. What type of company might still be interested in your by-products?

---

### References

- Go to instructions
- Search by-products/wastes
- References

---

### About GEIPP

- About eco-industrial parks
- EIP toolbox
- EIP planning tools

---

### Acronyms

- ACROH
- INSTRUCTIONS
- ABOUT GEIPP
- ACKNOWLEDGEMENTS
- ACRONYMS
- FURTHER READING
- QUESTIONS AND CONTACT
**EIP Selection Tool**

**Tool objectives**
Support the selection of industrial parks with a high potential for EIP development and creating successful, visible and replicable EIP projects.

**Results and added value of the tool**
Selecting industrial parks through a structured and comprehensive process is critical to avoid the selection of unviable or less favourable industrial parks for EIP projects.

**Target users of tool**
The main targeted users of the tool are development agencies, service providers and government authorities who work on EIP projects, or are involved in the selection process of industrial parks for EIP interventions.

**Steps in the tool**
- Short-list industrial parks and collect basic information
- Pre-selection of industrial parks
- Prioritization of pre-selected industrial parks
- Review of prioritized parks against International EIP Framework
- Final selection of industrial parks for EIP project

**How to complete the tool**
The EIP Selection Tool is usually completed for the first time by a national service provider and development agency in a very close collaboration and through interactive workshop sessions with government authorities and park management entities.

**Data required for completing tool**
- Listing and understanding of existing and planned industrial parks
- Observations and discussions with management entities during site visits to pre-selected industrial parks
- Insights on the performance of prioritized industrial park against the benchmarks of the international EIP Framework

**Practical example of tool application**
**Industrial park selection in Indonesia**
The EIP Selection Tool was applied successfully to support the selection of industrial parks for UNIDO’s Global Eco-industrial Parks Programme. The country level interventions of this programme focus on tailor-made EIP initiatives in selected countries, including Colombia, Egypt, Indonesia, Peru, South Africa, Ukraine and Viet Nam.
Objective of this step is to compare and prioritize industrial parks against set of criteria for their selection to be part of an EIP project. This figure is based on multi-criteria analysis to compare industrial parks against set of topics such as park management, environmental, social and environmental aspects, and replication.

Number and types of industrial parks to be selected will depend on the scope and available resources as well as national context and priorities of government and donors. The gaps identified through the reviews against the International EIP Framework provide a good basis to scope EIP interventions for a project.
EIP Policy Support Tool

Tool objectives

Provide technical support to policy makers on EIP policy planning and development by guiding the user through the different stages of the policy development process in relation to Eco-Industrial Parks (e.g. from high level visioning to implementation).

Results and added value of the tool

EIP related policies will only succeed when there is a high-level and long-term commitment from key stakeholders, including a crucial role for Governments in creating the appropriate market conditions, policy and regulatory frameworks, technical guidelines etc. Policy interventions must be prioritized and integrated where needed. This tool is built around these success factors and supporting processes.

Target users of tool

Government authorities involved in the policy development and implementation processes related to eco-industrial parks, where needed, supported by service providers and development agencies.

Steps in the tool

1. Analyse stakeholders
2. Develop policy vision/goal
3. Review existing policies
4. Prioritize policy interventions
5. Overview policy instruments
6. EIP policy action planning

How to complete the tool

The tool is organized into different modules representing the multiple stages of policy development. The applicability of different modules will depend on the specific scope of the policy work in the EIP projects. Through the main menu, you can easily navigate to the module(s) of your specific interest.

Data required for completing tool

- Existing and planned policy documents directly or indirectly relevant to eco-industrial parks
- Insights into relevant public and private sector stakeholders
- Understanding of existing and planned industrial parks

Practical example of tool application

The EIP Policy Support was used during the preparatory phase of the Global EIP Programme in Colombia. The tool supported the stakeholder mapping and systematic review of existing government policies and strategies related to the multi-disciplinary topics of the EIP concept (e.g. industrial productivity, green growth, circular economy, sustainable production, solid waste management, water and energy efficiency). The results from the tool application were summarized in a stakeholder mapping and policy analysis report which was used as reference material to scope the implementation phase of the GEIPP in Colombia.
Country level

EIP Policy Support Tool

Policy cycle

Develop Policy Vision
Assist with defining a policy vision/goal for eco-industrial
park development in a country, by using the theory of change.

Review Existing Policies
Create an overview of existing policies and
management structures relevant to EIPs in
the country, and potential for integrating EIP into existing policies/structures.

Step 1: High Level Vision

Step 2: Scoping

Step 3: Prioritisation

Step 4: Policy Domains & Instruments

Step 5: Policy Planning & Impact Assessment

Step 6: Implementation

Implementation steps in chapter c (Policy support) in UNIDO EIP
Implementation Handbook

Analyse Stakeholders
Assess stakeholders on suitability for participating in EIP policy process.

EIP Policy Action Planning
Assist in the scoping of EIP policy
intervention actions as part of
UNIDO projects on economy

Prioritise EIP Policy Instruments
Create an understanding of potential trade-offs between
EIP policy intervention options.

Overview of EIP Policy Instruments
Assist in selecting most suitable policy instruments
for EIP related policies.
Multi-criteria analysis in which the identified criteria, weightings, and their subsequent policy intervention options, prioritization scorings can easily be added.

The tool includes a detailed template for a multi-criteria analysis in which the identified policy intervention options, prioritization criteria, weightings, and their subsequent scorings can easily be added.

EIP POLICY SUPPORT TOOL
Multi-criteria analysis to support prioritization of policy interventions

Criteria can be reformulated and added in the tool as required

<table>
<thead>
<tr>
<th>Type of criteria</th>
<th>Type of criteria</th>
<th>Economic</th>
<th>Type of criteria</th>
<th>Social</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHG emissions</td>
<td>Contribution to GDP</td>
<td>Job creation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weighting: 3</td>
<td>Weighting: 1</td>
<td>Weighting: 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Examples of policy interventions:
- Development of National Action Plan on Eco-Industrial Parks
- Introduction of national minimum requirements for industrial parks
Policy Instruments are the practical means for implementing policy; the tools that create change and achieve policy’s targets/objectives. They include a number of different types including regulatory instruments, economic instruments, information-based and voluntary agreements. Instruments are usually linked to a policy.

This step presents an overview of EIP related policy instruments and assist in selecting most suitable policy instruments for EIP related policies.
EIP monitoring tools

RECP Monitoring Tool

**Tool objectives**

Monitor and report the resource savings and results of RECP assessments undertaken with companies in industrial parks.

**Results and added value of the tool**

Projects on eco-industrial parks (EIPs) and resource efficient and cleaner production (RECP) can only be fully successful if the results achieved are communicated in a standardized and systematic manner.

**Target users of tool**

The tool is designed to be used by any organization which is involved with RECP assessment and monitoring implementation results.

**Steps in the tool**

- Enter results from company RECP assessments in RECP monitoring worksheet
- View summary results at company level
- View summary results at industrial park level

**How to complete the tool**

The tool can be used after completion of the RECP assessments to inform about expected / preliminary results. The tool can also be used several months after the RECP assessments, to report about the implementation and actual results.

**Data required for completing tool**

RECP assessment reports completed for companies, including savings on electricity, fuel, water, materials and waste and financial savings.

**Practical example of tool application**

The RECP Monitoring Tool was applied to monitor and report the results from RECP assessments undertaken with 20 companies in Epping Industria and the East London Industrial Development Zone in South Africa. The RECP assessments were carried out by the National Cleaner Production Centre of South Africa (NCPC-SA) as part of the UNIDO EIP Pilot Project (2017-2018).
RECP MONITORING TOOL

Illustrative extract of RECP monitoring worksheet

<table>
<thead>
<tr>
<th>COMPANY NAME</th>
<th>COMPANY NAME</th>
<th>DATE OF ASSESSMENT</th>
<th>DESCRIPTION OF SAVINGS</th>
<th>IMPLEMENTATION</th>
<th>DATE OF IMPLEMENTATION</th>
<th>SAVINGS</th>
<th>UNIT</th>
<th>ELECTRICITY SAVINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company A</td>
<td>Company A</td>
<td>01/01/2020</td>
<td>Implementation of energy-efficient machinery</td>
<td>Implemented</td>
<td>01/01/2020</td>
<td>0.897</td>
<td>kWh</td>
<td>11.18</td>
</tr>
<tr>
<td>Company B</td>
<td>Company B</td>
<td>01/01/2020</td>
<td>Implementation of water-saving practices</td>
<td>Not implemented</td>
<td>01/01/2020</td>
<td>0.897</td>
<td>kWh</td>
<td>11.18</td>
</tr>
</tbody>
</table>

This table is generated automatically based on the data entered in the RECP monitoring worksheet.

In the RECP Monitoring Tool, similar tables as listed above are available for savings in fuels, water, materials and financials.

Summary of RECP results at industrial park level

<table>
<thead>
<tr>
<th>COMPANY NAME</th>
<th>COMPANY NAME</th>
<th>DATE OF ASSESSMENT</th>
<th>DESCRIPTION OF SAVINGS</th>
<th>IMPLEMENTATION</th>
<th>DATE OF IMPLEMENTATION</th>
<th>SAVINGS</th>
<th>UNIT</th>
<th>ELECTRICITY SAVINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company A</td>
<td>Company A</td>
<td>01/01/2020</td>
<td>Implementation of energy-efficient machinery</td>
<td>Implemented</td>
<td>01/01/2020</td>
<td>0.897</td>
<td>kWh</td>
<td>11.18</td>
</tr>
<tr>
<td>Company B</td>
<td>Company B</td>
<td>01/01/2020</td>
<td>Implementation of water-saving practices</td>
<td>Not implemented</td>
<td>01/01/2020</td>
<td>0.897</td>
<td>kWh</td>
<td>11.18</td>
</tr>
</tbody>
</table>

This table is generated automatically based on the data entered in the RECP monitoring worksheet.
EIP monitoring tools

**Tool objectives**
Monitor and report resource savings and impacts from EIP opportunities identified and implemented in industrial parks with the support of (inter)national development projects.

**Results and added value of the tool**
EIP opportunities can cover a wide range of project interventions to improve the performance of the industrial parks and their tenant companies, including industrial synergies, resource efficiency, park management, and planning/zoning.

**Target users of tool**
The tool is designed to be used by international development agencies and service providers who work on EIP projects.

**Steps in the tool**
1. Enter results in EIP opportunities monitoring worksheet
2. View summary of impacts

**How to complete the tool**
The tool can be used immediately after completion of EIP opportunity assessments for an industrial park to inform about expected / preliminary results. The tool can also be used several months after the assessments, to report about the implementation and actual results.

**Data required for completing tool**
Reporting on EIP opportunities completed for industrial parks and companies, including savings on electricity, fuel, materials, waste, water, improvement of effluent quality, financial savings, and social benefits.

**Practical example of tool application**
This tool was applied to monitor the results from industrial synergy assessments undertaken with industrial parks in South Africa and Colombia. The assessments were carried out by South Africa National Cleaner Production Centre (SA-NCPC) and Colombia’s National Cleaner Production Centre (CNPML) as part of the UNIDO EIP Pilot Project (2017-2018).
Illustrative extract of EIP opportunities monitoring worksheet

<table>
<thead>
<tr>
<th>BASIC INFORMATION</th>
<th>ELECTRICITY SAVINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>EIP opportunity (Short description)</td>
<td>Implementation of EIP opportunity (Yes / Planned / No)</td>
</tr>
<tr>
<td>Example #1: Develop Solar PV panel project in the industrial park</td>
<td>Yes</td>
</tr>
<tr>
<td>Example #2: Repair leaks in the steam network</td>
<td>Planned</td>
</tr>
<tr>
<td>Example #3: Upgrading of centralised wastewater treatment plant (WWTP)</td>
<td>Planned</td>
</tr>
<tr>
<td>Example #4: Establish committee on waste management, environment and resource efficiency</td>
<td>No</td>
</tr>
</tbody>
</table>

In the EIP Opportunity Monitoring Tool, similar tables as listed above are available for savings on fossil fuels, water, materials and financials as well as social benefits.
Wherever you are in this manual, you can always go back to start menu by clicking here.
**DEFINITION**

EIPs can be defined as managed industrial areas that promote zero-industry and community collaboration for common benefits related to economic, social and environmental performance.

The EIP concept has evolved to address additional, interrelated aspects, including, for example: resource efficient and cleaner production, industrial symbiosis, circular economy, climate change, pollution, social standards, shared infrastructures, improved management of risks and shared resources, including land and ecosystem services. An interdisciplinary approach is required to optimally realise the EIP concept.

Compliance with national and local regulations is the baseline for all industrial parks, whatever the geographical location and specific characteristics of the park.

**INTERNATIONAL FRAMEWORK**

UNIDO, World Bank Group and GIZ have collaborated to develop an International Framework which provides guidance on what constitutes an eco-industrial park (EIP) and how an industrial park can work towards becoming an EIP.

The framework is based on “performance” and “performance indicators” in five key categories: Park management, Environmental performance, Social performance, and Economic performance. The framework highlights the basic requirements for EIPs, and the performance indicators describe expected performance levels that an EIP must meet.

The International EIP Framework is not a certification or audit scheme. The framework is a practical means to (i) understand the current status and intentions of an industrial park with regards to their EIP transformation and (ii) identify a set of practical priority opportunities for the park.

In short, eco-industrial parks are about creating more resource-efficient and cost-effective industrial parks which are more competitive, attractive for investment and risk resilient.
ABOUT THE GLOBAL ECO-INDUSTRIAL PARKS PROGRAMME

Objective

The objective of the Global Eco-Industrial Parks Programme (GEIPP) is to demonstrate the viability and benefits of greening industrial parks by improving resource productivity and economic, environmental and social performances of businesses and thereby contributing to inclusive and sustainable industrial development in the participating developing and transition economies.

GEIPP components

Component 1 (Country level interventions) implements tailor-made initiatives in seven countries: Colombia, Egypt, Indonesia, Peru, South Africa, Ukraine and Viet Nam, focusing on the incentivization of EIPs in policies/ regulations and the identification and implementation of EIP opportunities in selected industrial parks.

Component 2 (Global Knowledge Development) focusing on the development of specific EIP tools, providing methodological guidance and dissemination of good practices between GEIPP countries and lessons learnt from international experiences.

UNIDO EIP Knowledge Hub

For more information about UNIDO’s work on EIPs, including publications, a self-paced EIP online course and EIP tools in Mandarin, Spanish, Ukrainian and Arabic, visit the UNIDO EIP Knowledge Hub.

Funding

Component 1 (Country level interventions) implements tailor-made initiatives in seven countries: Colombia, Egypt, Indonesia, Peru, South Africa, Ukraine and Viet Nam, focusing on the incentivization of EIPs in policies/ regulations and the identification and implementation of EIP opportunities in selected industrial parks.

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ACKNOWLEDGEMENT

The Global Eco-Industrial Parks Programme (GEIPP) (2019-2023) is made possible by funding provided by the Swiss Government through the State Secretariat for Economic Affairs of Switzerland (SECO).

Dick van Beers, Klaus Tyrkko, Beatrice Verez (UNIDO).

DISCLAIMER

The designations employed and the presentation of material in this document do not imply the expression of any opinion whatsoever on the part of UNIDO and their governing bodies concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The views expressed in this document are those of the authors and do not necessarily reflect the views of UNIDO and its governing bodies.

DESIGNER

Dico Creative Agency e.U.

VERSION OF THIS MANUAL

April 2023
ACRONYMS

- A2F: Access to Finance
- EIP: Eco-Industrial Park
- GEIPP: Global Eco-Industrial Parks Programme
- GIZ: Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (German Development Cooperation)
- IP: Industrial Park
- OH&S: Occupational Health and Safety
- RECP: Resource Efficient and Cleaner Production
- SDG: Sustainable Development Goal
- SECO: State Secretariat for Economic Affairs of Switzerland
- SME: Small and Medium Enterprise
- UNIDO: United Nations Industrial Development Organization
- WBG: World Bank Group
Further Reading

Why?

Why is it important to work on Eco-Industrial Parks?

Eco-Industrial Parks: Creating Shared Prosperity and Safeguarding the Environment

(UNIDO, 2016).

Where?

Where do we stand regarding International EIP practices?

Global Assessment of Eco-Industrial Parks in Developing and Emerging Countries

(UNIDO, 2016).

What?

What do we mean with Eco-Industrial Parks?

An International Framework for Eco-Industrial Parks


How?

How do we implement Eco-Industrial Parks?


How to operationalize the International EIP Framework?

Practitioner's Handbook for Eco-Industrial Parks – Implementing the International Framework
(UNIDO, WBG, GIZ, MTV, 2016).
https://bit.ly/PractitionersHandbookforEIP

How to do detailed planning of Eco-Industrial Parks?

Planning for Sustainable Industrial Parks (GIZ, 2015).

How to mainstream Eco-Industrial Parks?

Mainstreaming Eco-Industrial Parks (WBG, KICs, 2016).
UNIDO has developed a self-paced e-learning course on eco-industrial parks. It is aimed at public sector officials working on industrial policy and planning, industrial park managers, firms, innovation centers, academia etc. Participants learn about the key resources and tools available to support the identification, development, and implementation of EIP approaches in industrial parks.

Access to enrolment in the course is available here:


For questions and technical advice on the implementation of EIPs, please feel to get in touch with us at EIP@unido.org or join the GEIPP LinkedIn Group here:

www.linkedin.com/groups/12397112/